HIGHLIGHTS

REVISION NO. 33 Jun 01/10

Pages which have been revised are outlined below, together with the Highlights of the Revision

CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
CHAPTER 27		
L.E.P. 1-19	Revised to Reflect this revision indicating new,revised, and/or deleted pages	
T. OF C. 1- 2, 5- 10, 15- 30	Revised to reflect this revision	
27-10-00 302- 305	Mod.0001X0057 incorporated **TECHNICAL PUBLICATION-BASIC MODIFICATION.**	
27-10-00 401, 403- 404, 407- 413	Layout Improved or Effectivity Updated	
27-10-00 501- 504, 506, 514- 515, 517- 518	Minor additions and amplification **MODIFIED TEXT.**	
27-10-00 607- 613	Minor additions and amplification **DELETED TEXT.** Reprinted	
27-12-00 601	Minor additions and amplification **ADDED TEXT.**	
27-12-16 401, 403	Minor additions and amplification **ADDED TEXT.**	
27-14-00 601- 602	Topic cancelled	
27-20-00 601, 603, 607	Minor additions and amplification **DELETED TEXT.** Reprinted	

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CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
27-21-21 401- 403, 408- 409, 423- 433	Effectivity updated at the bottom of the page Minor additions and amplification CHANGED THE P/N 98A55407525001 WITH P/N 98A55308440000 AND P/N 98A55308741000 ADDED NOTE FOR P/N 98A55308440000 AND P/N 98A55308741000	
27-22-00 501- 502	Minor additions and amplification DELETED MPD TASK REFERENCES.	
27-23-00 506	Minor additions and amplification DELETED CLOSE-UP.	
27-24-00 601- 602	New Topic/New Configuration Mod.0001X0567 incorporated TECHNICAL PUBLICATION-BASIC MODIFICATION.	
27-30-00 601, 603- 604	Reprinted	
27-33-14 403, 412- 413	Minor additions and amplification DEPRESSURIZE HYDRAULICS SYSTEM MOVED AFTER THE RIGGING PINS INSTALLATION	
27-40-00 601- 604	Minor additions and amplification CHANGED TITLE. Reprinted	
27-41-51 401- 403, 405	Layout Improved or Effectivity Updated	
27-44-14 506- 507	Minor additions and amplification ADDED STEPS FOR ROTATION OF THE DISC COUNTERCLOCKWISE	
27-50-15 404, 411- 412	Minor additions and amplification CHANGED THE TOOL P/N 98A27508044000 WITH P/N 98A27508494000	
27-50-16 601, 605- 606	Minor additions and amplification TOOL PARTNUMBER AMENDED.	
27-50-17 401, 405	Minor additions and amplification CHANGED THE TOOL P/N 98A27508044000 WITH P/N 98A27508494000	

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CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
27-51-00 501- 508	Layout Improved or Effectivity Updated	
27-54-23 401, 404	Minor additions and amplification MODIFIED VALUE OF TORQUE WRENCH FROM 60-65 NM (531-620 LB/IN) TO 60-65 NM (531-575 LB/IN)	
27-56-00 508, 510	Minor additions and amplification ADDED STANDARD TORQUE MULTIPLIER	
27-60-00 601- 602	New Topic/New Configuration Mod.0001X0567 incorporated TECHNICAL PUBLICATION-BASIC MODIFICATION.	
27-61-00 8	Minor additions and amplification DELETED CROSS-REFERENCE.	
27-61-00 530	Minor additions and amplification MODIFIED TEXT. Reprinted	
27-64-00 501- 504	Minor additions and amplification ADDED ALTERNATIVE TOOL P/N : G5M5M0-127-0000.	
27-81-00 502- 503	Minor additions and amplification ADDED TEXT 'AND RELEASE'	
27-84-00 1- 4, 6, 8, 11, 15, 19, 25	Minor additions and amplification REPLACED PANEL 613RL WITH 613RR	
27-86-00 504, 506	Minor additions and amplification ADDED STANDARD TORQUE MULTIPLIER	

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CHAPTER 27

FLIGHT CONTROLS

LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively
Remove and insert the affected pages and complete the Record of Revisions and the Record of Temporary Revisions as necessary

CH/SE/SU	C	PAGE	DATE
RECORD			
OF TEMP.			
REVISION			
L.E.P.	R	1-19	Jun01/10
T. of C.	R	1	Jun01/10
T. of C.	R	2	Jun01/10
T. of C.		3	Jun01/08
T. of C.		4	Jun01/08
T. of C.	R	5	Jun01/10
T. of C.	R	6	Jun01/10
T. of C.	R	7	Jun01/10
T. of C.	R	8	Jun01/10
T. of C.	R	9	Jun01/10
T. of C.	R	10	Jun01/10
T. of C.		11	Jun01/09
T. of C.		12	Jun01/09
T. of C.		13	Jun01/09
T. of C.		14	Jun01/09
T. of C.	R	15	Jun01/10
T. of C.	R	16	Jun01/10
T. of C.	R	17	Jun01/10
T. of C.	R	18	Jun01/10
T. of C.	R	19	Jun01/10
T. of C.	R	20	Jun01/10
T. of C.	R	21	Jun01/10
T. of C.	R	22	Jun01/10
T. of C.	R	23	Jun01/10
T. of C.	R	24	Jun01/10
T. of C.	R	25	Jun01/10
T. of C.	R	26	Jun01/10
T. of C.	R	27	Jun01/10
T. of C.	R	28	Jun01/10
T. of C.	R	29	Jun01/10
T. of C.	R	30	Jun01/10
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27-00-00		5	Dec01/90
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27-10-00	R	412	Jun01/10
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27-10-00	R	506	Jun01/10
27-10-00		507	Mar01/03

CH/SE/SU	C	PAGE	DATE
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27-11-71		403	Jun01/08

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27-14-24		404	Dec01/90
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27-14-24		903	Jun01/04
27-14-24		904	Jun01/04
27-14-24		905	Dec01/90

CH/SE/SU	C	PAGE	DATE
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FLIGHT CONTROLS

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Removal/Installation			401	ALL
VARIABLE STOP UNIT	27-23-22			

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Removal/Installation			401	ALL
VARIABLE STOP ACTUATOR 300CY	27-23-23			
Removal/Installation			401	ALL
VARIABLE STOP	27-23-24			
TRANSDUCER UNIT 301CY				
Removal/Installation			401	ALL
FEEL AND LIMITATION COMPUTER (FLC)	27-23-26			
302CY1 302CY2				
Removal/Installation			401	ALL
HYDRAULIC ACTUATION (RUDDER)	27-24-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Component Description			3	ALL
Rudder Servo Control			3	ALL
Adjustment/Test			501	ALL
Operational/Functional Test			501	ALL
Inspection/Check			601	ALL
Check of Cable Tension on Rudder Linkage			601	ALL
RUDDER SERVO CONTROL 22CB, 27CB, 32CB	27-24-11			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
RUDDER SERVO CONTROL JAMMING DETECTION MICROSWITCHES	27-24-12			
Removal/Installation			401	ALL
Deactivation/Reactivation			901	ALL
Ref.: MMEL Sect. 1-27, Item 3			901	ALL
SERVO CONTROL SAFETY VALVE 271645	27-24-14			
Removal/Installation			401	ALL
SERVO CONTROL NON-RETURN (CHECK) VALVE 271164	27-24-15			
Removal/Installation			401	ALL
CONTROL SURFACE POSITION INDICATING (RUDDER)	27-25-00			
Description and Operation			1	ALL
General			1	ALL
Adjustment/Test			501	ALL
Adjustment with Zeroing Equipment			501	ALL
Adjustment of Rudder Position Transmitter 10CT With Zeroing Equipment			502	ALL
Adjustment of Rudder Position Transmitter 10CT Without Zeroing Equipment			503	ALL
Functional/Operational Test			505	ALL
RUDDER POSITION TRANSMITTER 10CT	27-25-11			
Removal/Installation			401	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
ELEVATOR	27-30-00			
Description and Operation			1	ALL
General			1	ALL
General			1	ALL
Interface with Autopilot System			1	ALL
Interface with the ECAM System (Ref. Chap 31)			1	ALL
Removal/Installation			401	ALL
Cables			401	ALL
Adjustment/Test			501	ALL
Adjustment of Pitch Control Linkage Cable Tension			501	ALL
Shortening of the Elevator Cable Length			506	ALL
Cutting of a New Aft Control Elevator Cable			513	ALL
Inspection/Check			601	ALL
MECHANICAL CONTROL AND PITCH UNCOUPLING	27-31-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Elevator Mechanical Control			5	ALL
General			5	ALL
Elevator Mechanical Control			6	101-104,
General			6	101-104,
Component Description			6	ALL
Leading Particulars			9	ALL
Pitch Uncoupling			13	ALL
General			13	ALL
Component Description			13	ALL
Maintenance			15	ALL
Leading Particulars			15	ALL
Rigging			301	ALL
Adjustment/Test			501	ALL
Adjustment of Elevator Mechanical Control			501	ALL
Adjustment of Elevator Mechanical Control			502	101-104,
Adjustment of Cable Tension			506	ALL
Adjustment of Front Section Mechanical Control			506	ALL
Adjustment of Rear Section Mechanical Control			508	ALL
Adjustment of Autopilot			510	ALL
Adjustment of Servo Controls with the Reference Triangle			515	ALL
Adjust Position Transmitter at RIB 14 (Ref. 27-35-00, P. Block 501)			515	ALL
Adjustment of Deflections and Functional Test			515	ALL

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Operational Test			518	ALL
Functional Test			520	ALL
Functional Test			521	ALL
Functional Test of Pitch Control Uncoupling and Coupling			522	ALL
System Test			525	ALL
Inspection/Check			601	ALL
CONTROL COLUMN	27-31-11			
Removal/Installation			401	ALL
Procedure			401	ALL
CABLE TENSION REGULATOR 274510 (274509)	27-31-16			
Removal/Installation			401	ALL
VERTICAL TORQUE TUBE, WITH UNIVERSAL JOINT	27-31-21			
Removal/Installation			401	ALL
THS BELLCRANKS	27-31-22			
Removal/Installation			401	ALL
SERVO CONTROL ACTUATING SPRING ROD	27-31-23			
Removal/Installation			401	ALL
ELEVATOR	27-31-24			
Removal/Installation			401	ALL
DYNAMOMETRIC ROD	27-31-25			
Removal/Installation			401	ALL
ARTIFICIAL FEEL UNIT FRAME	27-31-26			
Removal/Installation			401	ALL
SPRING ROD	27-31-27			
Removal/Installation			401	ALL
FORWARD DETENT BELLCRANK	27-31-31			
Removal/Installation			401	ALL
AFT DETENT BELLCRANK	27-31-32			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
PITCH UNCOUPLING UNIT	27-31-33			
Removal/Installation			401	ALL
PITCH UNCOUPLING SOLENOID 4CF	27-31-35			
Removal/Installation			401	ALL
ARTIFICIAL FEEL (ELEVATOR)	27-33-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
System Description			3	ALL
Mechanical Installation			5	ALL
Pitch Artificial Feel Unit - Description			5	ALL
Pitch Artificial Feel Unit - Operation			5	ALL
Pitch Artificial Feel Actuator - Description			5	ALL
Pitch Artificial Feel Actuator - Leading Particulars			9	ALL
Electrical Installation			9	ALL

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Feel and Limitation Computer (FLC)			9	ALL
Pitch Feel Control Panel			9	ALL
Pitch Feel & Rud Travel Maintenance Panel			9	ALL
Electrical Power Supply			9	ALL
Trimmable Horizontal Stabilizer (THS) Position Sensor			9	ALL
Operation			10	ALL
Actuator Control			10	ALL
Engagement - Warnings			17	ALL
Pitch Disagree Warning			17	ALL
Test			17	ALL
Leading Particulars			17	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
Annunciator Light Test			501	ALL
System Disengagement Test			501	ALL
Operational Check of Monitoring circuits (SYS 1 and SYS 2)			501	ALL
Test of Warnings in the event of ADC Failure			501	ALL
Test of Pitch Feel Disagree Warning			501	ALL
Functional Test			511	ALL
Functional Test			511	ALL
Functional Test (Anti High - Incidence Function)			513	ALL
Functional test			513	ALL
Functional Test of Elevator Artificial Feel Operating Loads			515	ALL
System Test			517	ALL
System Test (Anti High - Incidence Function)			520	ALL
Deactivation/Reactivation			901	ALL
Ref. MMEL Sect. 1-27, Item 12			901	ALL
ARTIFICIAL FEEL UNIT 274511	27-33-11			
Removal/Installation			401	ALL
PITCH ARTIFICIAL FEEL ACTUATOR 3CY1, 3CY2	27-33-14			
Removal/Installation			401	ALL
Removal of Servo Valve			406	ALL
Removal of Solenoid			406	ALL
Removal of Bonding Straps			406	ALL
Removal of Manifolds			406	ALL
Removal of Filter and Bobbin			406	ALL
Removal of Pitch Artificial Feel Actuator			406	ALL
Installation of Filter and Bobbin			408	ALL
Installation of Manifolds			411	ALL
Installation of Bonding Straps			411	ALL
Installation of Solenoid			411	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Installation of Servo Valve			411	ALL
Installation of Pitch Artificial Feel Actuator			411	ALL
ARTIFICIAL FEEL UNIT	27-33-15			
POSITION DETECTION MICROSWITCH 304CY				
Removal/Installation			401	ALL
HYDRAULIC ACTUATION (ELEVATOR)	27-34-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Component Description			3	ALL
Elevator Servo Control			3	ALL
Adjustment/Test			501	ALL
Operational/Functional Test			501	ALL
ELEVATOR SERVO CONTROL	27-34-11			
23CB, 24CB, 28CB, 29CB, 33CB, 34CB				
Removal/Installation			401	ALL
Inspection/Check			601	ALL
(Before Air Equipement SB31043-27-03)			601	ALL
SERVO CONTROL JAMMING DETECTION MICROSWITCHES	27-34-12			
Removal/Installation			401	ALL
Deactivation/Reactivation			901	ALL
Ref.: MMEL Sect. 1-27, Item 3			901	ALL
CONTROL SURFACE POSITION INDICATING (ELEVATOR)	27-35-00			
Description and Operation			1	ALL
General			1	ALL
Adjustment/Test			501	ALL
Adjustment of Elevator Position			501	ALL
Transmitter with Zeroing Equipment				
Adjustment of Position Transmitter 12CT With Zeroing Equipment			502	ALL
Adjustment of Elevator Transmitter 12CT Without Zeroing Equipment			503	ALL
Functional/Operational Test			505	ALL
Procedure			505	ALL
Test			506	ALL
Close-up			506	ALL
ELEVATOR POSITION TRANSMITTER 12CT	27-35-11			
Removal/Installation			401	ALL
STALL WARNING	27-36-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Interface With Flight Controls			4	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Adjustment/Test			501	ALL
Operational Test			501	ALL
Stickshaker	27-36-12			
Removal/Installation			401	ALL
TRIMMABLE HORIZONTAL STABILIZER	27-40-00			
Description and Operation			1	ALL
General			1	ALL
Interface With Automatic Pitch Trim System			1	ALL
Removal/Installation			401	ALL
Trim Control Cables (THS)			401	ALL
Installation of Forward Cable Run			403	ALL
Removal of Intermediate Cable Runs			403	ALL
Installation of Intermediate Cable Run			407	ALL
Removal of Aft Cable Run			407	ALL
Installation of Aft Cable Run			407	ALL
Adjustment/Test			501	ALL
Adjustment of Cable Tension on Pitch Trim Control Linkage			501	ALL
Shortening of the THS Cable Length			505	ALL
Cutting of a New Aft Control THS Cable			511	ALL
Inspection/Check			601	ALL
Check of Cable Tension on Pitch Trim Control Linkage			601	ALL
Check of Control Cables			602	ALL
MECHANICAL CONTROL (THS)	27-41-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Component Description			3	ALL
Cable Tension Regulator			3	ALL
Stops and Rigging Facilities			3	ALL
Leading Particulars			7	ALL
Servicing			301	ALL
THS Actuator Manual Actuation			301	ALL
Adjustment/Test			501	ALL
Adjustment of Pitch Trim Mechanical Control			501	ALL
Checking of Trim Mechanical Control			502	ALL
Checking of Cable Control			505	ALL
Operational Test, TO CONFIG warning			508	ALL
Functional Test of THS Actuator Overfull Travel Range by Reference to Mechanical Indicator			509	ALL
THS Functional Test			511	ALL
System Test			513	ALL
Deflection Measurement			514	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Operating Load Measurement			514	ALL
Pitch Trim Control Mechanism	27-41-11			
Removal/Installation			401	ALL
CABLE TENSION REGULATOR 274954	27-41-12			
Removal/Installation			401	ALL
PITCH TRIM CONTROL DRIVE SHAFT	27-41-14			
Removal/Installation			401	ALL
Pitch Trim Control Stop and Gearset Unit	27-41-15			
Removal/Installation			401	ALL
THS POSITION TRANSMITTER (41WW)	27-41-51			
Removal/Installation			401	ALL
HYDRAULIC ACTUATION (THS)	27-44-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Component Description			3	ALL
THS Actuator			3	ALL
Adjustment/Test			501	ALL
Operational/Functional Test			501	ALL
TRIMMABLE HORIZONTAL STABILIZER (THS) ACTUATOR 35CB	27-44-11			
Removal/Installation			401	ALL
Replacement of Oil Filler Plug			404	ALL
Replacement of Bayonet Plugs			404	ALL
Replacement of Oil Draining Plugs			408	ALL
Inspection/Check			601	ALL
THS ACTUATOR HYDRAULIC MOTOR 293174, 291174	27-44-13			
Removal/Installation			401	ALL
Removal of THS Actuator Hydraulic Motors			402	ALL
Removal of Pressure-off Brakes			402	ALL
Installation of Pressure-off Brakes			404	ALL
Installation of THS Actuator Hydraulic Motors			404	ALL
THS ACTUATOR JAMMING DETECTION MICROSWITCHES	27-44-14			
Removal/Installation			401	ALL
Adjustment/Test			501	ALL
THS ACTUATOR VALVE BLOCKS	27-44-15			
Removal/Installation			401	ALL
PRIORITY VALVE 273179	27-44-16			
Removal/Installation			401	ALL
THS ACTUATOR SPHERICAL BEARINGS	27-44-17			
Removal/Installation			401	ALL
THS ACTUATOR LOWER CLAW STOP	27-44-18			
Removal/Installation			401	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
CONTROL SURFACE POSITION INDICATING (THS)	27-45-00			
Description and Operation			1	ALL
General			1	ALL
Adjustment/Test			501	ALL
Adjustment of Position Sensor with Zeroing Equipment			501	ALL
Adjustment of THS Position Sensor 11CT			502	ALL
Mechanical Adjustment of THS Position Sensor 11CT			502	ALL
Adjustment of Position Sensor without Zeroing Equipment			504	ALL
Adjustment of THS Position Sensor 11CT			505	ALL
Mechanical Adjustment of THS Position Sensor 11CT			505	ALL
Operational/Functional Test			506	ALL
Test			506	ALL
TRIMMABLE HORIZONTAL STABILIZER POSITION SENSOR 11CT	27-45-11			
Removal/Installation			401	ALL
Installation with Zeroing Equipment			404	ALL
Installation without Zeroing Equipment			405	ALL
TRIM ROTATION WARNING	27-46-00			
Description and Operation			1	ALL
General			1	ALL
PITCH TRIM ROTATION DETECTOR (1CD)	27-46-15			
Removal/Installation			401	ALL
AURAL WARNING BOX (2CD)	27-46-21			
Removal/Installation			401	ALL
FLAPS	27-50-00			
Description and Operation			1	ALL
General			1	ALL
Description			1	ALL
Operation			3	ALL
Servicing			301	ALL
Extension and Rectraction of Flaps with Aircraft System			301	ALL
Flap/Slat Retraction with Wing Tip Brake Test Tool			302	ALL
Manual Operation of Flap Transmission System			304	ALL
Adjustment/Test			501	ALL
Adjustment of Inboard and Outboard Flaps			501	ALL
Adjustment of Flap Drive System			503	ALL
Adjustment of Clean Wing Configuration			509	ALL
INBOARD FLAP	27-50-11			

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Removal/Installation			401	ALL
Inspection/Check			601	ALL
Fit and Clearances			601	ALL
OUTBOARD FLAP	27-50-12			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
Fit and Clearances			601	ALL
FLAP VANE	27-50-15			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
VANE OPERATING MECHANISM	27-50-16			
Removal/Installation			401	ALL
Spring Rod			401	ALL
Sarma Rod			401	ALL
Lever			401	ALL
Inspection/Check			601	ALL
Approved Repairs			801	ALL
SPRING UNIT	27-50-17			
Removal/Installation			401	ALL
FLAP TRACK FAIRINGS	27-50-21			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
Flap Track Movable Fairings - Special Inspection of Internal and External Surfaces			604	ALL
Pencil Hardness Test			604	ALL
Corrosion Pressure Test			607	ALL
Cleaning			701	ALL
Deactivation/Reactivation			901	ALL
Ref.: CDL Sect. 6.01.01 Chap. 27 Item 1			901	ALL
FAIRINGS OPERATING ROD	27-50-22			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
FAIRING SIDE LOAD STAY	27-50-23			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
FAIRING LINK ASSY	27-50-24			
Removal/Installation			401	ALL
MECHANICAL AND ELECTRICAL CONTROL (FLAPS)	27-51-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Description			5	ALL
Component Description			5	ALL
Operation			13	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
Flap/Slat Wing Tip Brake Solenoid Test Flap/Slat Bite Test			501	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
T.O CONFIG Warning Test (Refer to 27-00-00, P. Block 501)			508	ALL
Deactivation/Reactivation			901	ALL
Ref. MMEL Sect. 1-27, Item 18			901	ALL
FLAP AND SLAT CONTROL LEVER	27-51-11			
Removal/Installation			401	ALL
COMMAND SENSOR UNIT 51CV	27-51-17			
Removal/Installation			401	ALL
SLAT/FLAP CONTROL COMPUTER 21CV (22CV)	27-51-18			
Removal/Installation			401	ALL
FEEDBACK POSITION PICK-OFF UNIT (27CV)	27-51-19			
Removal/Installation			401	ALL
HYDRAULIC ACTUATION AND POWER TRANSMISSION (FLAPS)	27-54-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Description			7	ALL
Component Description			7	ALL
Operation			31	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
System Test			504	ALL
Flap System 1 Operating Time and Measurement of Flap Deflection Angles			506	ALL
Flap System 2 Operating Time			507	ALL
Flap Systems 1 and 2 Operating Time and Measurement of Flap Deflection Angles			508	ALL
Flap GREEN Low Hydraulic Pressure Function			509	ALL
Flap YELLOW Low Hydraulic Pressure Function			510	ALL
Inspection/Check			601	ALL
General Condition Inspection and Load Path Integrity Check of Flap Screwjacks 1,2,3 and 4			601	ALL
Inspection of Complete Units and Attachments			602	ALL
Check of Primary and Secondary Loadpath Integrity			602	ALL
Ballnut/Spindle Backlash Check of Flap Screwjacks 1,2,3 and 4			607	ALL
Flap Track Beams/Carriage Rollers 1 thru 5 - Clearance and Wear Check			613	ALL
Visual Inspection of Flap Link Bearings and Trunnion Bushes			616	ALL
Inspection of Universal Joints			618	001-005,105-105,

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Inspection of Steady Bearings			622	ALL
Inspection of Flap Transmission System after Vibration			627	ALL
Screw/Jackhead Backlash Check of Flap Screwjacks 2,3 and 4			628	ALL
FLAPS POWER CONTROL UNIT (5469)	27-54-11			
Removal/Installation			401	ALL
TORQUE LIMITER 5471 (5514)	27-54-12			
Removal/Installation			401	ALL
RIGHT ANGLE GEARBOX 5473 (5516) - 5476 (5519)	27-54-13			
Removal/Installation			401	ALL
PLUNGING JOINT 5474 (5517), 5478 (5521)	27-54-14			
Removal/Installation			401	ALL
SLIDING BEARING 5480, 5482 (5523, 5525)	27-54-15			
Removal/Installation			401	ALL
SHORT STEADY BEARING (5486, 5529)	27-54-16			
Removal/Installation			401	ALL
STEADY BEARINGS	27-54-17			
Removal/Installation			401	ALL
KINK STEADY BEARING (5490, 5533)	27-54-18			
Removal/Installation			401	ALL
TRANSMISSION SHAFTS	27-54-19			
Maintenance Practices			201	ALL
Resetting of an Activated Flap Screwjack Torque Limiter			201	ALL
Disconnection/Connection of a Jammed Flap Transmission System			201	ALL
Disconnection/Connection of Individual Flap Transmission System Components			201	ALL
Removal/Installation			401	ALL
Inspection/Check			601	ALL
General Check			601	ALL
Flap Half System Operation Torque Check			603	ALL
Inspection of Splined Coupling, Sliding Bearing and Plunging Joint			604	ALL
Inspection of Flap Transmission Shaft Assemblies for Cracks			612	ALL
Overhaul of Flap Transmission Shaft Assembly Universal Joints with Rose Bushes			613	001-104,106-200,
SCREWJACK 1	27-54-21			
Removal/Installation			401	ALL
Screwjack 1 Complete			401	ALL
Screwjack Spindle/Ballnut			401	ALL
SCREWJACK 2	27-54-22			
Removal/Installation			401	ALL
Screwjack 2 Complete			401	ALL
Screwjack Spindle/Ballnut			401	ALL

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
SCREWJACK 3	27-54-23			
Removal/Installation			401	ALL
Screwjack 3 Complete			401	ALL
Screwjack Spindle/Ballnut			401	ALL
SCREWJACK 4	27-54-24			
Removal/Installation			401	ALL
Screwjack 4 Complete			401	ALL
Screwjack Spindle/Ballnut			401	ALL
CARRIAGE 1	27-54-25			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
CARRIAGE 2	27-54-26			
Removal/Installation			401	ALL
Carriage Complete			401	ALL
Carriage Rollers			401	ALL
Inspection/Check			601	ALL
CARRIAGE 3	27-54-27			
Removal/Installation			401	ALL
Carriage Complete			401	ALL
Carriage Rollers			401	ALL
Inspection/Check			601	ALL
CARRIAGE 4	27-54-28			
Removal/Installation			401	ALL
Carriage Complete			401	ALL
Carriage Rollers			401	ALL
Inspection/Check			601	ALL
CARRIAGE 5	27-54-29			
Removal/Installation			401	ALL
Carriage Complete			401	ALL
Carriage Rollers			401	ALL
Inspection/Check			601	ALL
FLAP PCU INTERMEDIATE GEARBOX	27-54-31			
Removal/Installation			401	ALL
FLAP PCU PRESSURE-OFF BRAKE	27-54-32			
Removal/Installation			401	ALL
FLAP PCU VALVE BLOCK	27-54-33			
Removal/Installation			401	ALL
Filter			401	ALL
Pressure Switches			401	ALL
Solenoid Valves			401	ALL
FLAP PCU HYDRAULIC MOTOR	27-54-34			
Removal/Installation			401	ALL
FLAP SCREWJACK 1 SUPPORT SPRING	27-54-36			
Removal/Installation			401	ALL
FLAP TRUNNION, SCREWJACKS 1 THRU 4	27-54-37			
Removal/Installation			401	ALL
POSITION INDICATING (FLAPS)	27-55-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Description			1	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Component Description			3	ALL
Operation			6	ALL
Power Supplies			6	ALL
SLAT/FLAP INDICATOR (5CN)	27-55-11			
Removal/Installation			401	ALL
INSTRUMENTATION POSITION PICK-OFF UNIT (3CN)	27-55-12			
Removal/Installation			401	ALL
ASYMMETRY AND POWER TRANSMISSION MONITORING (FLAPS)	27-56-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Description			3	ALL
Component Description			3	ALL
Operation			6	ALL
Adjustment/Test			501	ALL
Zeroing of Flap System PPU's			501	ALL
Test of Wing Tip Brake Static Torque and Test of the Integrity of the Flap Transmission System			501	ALL
ASYMMETRY POSITION PICK-OFF UNIT	27-56-11			
Removal/Installation			401	ALL
ASYMMETRY POSITION PICK-OFF UNIT ADAPTER	27-56-12			
Removal/Installation			401	ALL
WING TIP BRAKE (33CV, 34CV)	27-56-13			
Removal/Installation			401	ALL
Solenoid Valve			402	ALL
Wing Tip Brake Assy			402	ALL
Adjustment/Test			501	ALL
Operational Test of Flap and Slat Wing Tip Brakes, System Torque Limiters and Pressure-Off Brakes with WTB Test Tool			503	ALL
Operational Test of Flap Wing Tip Brakes and System Torque Limiters with SFCCs			504	ALL
Inspection/Check			601	ALL
WING TIP BRAKE ADAPTER	27-56-14			
Removal/Installation			401	ALL
VANE JAM DETECTOR UNIT (37CV-A,38CV-A, 39CV-A,40CV-A,41CV-A,42CV-A)	27-56-15			
Removal/Installation			401	ALL
Adjustment/Test			501	ALL
Inspection/Check			601	ALL
SPOILERS AND SPEED BRAKES	27-60-00			
Description and Operation			1	ALL
General			1	ALL
Servicing			301	ALL
Inspection/Check			601	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
ELECTRICAL AND MECHANICAL CONTROL (SPOILERS AND SPEEDBRAKES)	27-61-00			
Description and Operation			1	ALL
General			1	ALL
Spoiler Functions			1	ALL
Control Input			1	ALL
Electrical Flight Control Units (EFCU)			5	ALL
Control Panel			7	ALL
Spoiler Wire Routing			7	ALL
Component Location			8	ALL
Electrical Power Supply			12	ALL
Distribution				
Normal Operation			12	ALL
Land Recovery Procedure			12	ALL
Spoiler Operation			16	ALL
Servo Controls - Control and Monitoring			16	ALL
Speed Brake Commands			22	ALL
Roll Spoiler Commands			24	ALL
Ground Spoiler Commands			31	ALL
Spoiler Extension Commands			39	ALL
Component Description			50	ALL
Roll Control Transducer Unit			50	ALL
SPEED BRAKE Control Lever			52	ALL
Speed Brake Control Transducer Unit			55	ALL
EFCU			57	ALL
Maintenance and Periodic Test			85	ALL
Failure Indication			85	ALL
Failure Identification			85	ALL
Periodic Test			89	ALL
Adjustment/Test			501	ALL
Adjustment			501	ALL
Adjustment of Linkage Between SPEED BRAKE Control Lever and Speed Brake Control Transducer Unit			504	ALL
Adjustment of Spoilers 1 and 2 by Manual Retraction/Extension			506	ALL
Adjustment of Spoilers 1 and 2 with Spoiler Valve Group Control Box			510	ALL
Adjustment of Spoilers 3 to 7 to zero by Manual Retraction/ Extension			512	ALL
Adjustment of Spoilers 3 to 7 to zero with spoiler valve group control box			516	ALL
Operational Test			518	ALL
Indicating System Test			518	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Spoiler and Speed Brake Electrical Power Supply Test			518	ALL
Operational Test of Spoilers and Speedbrakes Servo-Control Disengagement			518	ALL
Ground Spoiler Operational Test			518	ALL
TO CONFIG Warning Test			518	ALL
Functional Test			530	ALL
Speed Brake Functional Test			531	ALL
Ground Spoiler Test			532	ALL
System Test			533	ALL
Measuring speed brake travel			535	ALL
Measuring ground spoiler travel			536	ALL
Measuring Roll Spoilers 3 to 7 Travel			537	ALL
Inspection/Check			601	ALL
Deactivation/Reactivation			901	ALL
Ref. : MMEL Sect. 1-27, Item 15 (Ground Spoiler Control System)			901	ALL
Deactivation			901	ALL
Reactivation			902	ALL
SPEED BRAKE CONTROL LEVER	27-61-11			
Removal/installation			401	ALL
TRANSDUCER UNIT 3CP (74CP)	27-61-33			
Removal/Installation			401	ALL
Equipment and Materials			401	ALL
Procedure			401	ALL
ELECTRICAL FLIGHT CONTROL UNIT (EFCU) 1CP-(2CP)	27-61-34			
Removal/Installation			401	ALL
PRESELECTION OR THRUST REVERSER OPERATED MICROSWITCH 4CS/41CS	27-61-43			
Removal/Installation			401	ALL
SPEED BRAKE CONTROL TRANSDUCER UNIT - 7CS	27-61-46			
Removal/Installation			401	ALL
SPOILERS 3 AND 4	27-61-51			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
Deactivation/Reactivation			901	ALL
Ref. MMEL Sect. 1-27 Item 1			901	ALL
SPOILERS 5, 6 AND 7	27-61-53			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
Deactivation/Reactivation			901	ALL
Ref. MMEL Sect. 1-27 Item 1			901	ALL
SPOILER 1 AND 2	27-61-54			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
Deactivation/Reactivation			901	ALL
Ref. MMEL Sect. 1-27 Item 1			901	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
HYDRAULIC ACTUATION (SPOILERS AND SPEEDBRAKES)	27-64-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Component Description			4	ALL
Actuator and Valve Group - Spoilers 1 and 2			4	ALL
Actuator and Valve Group - Spoilers 3 Through 7			10	ALL
NAdjustment/Test			501	ALL
SPEEDBRAKE ACTUATORS (SURFACES 1 AND 2)	27-64-11			
Removal/Installation			401	ALL
SPEEDBRAKE VALVE GROUPS (SURFACES 1 AND 2)	27-64-12			
Removal/Installation			401	ALL
Valve Group Complete			401	ALL
Servo Valve			401	ALL
Solenoid Valve			401	ALL
Filter			401	ALL
SPOILER/SPEEDBRAKE VALVE GROUPS (SURFACES 3 THRU 7)	27-64-13			
Removal/Installation			401	ALL
Valve Group Complete			401	ALL
Servo Valve			401	ALL
Filter			401	ALL
SPOILER/SPEEDBRAKE ACTUATORS (SURFACES 3 THRU 7)	27-64-14			
Removal/Installation			401	ALL
CONTROL SURFACE POSITION INDICATING (SPOILERS AND SPEEDBRAKES)	27-65-00			
Description and Operation			1	ALL
General			1	ALL
Adjusment/Test			501	ALL
Operational/Functional Test			501	ALL
Test			502	ALL
LIFT AUGMENTING (SLATS AND KRUEGER FLAPS)	27-80-00			
Description and Operation			1	ALL
General			1	ALL
Description			1	ALL
Operation			3	ALL
Interfaces			7	ALL
Servicing			301	ALL
Extension and Retraction of Slats with Aircraft System			301	ALL
Manual Operation of Slat Transmission System			303	ALL
Adjustment/Test			501	ALL
Adjustment			501	ALL

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Slat Transmission to Zero Position			501	ALL
Slat Surfaces 1, 2 and 3 to Zero Position			501	ALL
SLAT 1	27-80-11			
Removal/Installation			401	ALL
SLATS 2 AND 3	27-80-12			
Removal/Installation			401	ALL
Removal/Installation of Slats 2 and 3 without tracks.			401	ALL
Removal/Installation of Slats 2 and 3 complete with Tracks.			413	ALL
TRACKS 1 THRU 3, SLAT 1	27-80-13			
Removal/Installation			401	ALL
TRACKS - SLAT 2 AND 3	27-80-14			
Removal/Installation			401	ALL
KRUEGER FLAP	27-80-19			
Removal/Installation			401	ALL
Hinged Door			401	ALL
Folding Nose			410	ALL
Krueger Flap and Folding Nose			415	ALL
Flight Control Rod			423	ALL
MECHANICAL AND ELECTRICAL CONTROL (SLATS)	27-81-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Description			5	ALL
Component Description			5	ALL
Operation			15	ALL
Adjustment/Test			501	ALL
Alpha Lock Function Test			501	ALL
FEEDBACK POSITION PICK-OFF UNIT (28CV)	27-81-19			
Removal/Installation			401	ALL
FOLDING NOSE - LH, RH	27-81-33			
Removal/Installation			401	ALL
SPRING ROD - FOLDING NOSE	27-81-34			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
Check of Fits and Clearances			601	ALL
SEALING SHUTTERS, TRACK 2	27-81-39			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
Deactivation/Reactivation			901	ALL
Ref.: Configuration Deviation List (CDL), Section 6.10.01. Chap 27 Item 6			901	ALL
SEALING SHUTTERS, TRACKS 4 TO 11	27-81-41			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
Deactivation/Reactivation			901	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Ref. : CDL Section 6.01.01, CHAP 27 Item 6.			901	ALL
SEALING SHUTTER (No.1 SCREWJACK /TRACK 1 AND NO.2 SCREWJACK/TRACK 3)	27-81-43			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
Deactivation/Reactivation			901	ALL
Ref. : CDL SECTION 6.01.01, CHAP 27 Item 6			901	ALL
SEALING SHUTTERS - NOS.3,4,5 AND 6 SCREWJACKS	27-81-45			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
Deactivation/Reactivation			901	ALL
SPRING ROD - SEALING SHUTTERS SCREWJACKS 3 THRU 5	27-81-46			
Removal/Installation			401	ALL
FAIRING PLATES	27-81-58			
Deactivation/Reactivation			901	ALL
HYDRAULIC ACTUATION AND POWER TRANSMISSION (SLATS)	27-84-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
System Description			6	ALL
Component Description			6	ALL
Operation			19	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
System Test			504	ALL
Slat System 1 and Krueger Flap Operating Time and Measurement of Slat Deflection Angles			505	ALL
Slat System 2 Operating Time			507	ALL
Slat Systems 1 and 2 and Krueger Flap Operating Time and Measurement of Slat Deflection Angles			508	ALL
Slat GREEN Low Hydraulic Pressure Function			509	ALL
Slat BLUE Low Hydraulic Pressure Function			510	ALL
Inspection/Check			601	ALL
Detailed Visual Inspection of Slats Srewjacks 1 to 6 for General Condition and Security			601	ALL
Slat Screwjacks 1 thru 6 - Backlash and Play Check			603	ALL
Check of Slat Tracks and Rollers for General Condition and Wear and Slat to Track Attachments for Security			608	ALL

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Inspection of Universal Joints			610	ALL
Inspection of Steady Bearings and Universal Joints			615	001-005,
SLATS POWER CONTROL UNIT (5264)	27-84-11			
Removal/Installation			401	ALL
TORQUE LIMITER 5272 (5420)	27-84-12			
Removal/Installation			401	ALL
TEE GEARBOX (5270)	27-84-14			
Removal/Installation			401	ALL
WING ROOT GEARBOX 5274 (5422)	27-84-15			
Removal/Installation			401	ALL
LINE GEARBOXES, TRACKS 2 AND 4	27-84-16			
Removal/Installation			401	ALL
STEADY BEARINGS	27-84-17			
Removal/Installation			401	ALL
TRANSMISSION SHAFTS	27-84-21			
Maintenance Practices			201	ALL
Resetting of an Activated Slat Screwjack Torque Limiter			201	ALL
Disconnection/Connection of a Jammed Slat Transmission System			201	ALL
Disconnection/Connection of Individual Slat Transmission System Components			201	ALL
Removal/Installation			401	ALL
Inspection/Check			601	ALL
SCREWJACKS 1 THRU 4	27-84-22			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
Fits and Clearances			601	ALL
SCREWJACKS 5 AND 6	27-84-23			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
SLAT PCU INTERMEDIATE GEARBOX	27-84-31			
Removal/Installation			401	ALL
SLAT PCU PRESSURE-OFF BRAKE	27-84-32			
Removal/Installation			401	ALL
SLAT PCU VALVE BLOCK 25CV, 26CV	27-84-33			
Removal/Installation			401	ALL
Filter			401	ALL
Pressure Switches			401	ALL
Solenoid Valves			401	ALL
SLAT PCU HYDRAULIC MOTOR	27-84-34			
Removal/Installation			401	ALL
POSITION INDICATING (SLATS)	27-85-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Description			3	ALL
Component Description			3	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Operation			3	ALL
Power Supplies			9	ALL
INSTRUMENTATION POSITION PICK-OFF UNIT (4CN)	27-85-12			
Removal/Installation			401	ALL
ASYMMETRY AND POWER TRANSMISSION MONITORING (SLATS)	27-86-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Description			3	ALL
Operation			3	ALL
Power Supply			9	ALL
Adjustment/Test			501	ALL
Zeroing of Slat System PPU			501	ALL
Test of Wing Tip Brake Static Torque and Test of the Integrity of the Slat Transmission System			501	ALL
ASYMMETRY POSITION PICK-OFF UNIT	27-86-11			
Removal/Installation			401	ALL
ASYMMETRY POSITION PICK-OFF UNIT ADAPTER	27-86-12			
Removal/Installation			401	ALL
WING TIP BRAKE (35CV, 36CV)	27-86-13			
Removal/Installation			401	ALL
Solenoid Valve			402	ALL
Wing Tip Brake			402	ALL
Adjustment/Test			501	ALL
Operational Test of Wing Tip Brakes and System Torque Limiters			502	ALL
Inspection/Check			601	ALL
KRUEGER FLAP CONTROL	27-87-00			
Description and Operation			1	ALL
Component Location			1	ALL
Description			5	ALL
Operation			5	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
Extension/Retraction Test Using Both SFCCs			502	ALL
Extension/Retraction Test Using SFCC1 and SFCC2 Individually			503	ALL
Extension/Retraction Test Using Manual Pushbuttons on Krueger Selector Solenoid Valve			504	ALL
Krueger Flap Position Switches Test			505	ALL
Deactivation/Reactivation			901	ALL
Ref. : MMEL Sect. 1-27, Item 19			901	ALL

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
KRUEGER FLAP HYDRAULIC ACTUATION	27-88-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Description			3	ALL
Operation			7	ALL
Adjustment/Test			501	ALL
Functional Test of Krueger Flap Actuator			501	ALL
KRUEGER FLAP ACTUATOR	27-88-11			
Removal/Installation			401	ALL
KRUEGER SELECTOR SOLENOID VALVE (50CV)	27-88-12			
Removal/Installation			401	ALL
CHECK VALVE 1198	27-88-13			
Removal/Installation			401	ALL
SAFETY VALVE 1149	27-88-14			
Servicing			301	ALL
Restoration of Safety Valve 1149			301	ALL
Removal/Installation			401	ALL
KRUEGER FLAP POSITION INDICATING	27-89-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Description			3	ALL
Component Description			3	ALL
Operation			6	ALL
Inspection/Check			601	ALL
POSITION SWITCH - KRUEGER EXTEND	27-89-11			
Removal/Installation			401	ALL
POSITION SWITCH - KRUEGER RETRACT	27-89-12			
Removal/Installation			401	ALL

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R 1. General

(Ref. Fig. 005)

Control of the aircraft is achieved as follows :

- Roll control (Ref. 27-10)
  Achieved on each wing by :
  . One all speed aileron (ASA)
  . Five spoilers, 3 through 7.
- Yaw control (Ref. 27-20)
  Achieved by one rudder.
- Pitch control (Ref. 27-30)
  Achieved by two elevators hinged on the trimmable horizontal stabilizer.
- Pitch trim control (Ref. 27-40)
  Achieved by the trimmable horizontal stabilizer, hinged on the aircraft structure.
- Flap control (Ref. 27-50)
  Achieved on each wing by one double slotted inboard flap and one single slotted outboard flap.
- Speed brake control (Ref. 27-60)
  Achieved on each wing by spoilers 1 through 4.
- Ground spoiler control (Ref. 27-60)
  Achieved on each wing by all the spoilers, 1 through 7
- Lift augmenting (Ref. 27-80)
  Achieved on each wing by three slats and one Krueger flap.

All surfaces are actuated by irreversible hydraulically powered actuators.
No surface is mass balanced.
The all speed ailerons, rudder and elevators are each actuated by three servo controls, each powered by a different hydraulic system, thus ensuring that these surfaces always remain under control.
Each flap and slat section is actuated by two ball screwjacks, powered by electrohydraulic control units installed in the fuselage.
All spoilers are each actuated by one hydraulic actuator.
Ground gust dampers are integrated in the servo controls where necessary, to allow parking of the aircraft in wind gusts up to 80 knots, without the need for any special ground locking device.

SYMBOLS		DESIGNATION
ELECTRICAL	MECHANICAL OR HYDRAULIC	
		ELECTRIC PUMP
		HYDRAULIC PUMP
		ENGINE PUMP
		RAM AIR TURBINE (RAT)
		HAND PUMP
		HYDRAULIC MOTOR
		ALTERNATING CURRENT MOTOR
		DIRECT CURRENT MOTOR
		ELECTRICALLY OPERATED SHUT OFF VALVE
		ELECTRICALLY OPRATED SELECTOR VALVE
		MECHANICALLY OPERATED SELECTOR VALVE
		HYDRAULICALLY OPERATED SELECTOR VALVE
		SOLENOID VALVE
		SERVOVALVE
		GROUND CONNECTOR

BM5 27 00 00 0 AAFO – 11

Symbols
Figure 001

SYMBOLS		DESIGNATION
ELECTRICAL	MECHANICAL ORHYDRAULIC	
	P	PRIORITY VALVE
		PRESSURE RELIEF VALVE
		CHECK VALVE
	F	SAFETY VALVE (FUSE)
		3 WAY VALVE
		PRESSURE ACCUMULATOR
		PRESSURE SWITCH
		SWITCH
		RELAY
	S	SYNCHRO
	P	POTENTIOMETER
		LVDT : LINEAR VARIABLE DIFFERENTIAL TRANSDUCER
	LVDT	LVDT

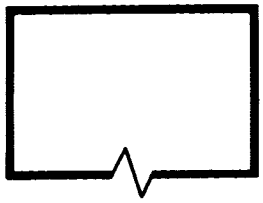
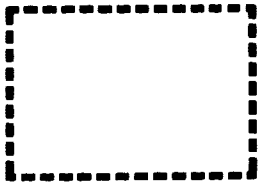
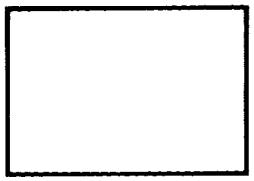
BM5 27 00 00 0 AAGO – 11

Symbols
Figure 002

SYMBOLS		DESIGNATION
ELECTRICAL	MECHANICAL OR HYDRAULIC	
	RVDT	RVDT : ROTARY VARIABLE DIFFERENTIAL TRANSDUCER
		AIRCRAFT GROUND
		ACCESSORY GROUND
		TWISTED DOUBLE CONDUCTOR
		DOUBLE SHIELDED AND INSULATED CONDUCTORS
		LAMP
		FILTER
		PRESSURE LINE
		RETURN LINE
		CONTROL LINE
		MECHANICAL CONNECTION ELECTRIC WIRE BUNDLE
		DATA BUS
		CABLE
		CHAIN
		ELECTRO MAGNETIC CLUTCH
		TORQUE LIMITER
		DETENT BELLCRANK
		UNIVERSAL JOINT
		DIFFERENTIAL
	T.R.	CABLE TENSION REGULATOR
		WING TIP BRAKE (TWO WAY BRAKE)

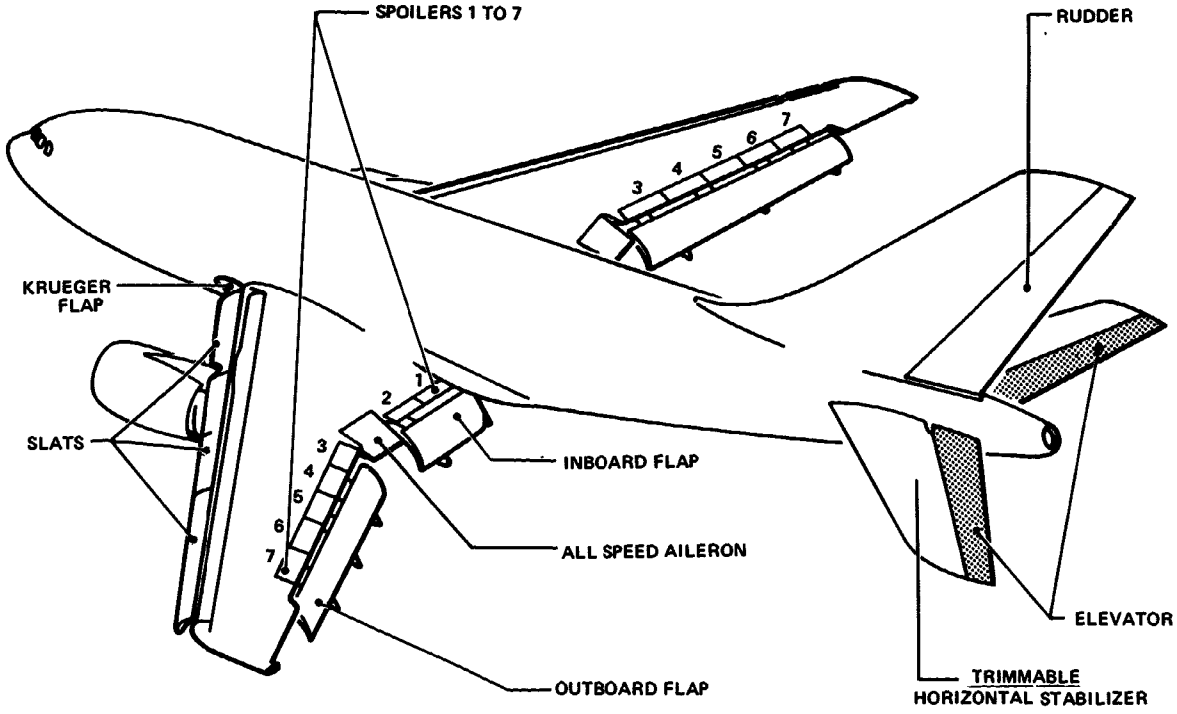
BM5 27 00 00 0 AAHO – 11

Symbols
Figure 003

SYMBOLS		DESIGNATION
ELECTRICAL	MECHANICAL ORHYDRAULIC	
		JUNCTION BOX PANEL EQUIPMENT OUT LINE UNIT COMPLETE
		JUNCTION BOX PANEL EQUIPMENT OUT LINE UNIT INCOMPLETE
		FULL PROVISION
		FUNCTION PART OF EQUIPMENT
		ZONE

BM5 27 00 00 0 AAJO – 11

Symbols
Figure 004



BM5 27 00 00 0 AAMO - 11

Flight Controls
Figure 005

2. Flight Compartment Controls and Indicating
These figures represent all the controls and indicators for the flight controls located in the flight compartment. They are followed by a description of each item.

**ON A/C 001-003,

(Ref. Fig. 006)

**ON A/C 004-200,

(Ref. Fig. 007)

**ON A/C ALL

(Ref. Fig. 008)
(Ref. Fig. 009, 010, 011)
(Ref. Fig. 012, 013)
(Ref. Fig. 014)

**ON A/C ALL

(Ref. Fig. 015, 016)
(Ref. Fig. 017, 018)

**ON A/C ALL

(Ref. Fig. 019)
(Ref. Fig. 020)
(Ref. Fig. 021)
(Ref. Fig. 022, 023, 024)
(Ref. Fig. 025)
(Ref. Fig. 026)
(Ref. Fig. 027, 028)

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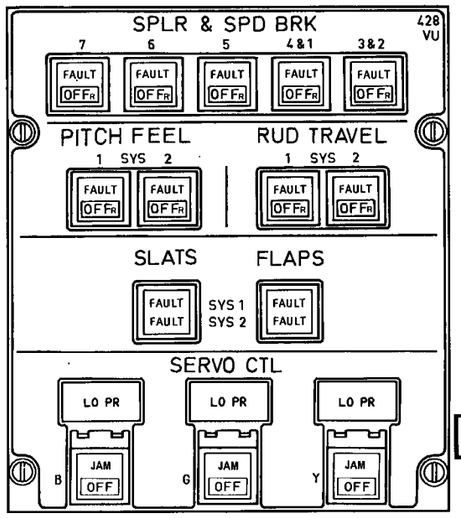

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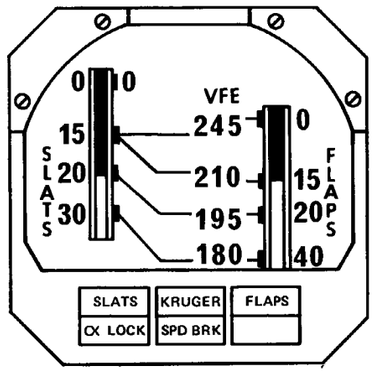

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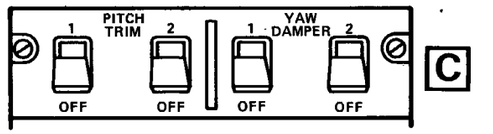

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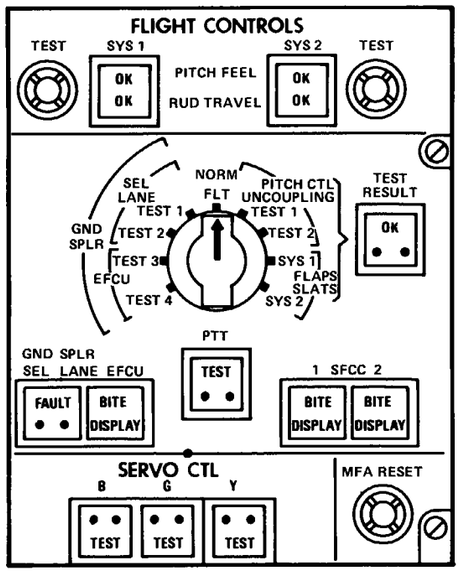

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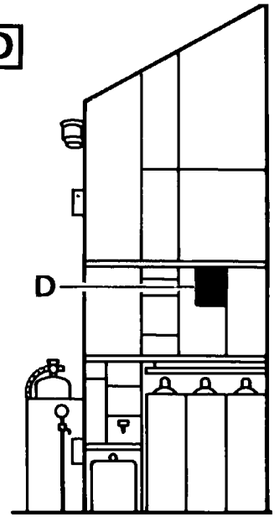

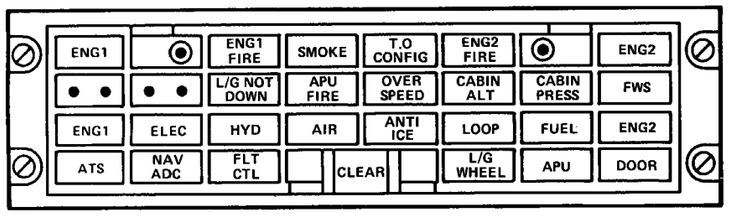

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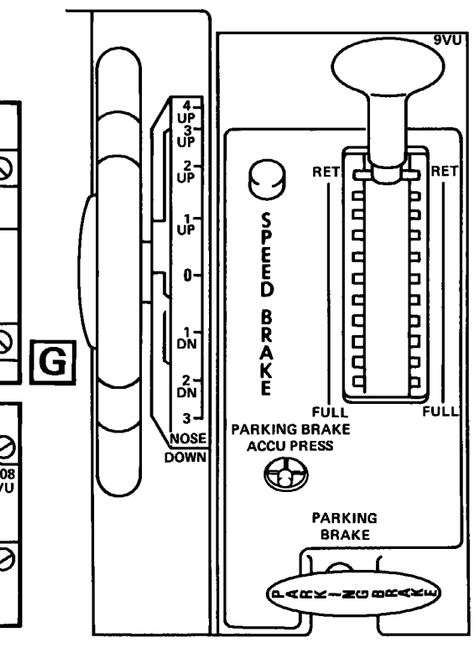

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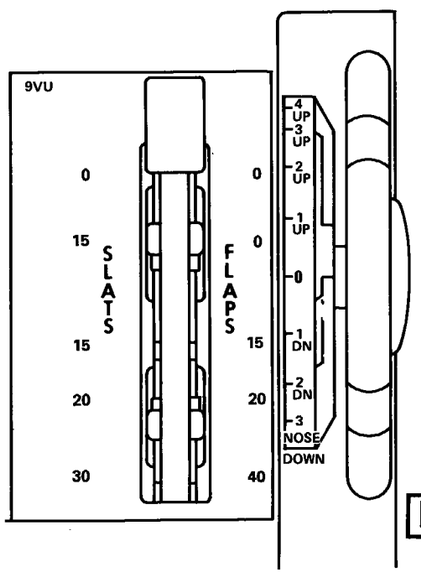

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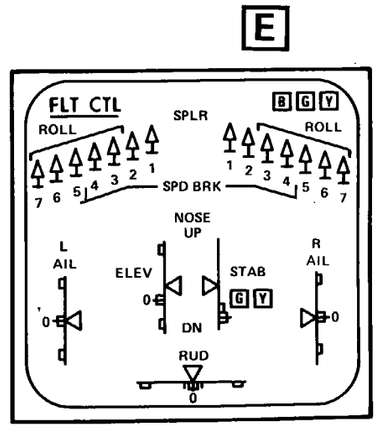
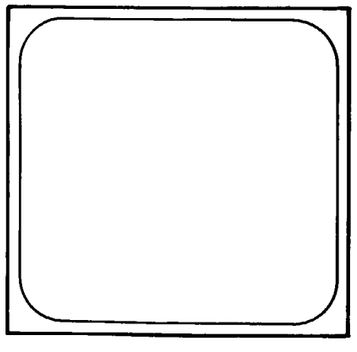
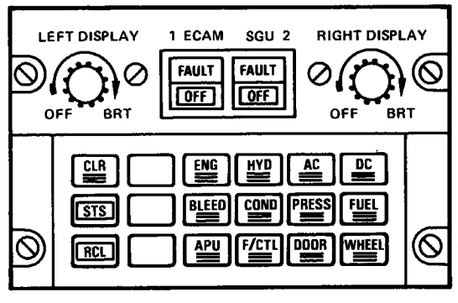


R ECAM DISPLAY UNIT



L ECAM DISPLAY UNIT

J



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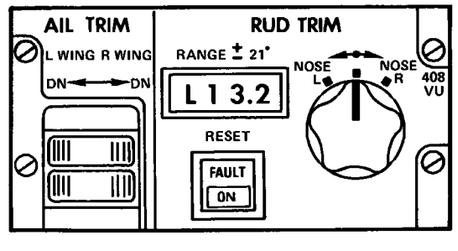

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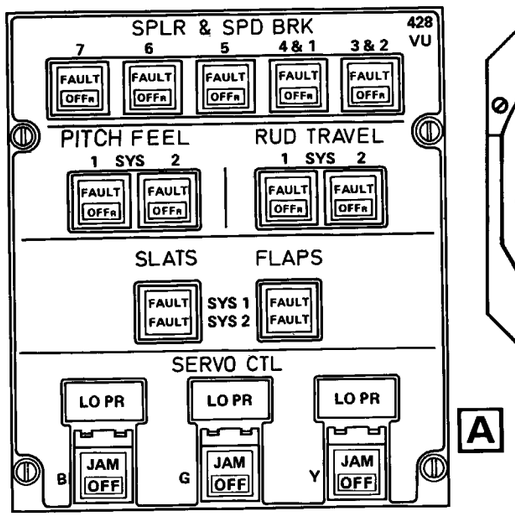
Flight Compartment Controls and Indicating
Figure 006



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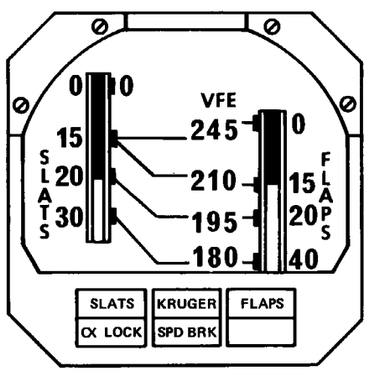

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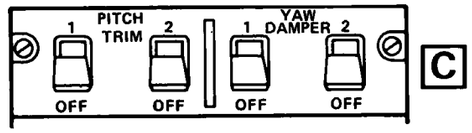

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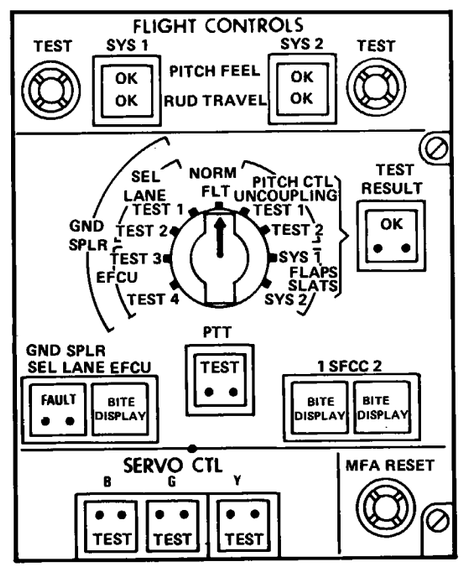

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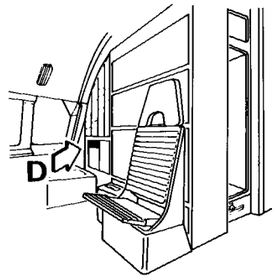

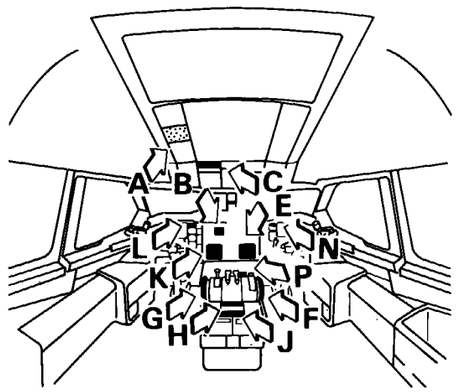

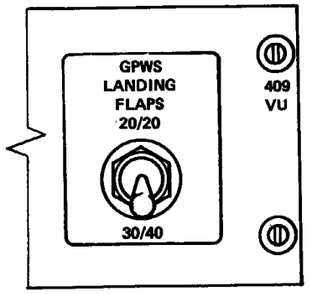

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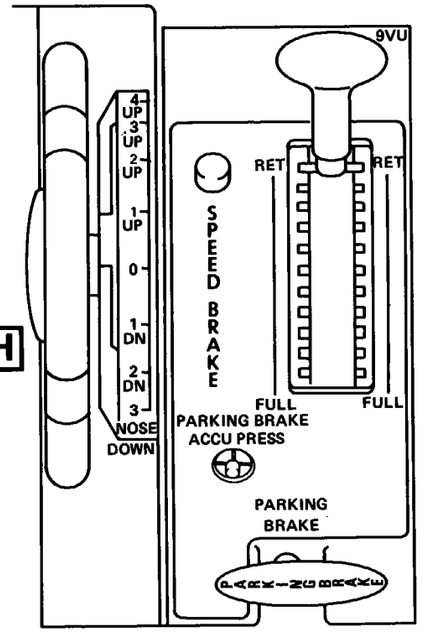

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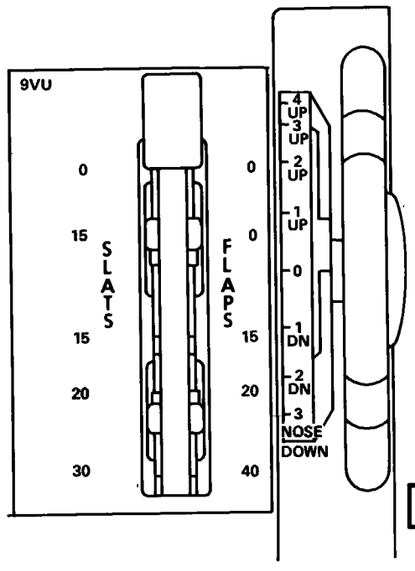

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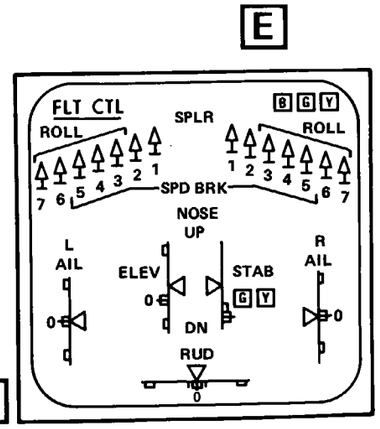
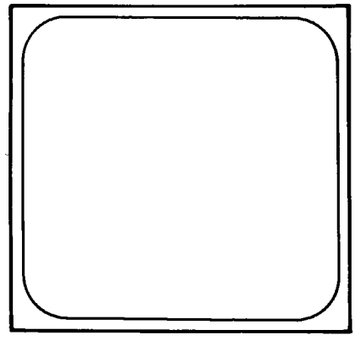


R ECAM DISPLAY UNIT



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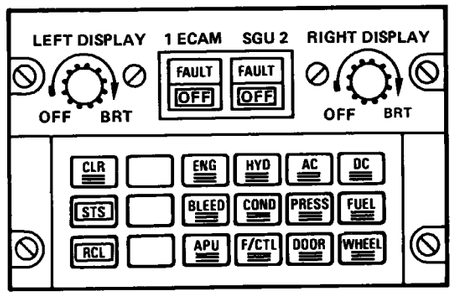

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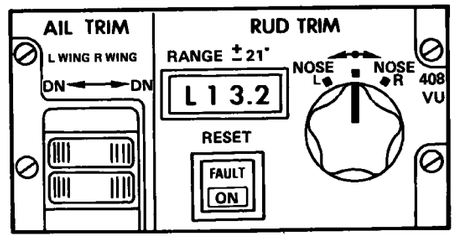

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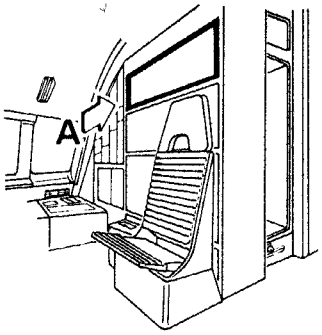
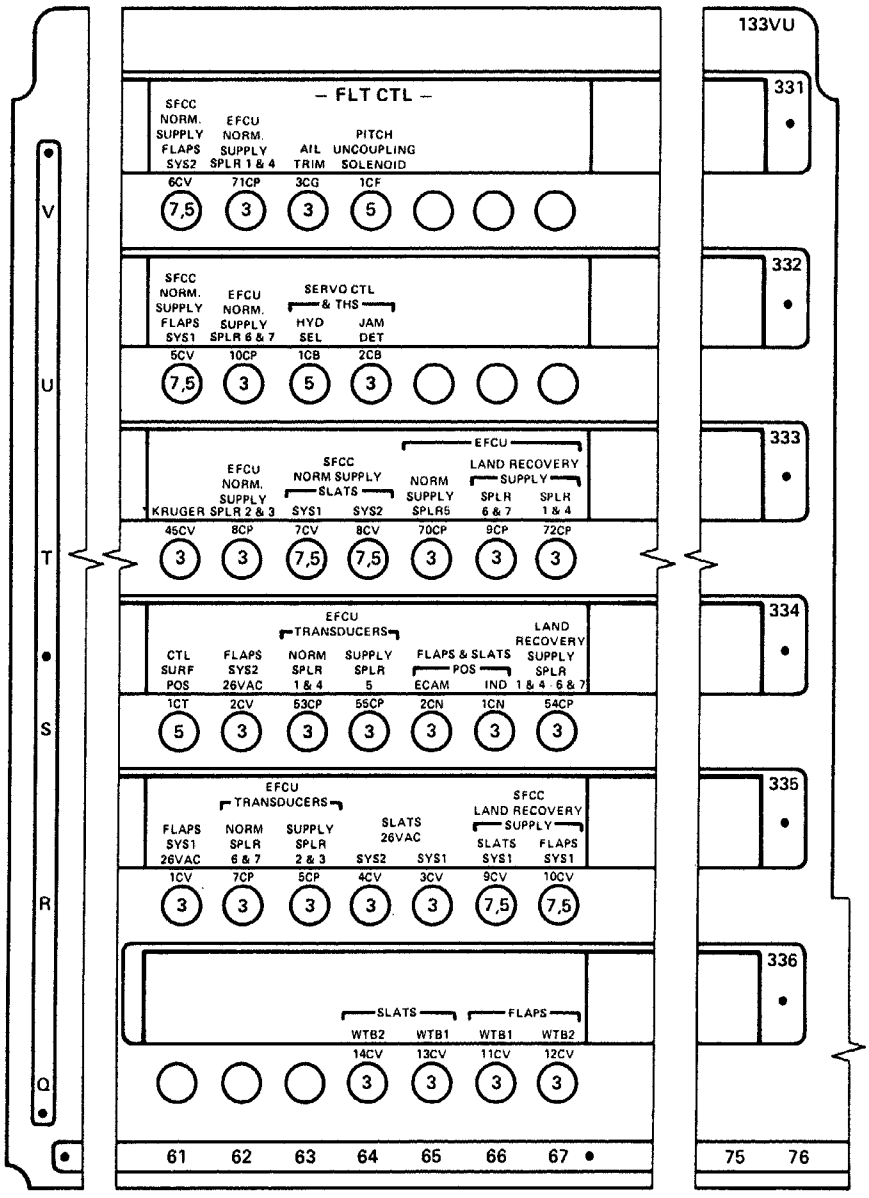
Flight Compartment Controls and Indicating
Figure 007




133VU
– FLT CTL –
SFCC NORM. SUPPLY FLAPS SYS2
EFCU NORM. SUPPLY SPLR 1 & 4
AIL TRIM
PITCH UNCOUPLING SOLENOID
6CV 71CP 3CG 1CF
SFCC NORM. SUPPLY FLAPS SYS1
EFCU NORM. SUPPLY SPLR 6 & 7
SERVO CTL & THS HYD SEL
JAM DET
5CV 10CP 1CB 2CB
KRUGER
EFCU NORM. SUPPLY SPLR 2 & 3
SFCC NORM SUPPLY SLATS SYS1
SYS2
EFCU NORM SUPPLY SPLR5
EFCU LAND RECOVERY SUPPLY SPLR 6 & 7
SPLR 1 & 4
45CV 8CP 7CV 8CV 70CP 9CP 72CP
CTL SURF POS
FLAPS SYS2 26VAC
EFCU TRANSDUCERS NORM SPLR 1 & 4
SUPPLY SPLR 5
FLAPS & SLATS POS ECAM
IND
LAND RECOVERY SUPPLY SPLR 1 & 4 6 & 7
1CT 2CV 53CP 55CP 2CN 1CN 54CP
FLAPS SYS1 26VAC
EFCU TRANSDUCERS NORM SPLR 6 & 7
SUPPLY SPLR 2 & 3
SLATS 26VAC SYS2
SYS1
SFCC LAND RECOVERY SUPPLY SLATS SYS1
FLAPS SYS1
1CV 7CP 5CP 4CV 3CV 9CV 10CV
SLATS WTB2 WTB1
FLAPS WTB1 WTB2
14CV 13CV 11CV 12CV
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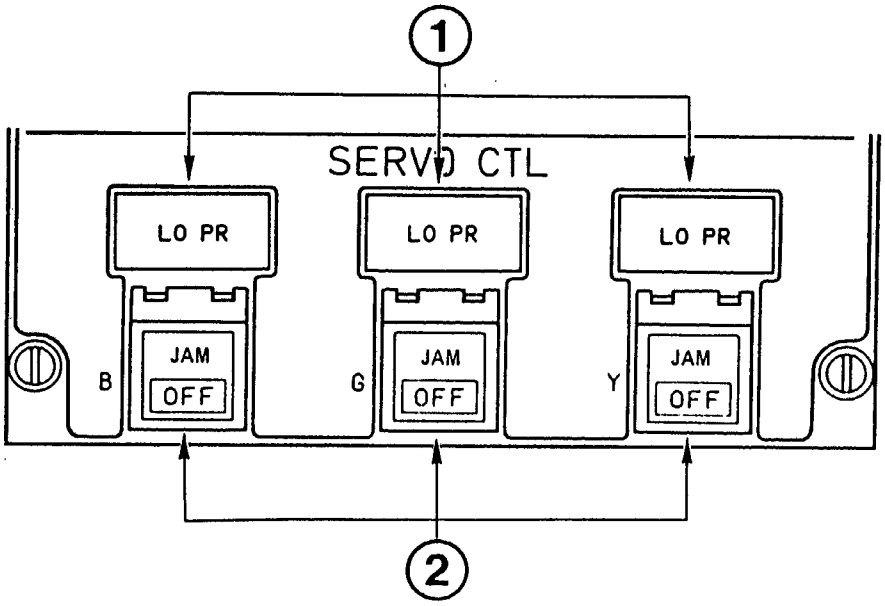
Circuit Breakers
Figure 008



-1- B, G, Y LO PR LIGHTS :
THESE LIGHTS COME ON AMBER WHEN THE FLIGHT CONTROL SUPPLY PRESSURE IN THE CORRESPONDING HYDRAULIC SYSTEM DROPS (BELOW 1450 PSI) DOWNSTREAM OF THE SERVO CONTROLS SELECTOR VALVE, OR WHEN THE HYDRAULIC POWER SUPPLY HAS BEEN SHUT OFF.
ILLUMINATION OF AN AMBER LO PR LIGHT IS ACCOMPANIED BY ECAM ACTIVATION.

-2- SERVO CTL/B, G, Y PUSHBUTTON SWITCHES :
ALL THESE PUSHBUTTON SWITCHES ARE GUARDED
THESE PUSHBUTTON SWITCHES CONTROL THE SERVO CONTROLS SELECTOR VALVES FOR THE INDIVIDUAL HYDRAULIC SYSTEMS, BLUE, GREEN AND YELLOW.
AN OFF AND A JAM INDICATION ARE INTEGRATED IN EACH PUSHBUTTON SWITCH.
- NORMAL (P/B SWITCH PRESSED-IN) : HYDRAULIC POWER IS SUPPLIED TO THE CORRESPONDING USERS AS SOON AS PRESSURE IS AVAILABLE IN THE ASSOCIATED HYDRAULIC SYSTEM (REF. HYDRAULIC DISTRIBUTION).
- OFF (P/B SWITCH RELEASED-OUT) : THE OFF LEGEND COMES ON WHITE AND THE HYDRAULIC POWER SUPPLY TO THE CORRESPONDING USERS IS SHUT OFF. THE ASSOCIATED JAM WARNING IS INHIBITED AND ILLUMINATION OF THE AMBER LO PR LIGHT CONFIRMS THE OFF SELECTION
- JAM WHEN A PUSHBUTTON SWITCH IS PRESSED (IN), ITS JAM LEGEND COMES ON AMBER IF JAMMING IS DETECTED BY THE JAMMING DETECTION CONTROL UNIT IN AN ASSOCIATED HYDRAULIC CONTROL VALVE (RUDDER, ELEVATOR, ALL SPEED AILERON, OR TRIMMABLE HORIZONTAL STABILIZER).
ILLUMINATION OF A JAM LEGEND IS ACCOMPANIED BY ECAM ACTIVATION.
THE JAMMED CONTROL IS IDENTIFIED ON THE WARNING DISPLAY.
NOTE : - SERVO CTL PUSHBUTTON SWITCH POSITIONS AND ASSOCIATED WARNINGS ARE REPEATED ON THE ECAM HYDRAULIC SYSTEM PAGE
- TO PREVENT INADVERTENT DEACTIVATION OF ALL SERVO CONTROLS, ONLY TWO SYSTEMS MAY BE DEACTIVATED AT THE SAME TIME BY AN OFF SELECTION OF THE SERVO CTL PUSH BUTTON SWITCHES. WHEN THE THIRD PUSHBUTTON SWITCH IS SELECTED OFF, ALL THREE SYSTEMS ARE ACTIVATED REGARDLESS OF PUSHBUTTON SWITCH SETTING.

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SERVO CTL Panel
Figure 009

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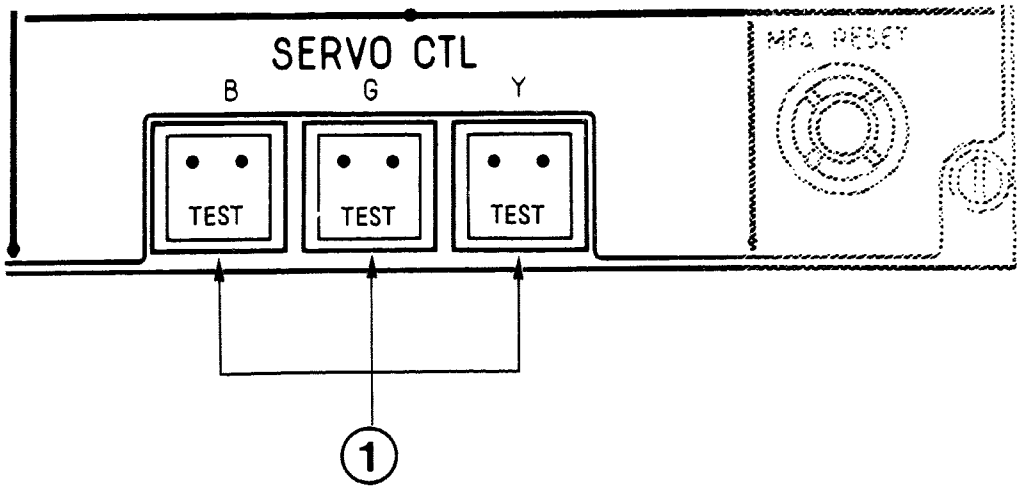

ONLY USED ON THE GROUND TO TEST THE JAMMING DETECTION MICROSWITCHES, WITH PRESSURE OF THE RESPECTIVE SYSTEM SHUT OFF :
A TEST INDICATION IS INTEGRATED IN EACH PUSHBUTTON SWITCH :

-1- SERVO CTL/B, G, Y (TEST) PUSHBUTTON SWITCHES :
AFTER THE RELATED SERVO CTL PUSHBUTTON SWITCH ON THE OVERHEAD PANEL HAS BEEN SELECTED OFF, THE SERVO CTL (TEST) PUSHBUTTON SWITCH FOR THE ASSOCIATED SYSTEM IS MAGNETICALLY LATCHED WHEN PRESSED IN, AND THE TEST LEGEND COMES ON WHITE.
FOR JAMMING DETECTION TESTS, THE CONTROLS INVOLVED MUST BE MOVED RAPIDLY
IF THE TEST IS SUCCESSFUL, THE JAM LEGEND IN THE RELATED OVERHEAD PANEL SERVO CTL PUSHBUTTON SWITCH FLASHES. IF THE TEST IS NOT SUCCESSFUL, THE FAULT ISOLATION PROCEDURE MUST BE APPLIED FROM THE FACE OF THE JAMMING DETECTION CONTROL UNIT.
WHEN THE OVERHEAD PANEL SERVO CTL PUSHBUTTON SWITCH IS SELECTED TO NORMAL (IN), THE SERVO CTL (TEST) PUSHBUTTON SWITCH IS AUTOMATICALLY RELEASED AND THE TEST LEGEND GOES OFF.

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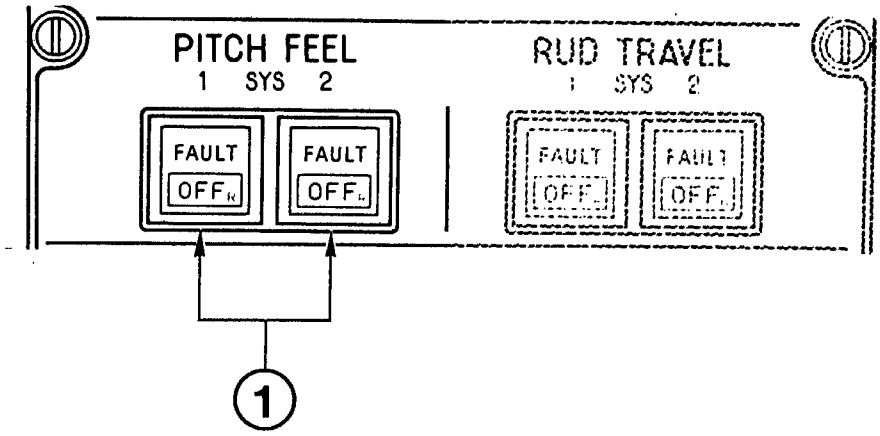
SERVO CTL Panel
Figure 010



-1- PITCH FEEL/SYS 1 AND 2 PUSHBUTTON SWITCHES :
THESE SWITCHES CONTROL CHANNELS 1 AND 2 OF THE FEEL AND LIMITATION COMPUTER (FLC) FOR ELEVATOR CONTROL. AN OFF/R AND A FAULT INDICATION ARE INTEGRATED IN EACH PUSH-BUTTON SWITCH

- ON (P/B SWITCH PRESSED-IN) : THE CORRESPONDING SYSTEM IS ENGAGED.
BOTH SYSTEMS MAY BE ENGAGED SIMULTANEOUSLY BUT ONLY ONE IS EFFECTIVELY OPERATING.IF ONE SYSTEM FAILS, IT IS AUTOMATICALLY DEACTIVATED, AND THE OTHER CONTINUES TO OPERATE.
- OFF/R (P/B SWITCH RELEASED-OUT) : THE OFF/R LEGEND COMES ON WHITE AND THE SYSTEM INVOLVED IS DISENGAGED. THE MONITORING CIRCUITS ARE RESET BY THIS ACTION. THIS INDICATION IS ACCOMPANIED BY ECAM ACTIVATION.
- FAULT WHEN A PUSHBUTTON SWITCH IS PRESSED (IN), ITS FAULT LEGEND COMES ON AMBER IF A FAILURE IS DETECTED IN THE CORRESPONDING SYSTEM.
ILLUMINATION OF AN AMBER FAULT LEGEND IS ACCOMPANIED BY ECAM ACTIVATION.
BOTH FAULT LEGENDS REMAINING ON WHEN THE PUSHBUTTON SWITCHES ARE RELEASED (OUT) AND THE OFF/R LEGENDS ARE ILLUMINATED WHITE CONSTITUTES A PITCH DISAGREE WARNING (THE ARTIFICIAL FEEL UNIT IS OPERATING IN HIGH SPEED CONFIGURATION WHEN THE FLAPS ARE EXTENDED 20° OR MORE).
ILLUMINATION OF BOTH FAULT LEGENDS IS ACCOMPANIED BY ECAM ACTIVATION.

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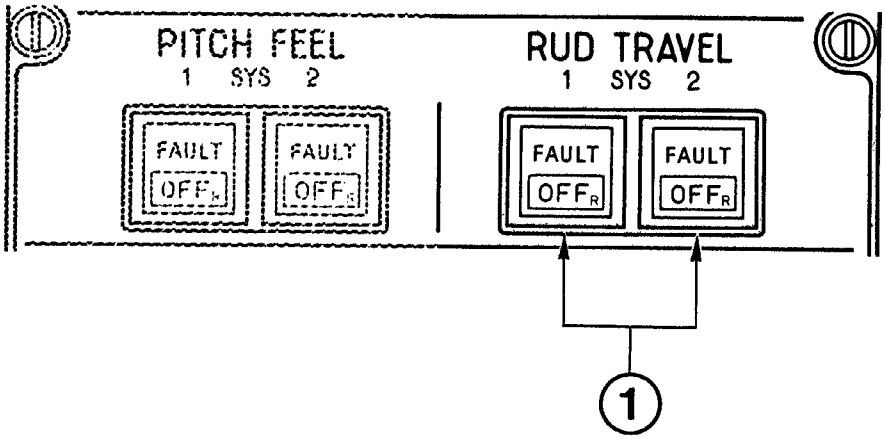
PITCH FEEL Panel
Figure 011



-1- RUD TRAVEL/SYS 1 AND 2 PUSHBUTTON SWITCHES :
THESE SWITCHES CONTROL SYSTEMS 1 AND 2 OF THE FEEL AND LIMITATION COMPUTERS (FLC) FOR RUDDER TRAVEL LIMITING SYSTEM.
AN OFF/R AND A FAULT INDICATION ARE INTEGRATED IN EACH PUSHBUTTON SWITCH.

- ON (P/B SWITCH PRESSED-IN) : THE CORRESPONDING SYSTEM IS ENGAGED. BOTH SYSTEMS MAY BE ENGAGED SIMULTANEOUSLY BUT ONLY SYSTEM 1 IS EFFECTIVELY ACTIVE. IF SYSTEM 1 FAILS, IT IS AUTOMATICALLY DEACTIVATED, AND SYSTEM 2 CONTINUES TO BE ACTIVE.
- OFF/R (P/B SWITCH RELEASED-OUT) : THE OFF/R LEGEND COMES ON WHITE AND THE SYSTEM INVOLVED IS DISENGAGED. THE MONITORING CIRCUITS ARE RESET BY THIS ACTION. THIS INDICATION IS ACCOMPANIED BY ECAM ACTIVATION.
- FAULT WHEN A PUSHBUTTON SWITCH IS PRESSED (IN), ITS FAULT LEGEND COMES ON AMBER IF A FAILURE IS DETECTED IN THE CORRESPONDING SYSTEM
ILLUMINATION OF AN AMBER FAULT LEGEND IS ACCOMPANIED BY ECAM ACTIVATION.
BOTH FAULT LEGENDS REMAINING ON WHEN THE PUSHBUTTON SWITCHES ARE RELEASED (OUT) AND THE OFF/R LEGENDS ARE ILLUMINATED WHITE CONSTITUTES A RUDDER DISAGREE WARNING (THE VARIABLE STOP LEVER IS NOT IN LOW SPEED POSITION WITH THE FLAPS EXTENDED 20° OR MORE).
ILLUMINATION OF BOTH FAULT LEGENDS IS ACCOMPANIED BY ECAM ACTIVATION.

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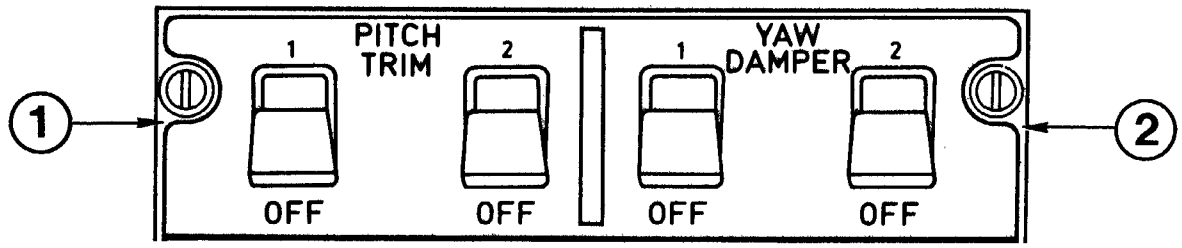
RUD TRAVEL Panel
Figure 012



-1- PITCH TRIM 1 AND 2 ENGAGE LEVERS
FOR DESCRIPTION OF ELECTRICAL PITCH TRIM CONTROL, REFER TO AUTO FLIGHT SYSTEM (REF. CHAP 22)

-1- (OR -2-) : THE LEVER IS AUTOMATICALLY LATCHED IN THE ACTIVE POSITION AND PITCH TRIM 1 OR 2 IS ENGAGED. IF A FAILURE IS DETECTED, THE CORRESPONDING PITCH TRIM ENGAGE LEVER TRIPS TO OFF.

- OFF : THE RESPECTIVE PITCH TRIM IS DISENGAGED.

WHEN ONE PITCH TRIM ENGAGE LEVER TRIPS TO OFF, THE ASSOCIATED PITCH TRIM CHANNEL DISENGAGES, AND THE ECAM IS ACTIVATED. WHEN BOTH PITCH TRIM ENGAGE LEVERS TRIP TO OFF, ALL ELECTRICAL CONTROL MODES OF THE THS ARE LOST, AND THE ECAM IS ACTIVATED.

NOTE : PITCH TRIM DISENGAGES AND THE LEVERS TRIP TO OFF WHEN TRIM REACHES FULL NOSE UP OR FULL NOSE DOWN POSITION (MECHANICAL STOPS).

-2- YAW DAMPER 1 AND 2 ENGAGE LEVERS
FOR DESCRIPTION OF YAW DAMPER SYSTEM, REFER TO AUTO FLIGHT SYSTEM (REF. CHAP 22).

-1- (OR -2-) : THE LEVER IS MAGNETICALLY LATCHED IN THE ACTIVE POSITION AND YAW DAMPER 1 (OR 2) IS ENGAGED
IF A FAILURE IS DETECTED, THE CORRESPONDING YAW DAMPER ENGAGE LEVER TRIPS TO OFF.

- OFF : THE RESPECTIVE YAW DAMPER IS DISENGAGED.

WHEN ONE YAW DAMPER ENGAGE LEVER TRIPS TO OFF, THE ASSOCIATED YAW DAMPER DISENGAGES AND THE ECAM IS ACTIVATED.
WHEN BOTH YAW DAMPER ENGAGE LEVERS TRIP TO OFF, THE YAW DAMPER FUNCTION IS LOST AND THE ECAM IS ACTIVATED.

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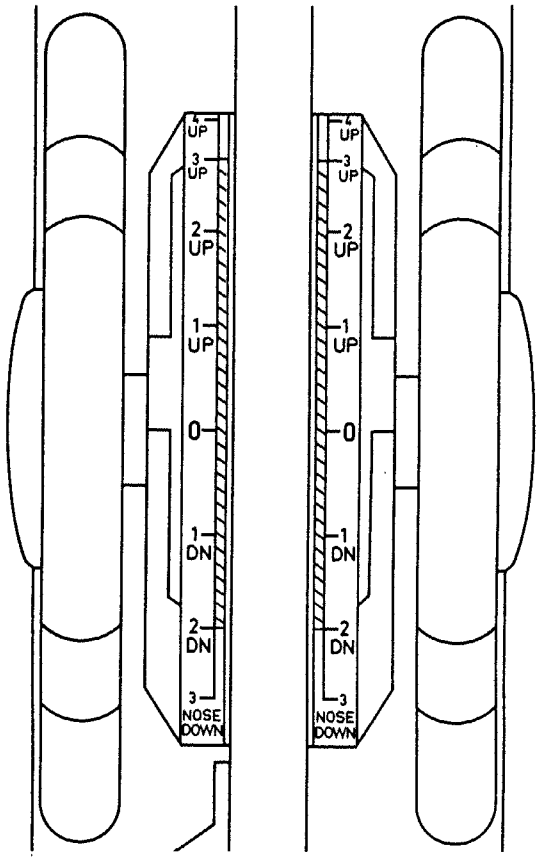
PITCH TRIM - YAW DAMPER 1 and 2 Engage Levers
Figure 013



BOTH PITCH TRIM CONTROL WHEELS PROVIDE MECHANICAL CONTROL OF THE TRIMMABLE HORIZONTAL STABILIZER (THS).
WHEN A PITCH TRIM CONTROL WHEEL IS USED TO OVERRIDE THE ELECTRICAL COMMAND, IT DISENGAGES THE ELECTRIC PITCH TRIM ACTUATORS AND THE PITCH TRIM ENGAGE LEVERS TRIP TO OFF.
TRIM RANGE IS 14^{0} NOSE UP TO 3^{0} NOSE DOWN.
TRIM POSITION IS INDICATED IN DEGREES ON A SCALE ADJACENT TO EACH PITCH TRIM CONTROL WHEEL. THE SCALE IS PAINTED GREEN OVER THE NORMAL TAKEOFF RANGE (AIRCRAFT NOSE DOWN 2^{0} AIRCRAFT NOSE UP 3^{0}).

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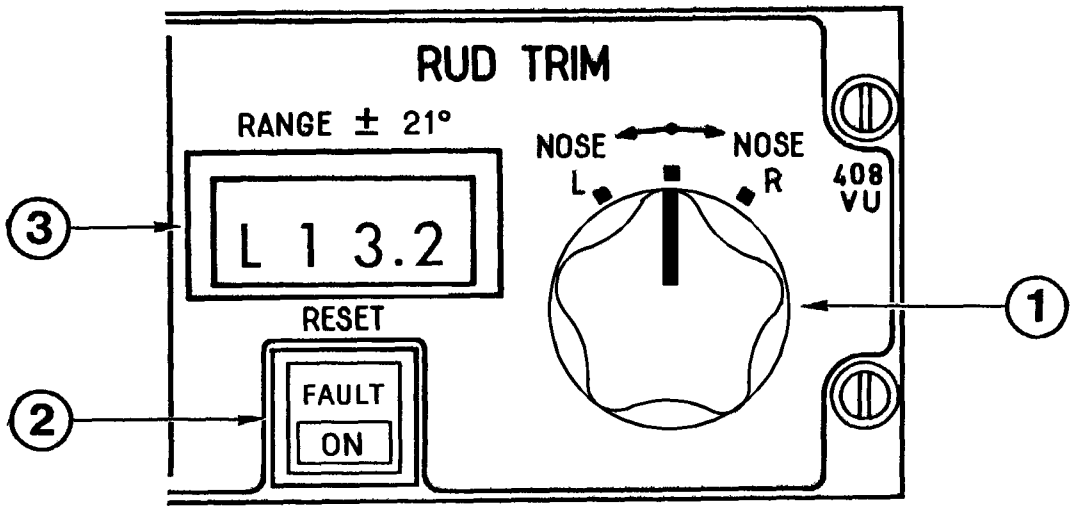
Pitch Trim Control Wheels
Figure 014



-1- RUD TRIM CONTROL SWITCH :
RUDDER TRIM IS ELECTRICALLY CONTROLLED. THE CONTROL SWITCH IS A THREE-POSITION ROTARY SWITCH SPRINGLOADED TO THE NEUTRAL (CENTER) POSITION.
THE DIRECTION OF RUDDER TRIM TRAVEL DEPENDS ON THE DIRECTION OF CONTROL SWITCH ROTATION (NOSE L OR NOSE R).
FULL AUTHORITY OF RUDDER TRIM IS ABOUT 21° IN EACH DIRECTION.

-2- RESET PUSHBUTTON SWITCH : ALLOWS INITIATION OF AN AUTOMATIC SEQUENCE CONTROLLED BY THE EFCUS TO NULL THE RUDDER TRIM POSITION.

- ON : (P/B SWITCH PRESSED-IN) : THE ON LEGEND COMES ON WHITE. THE SWITCH IS LATCHED IN DURING THE RESET ACTION AND WILL RELEASE AUTOMATICALLY WHEN RESET IS ACHIEVED.
- NORMAL : (P/B SWITCH RELEASED-OUT) : AUTOMATICALLY OR MANUALLY, THE RESET ACTION IS STOPPED AND THE ON LEGEND GOES OFF.
- FAULT : THE LEGEND COMES ON AMBER IF A FAILURE OF THE RESET FUNCTION IS DETECTED, OR IF THE ACTUATOR POSITION TRANSDUCER FAILS.

-3- RUD TRIM INDICATOR :
A DIGITAL INDICATOR DISPLAYS RUDDER TRIM DIRECTION (L OR R) AND VALUE (0° TO 21°).

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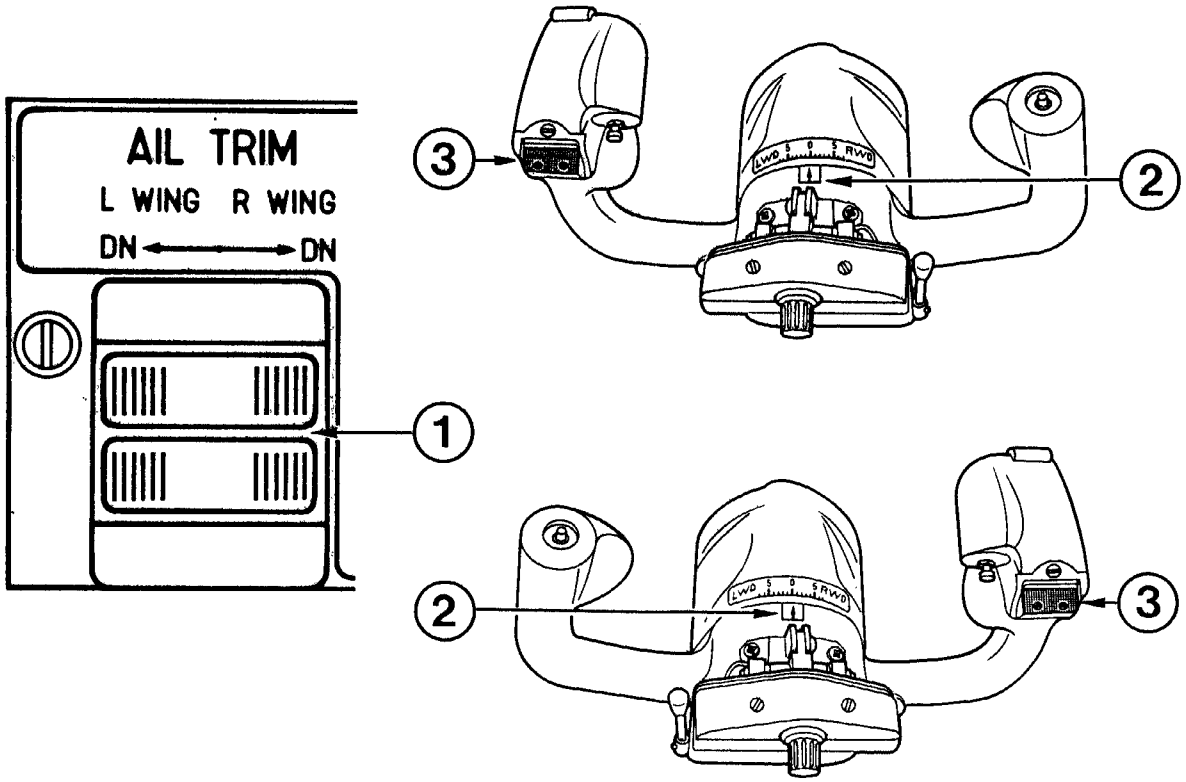
RUD TRIM Panel
Figure 015



-1- AIL TRIM CONTROL SWITCHES : AILERON TRIM IS ELECTRICALLY CONTROLLED. FOR SAFETY PURPOSES, BOTH SWITCHES MUST BE MOVED AND HELD IN THE SAME DIRECTION (L WING OR R WING) TO ENERGIZE THE SYSTEM. THIS ACTION SELECTS A CONSTANT SPEED DISPLACEMENT IN THE CORRESPONDING DIRECTION. FULL ALL SPEED AILERON TRAVEL OF ABOUT 7° IN EACH DIRECTION IS ACHIEVED AT A SPEED OF 0.4°/S.

-2- AILERON TRIM SCALES : A SCALE REPRESENTING 14° ALL SPEED AILERON MOVEMENT (7° IN EACH DIRECTION) IS ENGRAVED AND PAINTED AT THE TOP OF EACH CONTROL COLUMN OPPOSITE A POINTER PAINTED ON THE CONTROL WHEEL. WITH THE CONTROL WHEELS RELEASED, THE CREW CAN THUS READ THE ACTUAL AILERON TRIM VALUE.

-3- ON EACH CONTROL WHEEL, A SWITCH IS INSTALLED FOR ELECTRIC PITCH TRIM CONTROL. UP OR DOWN MOVEMENT OF THE SWITCHES ACTIVATES THE TWO ELECTRIC ACTUATORS WHICH CONTROL THE HYDRAULIC MOTORS OPERATING THE TRIMMABLE HORIZONTAL STABILIZER, PROVIDED THAT AT LEAST ONE PITCH TRIM SYSTEM IS ENGAGED, AND AP IS OFF OR IN CWS MODE.
THE PITCH TRIM CONTROL SWITCHES ARE SPRING LOADED TO NEUTRAL.
IF BOTH SWITCHES ARE OPERATED SIMULTANEOUSLY, BUT IN OPPOSITE DIRECTIONS, TRIMMING STOPS.
IF TRIMMING BY MEANS OF THESE SWITCHES LASTS FOR MORE THAN ONE SECOND, AN AURAL WARNING, THE «WHOOLER», IS ACTIVATED.
JAMMING OF ONE OF THE MICROSWITCHES INCLUDED IN EACH CONTROL SWITCH, RESULTING IN A RUNAWAY, IS OVERCOME BY SELECTING THE SAME SWITCH IN THE OPPOSITE DIRECTION. TRIMMING STOPS AND THE SYSTEM DISENGAGES.
NOTE : THE PITCH TRIM RATE IS :
0.9°/S WHEN THE SPEED IS BELOW 200 KTS. 0.17°/S WHEN THE SPEED IS ABOVE 240 KTS.
IT VARIES LINE ARLY FROM 0.9°/S TO 0.17°/S WHEN THE SPEED IS BETWEEN 200 AND 240 KTS.

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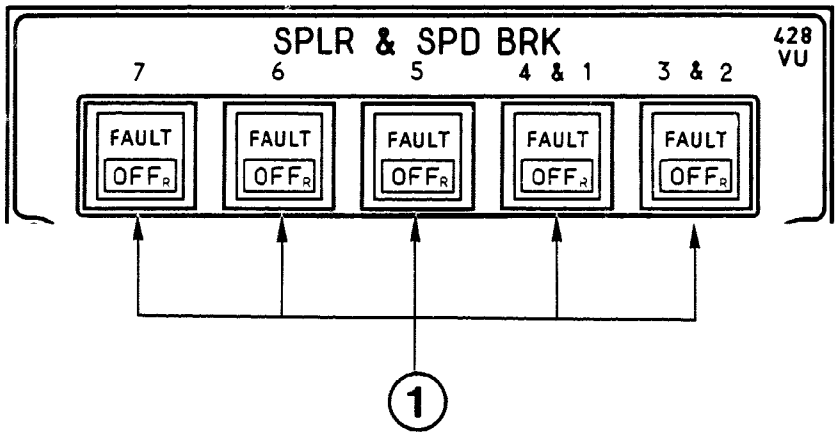
AIL TRIM Panel and Pitch Trim Control Switches
Figure 016

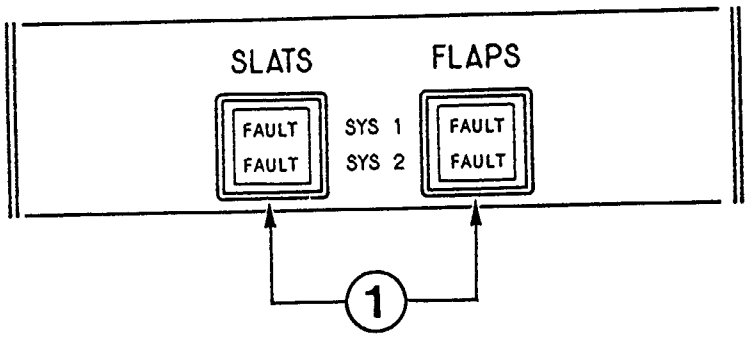


-1- SPLR & SPD BRK PUSHBUTTON SWITCHES :
EACH PUSHBUTTON SWITCH IS ASSOCIATED WITH ONE OR TWO PAIRS OF SYMMETRICAL SPOILERS.
A FAULT AND OFF/R INDICATION ARE INTEGRATED IN EACH PUSHBUTTON SWITCH.

- ON : (P/B SWITCH PRESSED-IN) : THE CORRESPONDING CONTROL SYSTEM IS ACTIVATED. EACH TIME A SYSTEM IS ACTIVATED OR THE CORRESPONDING AIRCRAFT HYDRAULIC SYSTEM IS ON, OR THE AIRCRAFT ELECTRICAL NETWORK IS ENERGIZED, A 2S SAFETY BITE TEST IS TRIGGERED FOR THE CORRESPONDING EFCU UNITS (CONTROL AND MONITOR)
- OFF/R (P/B SWITCH RELEASED-OUT) : THE OFF/R LEGEND COMES ON WHITE AND THE CORRESPONDING CONTROL SYSTEM IS DEACTIVATED. IF HYDRAULIC PRESSURE IS AVAILABLE, THE ACTUATORS ARE AUTOMATICALLY HELD IN RETRACTED POSITION.
THE MONITORING CIRCUITS ARE RESET BY THIS ACTION. THIS INDICATION IS ACCOMPANIED BY ECAM ACTIVATION.
- FAULT : WHEN A PUSHBUTTON SWITCH IS PRESSED (IN), ITS FAULT LEGEND COMES ON AMBER IF A FAILURE IS DETECTED BY THE MONITORING CIRCUITS WHICH THEN DEACTIVATE THE CONTROL SYSTEM.
ILLUMINATION OF THE FAULT LEGEND IS ACCOMPANIED BY ECAM ACTIVATION.

BM5 27 00 00 0 RUMO

SPLR & SPD BRK Panel
Figure 017



-1- SLATS (OR FLAPS) SYS 1 AND 2 FAULT LIGHTS

EACH LIGHT COMES ON AMBER WHEN THE ASSOCIATED HYDRAULIC MOTOR IS INOPERABLE.

BOTH SLATS (OR FLAPS) FAULT LIGHTS WILL COME ON SIMULTANEOUSLY IF THE SLATS (OR FLAPS) STOP DUE TO A SYSTEM OR VANE JAM. IN BOTH CASES, A REVERSE SELECTION IS POSSIBLE. IF SYSTEM OR VANE JAM IS RELEASED, THE SYSTEM WILL MOVE TO THE COMMAND POSITION.

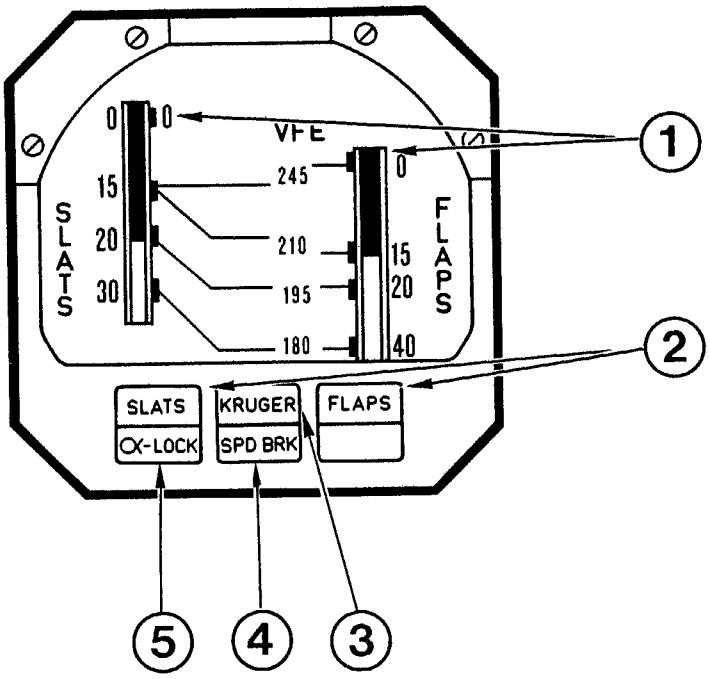
BOTH SLATS (OR FLAPS) FAULT LIGHTS AND THE ASSOCIATED AMBER SLATS (OR FLAPS) LIGHTS ON THE SLAT FLAP POSITION INDICATOR WILL COME ON SIMULTANEOUSLY IF A MECHANICAL FAILURE IS DETECTED.
IN THIS CASE, THE SYSTEM IS LOCKED BY.THE WING TIP BRAKES AND THERE IS NO POSSIBILITY OF RECOVERY IN FLIGHT.

NOTE : IF A SFCC IS NOT INSTALLED, THE TWO ASSOCIATED FAULT LIGHTS (ONE SLATS FAULT LIGHT AND ONE FLAPS FAULT LIGHT) WILL COME ON.

ILLUMINATION OF THESE LIGHTS IS ASSOCIATED WITH ECAM

BM5 27 00 00 0 RWMO

SLATS and FLAPS Panel
Figure 018



– 1 – SLATS/FLAPS POSITION INDICATORS : POSITION OF THE SLATS AND FLAPS IS SHOWN BY WHITE BARS MOVING UP AND DOWN ASSOCIATED SCALES. THE CORRESPONDING VFE (SPEED LIMIT) IS PLACARDED OPPOSITE EACH NORMAL POSITION (INDICATED BY A ROUND NUMBER).

– 2 – SLATS AND FLAPS LIGHTS
COME ON AMBER WHEN THE WING TIP BRAKES OF THE ASSOCIATED SYSTEM ARE LOCKED. ILLUMINATION OF THESE LIGHTS IS ACCOMPANIED BY MASTER CAUTION LIGHTS ON PANELS 3VU AND 5VU AND BOTH AMBER FAULT LEGENDS OF THE CORRESPONDING CHANNELS ON THE CONTROL PANEL, WITH ASSOCIATED SC AND ECAM ACTIVATION.

– 3 – KRUGER LIGHT :
COMES ON AMBER IF EITHER KRUGER FLAP IS NOT IN THE CORRECT POSITION 10 S AFTER A MOVEMENT COMMAND.
ILLUMINATION OF THE KRUGER LIGHT IS ACCOMPANIED BY ECAM ACTIVATION.

– 4 – SPD BRK LIGHT :
COMES ON BLUE WHEN SPEEDBRAKE CONTROL LEVER IS MOVED OUT OF THE RET POSITION

– 5 – ALPHA-LOCK LIGHT :
FLASHES BLUE WHEN THE SLATS ALPHA LOCK FUNCTION IS ACTIVATED (INHIBITION OF COMPLETE) SLAT AND KRUGER FLAP RETRACTION AT HIGH ANGLE OF ATTACK).

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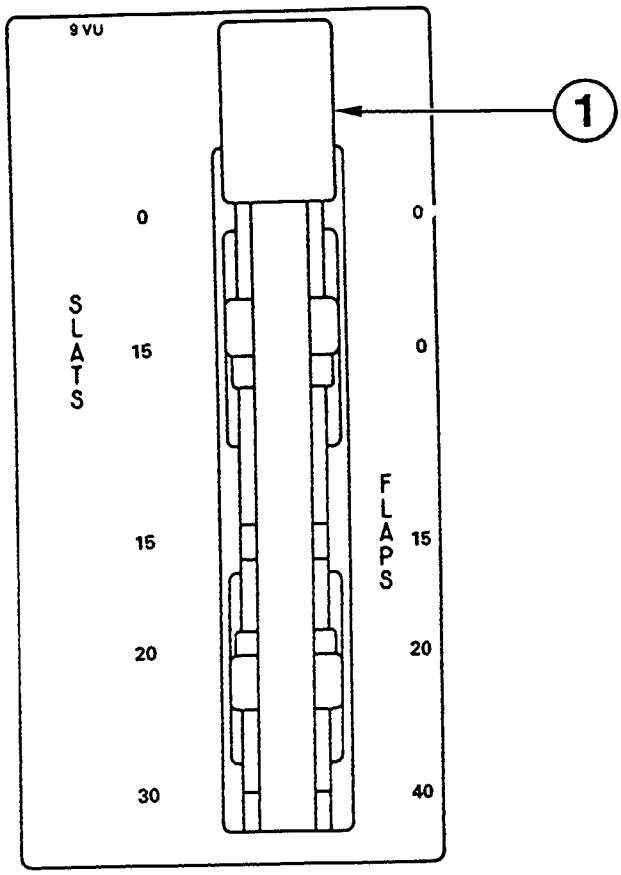
Slat/Flap Indicator
Figure 019



-1- FLAP AND SLAT CONTROL LEVER : THE LEVER CONTROLS SIMULTANEOUSLY OPERATION OF THE SLATS AND FLAPS AND KRUEGER FLAPS
FIVE GATED POSITIONS CORRESPOND TO THE FOLLOWING CONFIGURATIONS ON GROUND (DEGREES).

POSITION SEQUENCE	SLATS (OUTER,CENTER).	SLATS (INNER).	FLAPS (OUTER).	FLAPS (INNER).	KRUEGER FLAP
1 (0/0)	0	0	0	0	RETRACTED
2 (15/0)	17	16	0	0	EXTENDED
3 (15/15)	17	16	8	15	EXTENDED
4 (20/20)	21	20	16	22,1	EXTENDED
5 (30/40)	25,4	24	31,5	41	EXTENDED
( ) : NUMBER INDICATED ON THE SFPI (SLAT AND FLAP POSITION INDICATOR).					

BEFORE SELECTION OF ANY POSITION, THE FLAP AND SLAT CONTROL LEVER MUST BE PULLED UP.
A BAULK IS PROVIDED FOR POSITIONS 2 AND 4 TO PREVENT THE LEVER MOVING STRAIGHT THROUGH

NOTE : ALL SLATS AND FLAPS FAULT LIGHTS WILL COME ON IF THE CONTROL LEVER REMAINS BETWEEN TWO GATED POSITIONS (AFTER 10 S).

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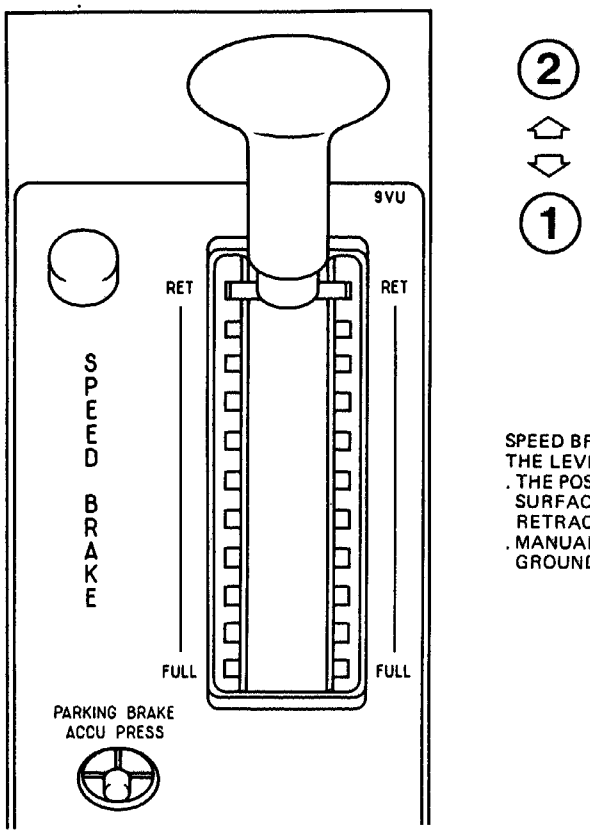
SLATS and FLAPS Controls
Figure 020



SPEED BRAKE LEVER
THE LEVER CONTROLS :
. THE POSITION OF THE SPEEDBRAKE SURFACES, ELEVEN POSITIONS FROM RETRACTED (RET) TO FULLY EXTENDED (FULL)
. MANUAL PRESELECTION OF THE GROUND SPOILER FUNCTION.

-1- SPEED BRAKE SELECTION
TO SELECT THE SPEED BRAKE SURFACES TO THE REQUIRED POSITION, THE PILOT MUST PRESS ON THE TOP OF THE LEVER AND MOVE IT TO THE CORRESPONDING NOTCH.
THE CONTROL LEVER CANNOT BE MOVED AS LONG AS THE GROUND SPOILER FUNCTION IS PRESELECTED.

-2- GROUND SPOILER OPERATION
TO ARM THE GROUND SPOILER FUNCTION, THE CONTROL LEVER MUST BE LIFTED WHEN IN THE RETRACTED POSITION (RET).
WHEN THE CONTROL LEVER IS LIFTED OR REVERSE THRUST IS SELECTED ON ONE ENGINE, ALL THE SPOILERS WILL EXTEND IF ALL THE OTHER LOGIC CONDITIONS ARE ACHIEVED :
- BOTH ENGINE THROTTLE CONTROL LEVERS AT IDLE POSITION
- AIRCRAFT ON GROUND LOGIC FULFILLED :
  - AFT WHEEL SPEED HIGHER THAN 85 KTS
  - OR BOGIE BEAM MOVEMENT (VALIDATED BY A LOGIC)

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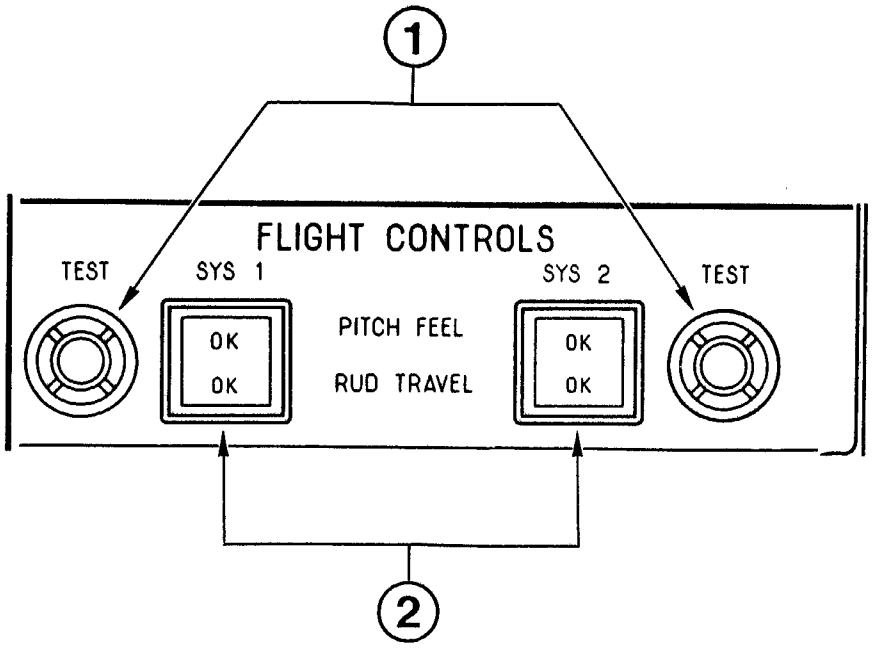
SPEED BRAKE Control Lever
Figure 021



-1- TEST PUSHBUTTON SWITCHES
THESE PUSHBUTTON SWITCHES CONTROL THE TEST OF PITCH FEEL AND RUD TRAVEL ELECTRICAL SYSTEMS AND WARNING SYSTEMS CONTINUITY.
THE TEST IS POSSIBLE ONLY IF PITCH FEEL AND RUD TRAVEL SYSTEMS ARE ENGAGED ON THE CONTROL PANEL (OVERHEAD PANEL).
THE LEFT PUSHBUTTON SWITCH TESTS PITCH FEEL AND RUDDER TRAVEL SYSTEM 1.
THE RIGHT PUSHBUTTON SWITCH TESTS PITCH FEEL AND RUDDER TRAVEL SYSTEM 2.
WHEN A TEST PUSHBUTTON SWITCH IS PRESSED AND HELD, THE ASSOCIATED SYSTEM MUST DISENGAGE AND THE ASSOCIATED FAULT LEGEND COMES ON AMBER.
IF THE TEST IS SUCCESSFUL, OK LEGENDS COME ON WHITE :
- UPPER LEGENDS FOR PITCH FEEL SYS 1 AND 2
- LOWER LEGENDS FOR RUD TRAVEL SYS 1 AND 2.

-2- OK LEGENDS
COME ON WHITE, AS LONG AS THE TEST PUSHBUTTON SWITCH IS PRESSED AND HELD, TO INDICATE A SUCCESSFUL TEST.

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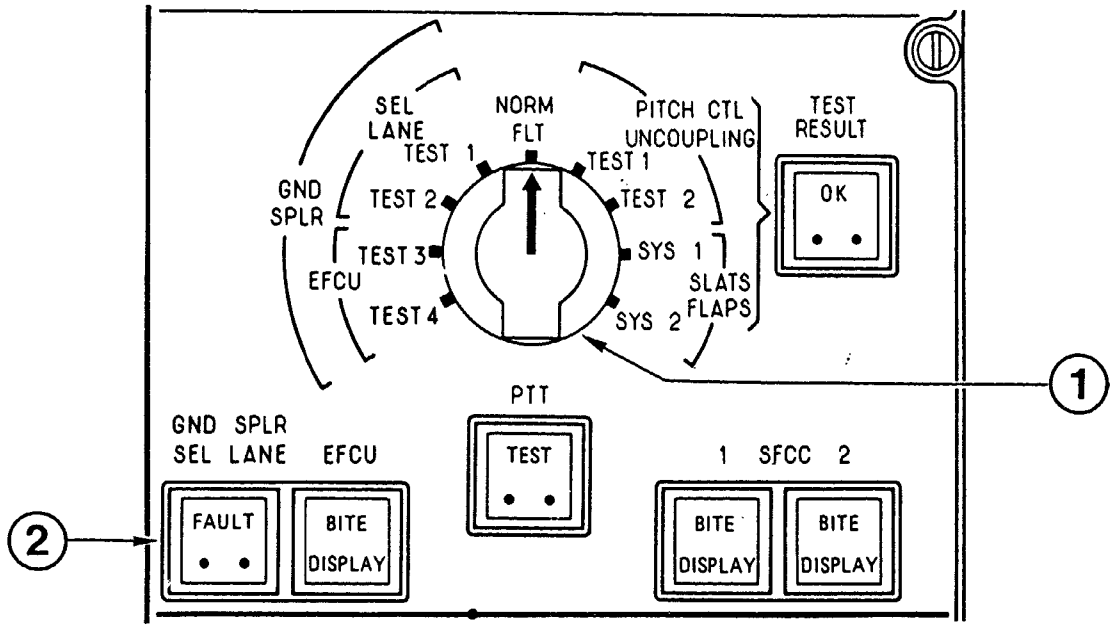
FLIGHT CONTROLS Panel (Lateral Panel)
Figure 022



-1- TEST SELECTOR SWITCH

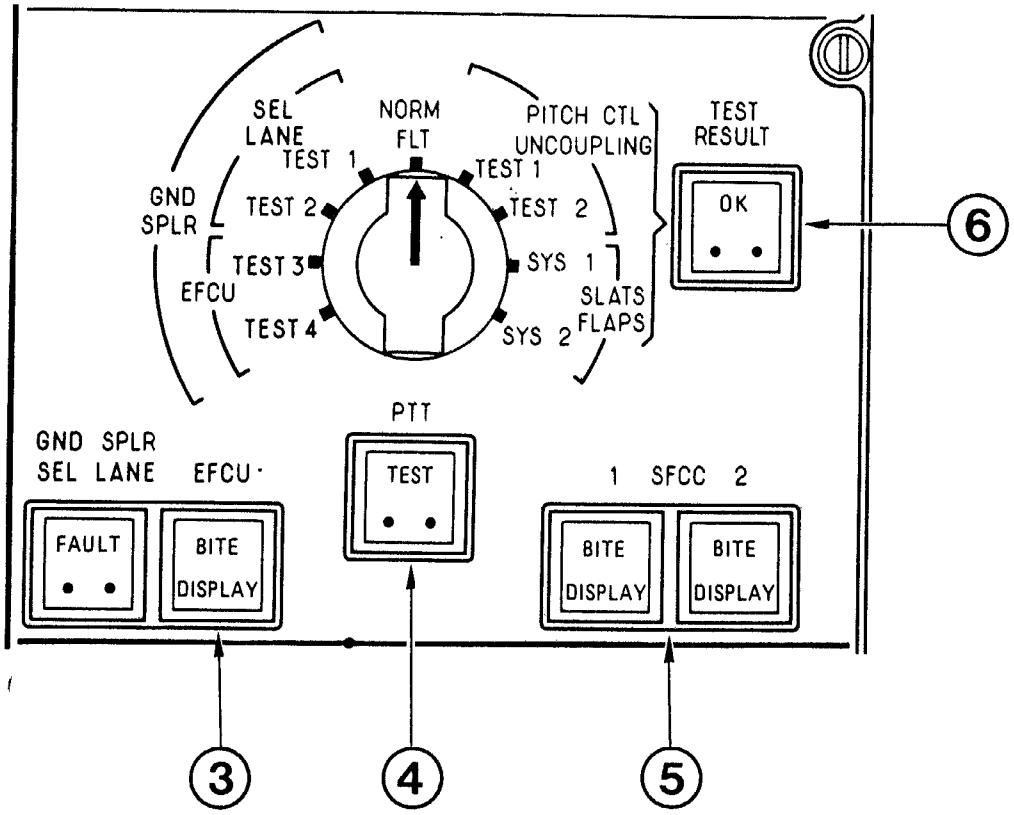
- NORM FLT — NORMAL OPERATING POSITION, TEST CIRCUITS DISCONNECTED, WARNINGS CANCELLED.
- GND SPLR — CHECKS THAT NO UNDUE CONDITION IS PERMANENTLY ACHIEVED IN THE GROUND SPOILER LOGIC FOR THE EFCU INVOLVED WHEN THE TEST PUSHBUTTON SWITCH IS PRESSED (IN) :
  - SEL LANE TEST 1 AND 2 POSITIONS CHECK THE INTEGRITY OF SELECTOR LANE AIRCRAFT WIRING.
  - EFCU TEST 3 AND 4 POSITIONS CHECK THE INTEGRITY OF EACH EFCU LOGIC. THE CORRESPONDING FAULT LEGENDS ON THE SPLR & SPD BRK PANEL WILL GO OFF.

  THIS TEST REQUIRES ALL HYDRAULIC POWER TO BE CUT OFF TO ALL FLIGHT CONTROLS, TO HAVE THE FAULT LEGENDS ILLUMINATED BEFORE THE TEST.
- PITCH CTL UNCOUPLING : TESTS PERIODICALLY ON THE GROUND, THE ELECTRICAL CIRCUITS OF THE PITCH UNCOUPLING UNIT.
  - TEST 1 CHECKS THAT THE UNCOUPLING UNIT ROD IS IN THE LOCKED POSITION.
  - TEST 2 CHECKS THAT THE UNCOUPLING UNIT MOVES TO THE UNLOCKED POSITION, WHEN THE SOLENOID IS ENERGIZED.
- SLATS FLAPS — COMMANDS A BITE SEQUENCE FOR THE RELEVANT SFCC (SYS 1 OR SYS 2) WHEN THE TEST PUSHBUTTON SWITCH IS PRESSED (IN).

-2- GND SPLR SEL LANE FAULT ANNUNCIATOR
COMES ON WHITE WHEN A FAULT HAS BEEN DETECTED IN TEST 1 OR TEST 2 POSITIONS OF THE TEST SELECTOR SWITCH.

BM5 27 00 00 0 SGMO - 07

FLIGHT CONTROLS Panel (Cont'd) (1 of 2)
Figure 023



-3- EFCU BITE DISPLAY ANNUNCIATOR
COMES ON WHITE WHEN A FAULT HAS BEEN DETECTED BY THE CONTINUOUS MONITORING OF EACH EFCU. MORE DETAILS OF THE FAILURE ARE DISPLAYED ON THE FACE OF THE EFCUS.

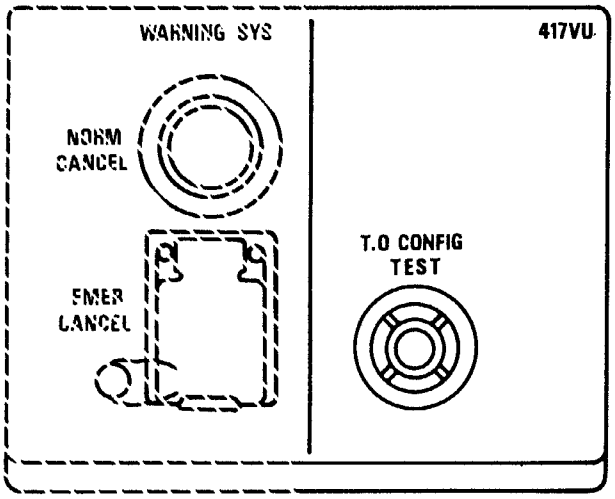
-4- PTT PUSHBUTTON SWITCH
THIS PUSHBUTTON SWITCH ACTIVATES THE TEST OF THE SYSTEM SELECTED BY THE TEST SELECTOR SWITCH. A TEST INDICATION IS INTEGRATED IN THE SWITCH.
- PTT WHEN PRESSED (IN) AND HELD, THE SELECTED SYSTEM IS TESTED.
- TEST THE TEST LEGEND COMES ON WHITE WHEN THE TEST SELECTOR SWITCH IS SET TO A SYSTEM TEST POSITION. IT IS OFF WHEN THE TEST SELECTOR SWITCH IS IN NORM FLT POSITION.

-5- SFCC 1 & 2 BITE DISPLAY ANNUNCIATORS.
COME ON WHITE WHEN A FAULT HAS BEEN DETECTED BY THE CONTINUOUS MONITORING OF THE SFCCS, EVEN IF THE FAILURE DOES NOT REQUIRE CREW ACTION (NO FAULT INDICATION ON THE OVERHEAD PANEL). MORE DETAILS OF THE FAILURE ARE DISPLAYED ON THE FACE OF THE SFCCS.

-6- TEST RESULT ANNUNCIATOR
THE OK LEGEND COMES ON WHITE WHEN THE TEST IS SUCCESSFUL.
NOTE : THESE ANNUNCIATORS (OK, FAULT, BITE DISPLAY) WILL COME ON PROVIDED THAT THE ANN LTS SWITCH IS IN READ POSITION DURING THE TEST.

BM5 27 00 00 0 SJMO – 14

FLIGHT CONTROLS Panel (Cont'd) (2 of 2)
Figure 024



WHEN THE T.O. CONFIG TEST PUSHBUTTON SWITCH IS PRESSED AND HELD, T.O. POWER APPLICATION IS SIMULATED.
THIS TEST WILL ACTIVATE THE APPROPRIATE WARNINGS IF THE AIRCRAFT IS NOT IN TAKEOFF CONFIGURATION
THE WARNINGS ARE CANCELLED WHEN THE PUSHBUTTON SWITCH IS RELEASED.
FLIGHT CONTROLS CONDITIONS FOR WARNING AND THE RESULTANT WARNINGS ARE :
- THS IS NOT IN TAKEOFF CONFIGURATION>2.5° AIRCRAFT NOSE DN OR>3.5° AIRCRAFT NOSE UP
THE MASTER WARNING LIGHTS COME ON PANELS 3VU AND 5VU WITH ASSOCIATED CRC AND ECAM ACTIVATION
- SLATS OR FLAPS ARE NOT IN TAKEOFF CONFIGURATION (NOT 15° OR 20°)
THE MASTER WARNING LIGHTS COME ON PANELS 3VU AND 5VU WITH ASSOCIATED CRC AND ECAM ACTIVATION
- SPEED BRAKE OR GROUND SPOILER SURFACES ARE EXTENDED.
IN THIS CASE, ILLUMINATION OF THE BLUE SPD BRK LIGHT ON THE SFPI IS ACCOMPANIED BY THE MASTER WARNING LIGHTS COME ON PANELS 3VU AND 5VU WITH ASSOCIATED CRC AND ECAM ACTIVATION.

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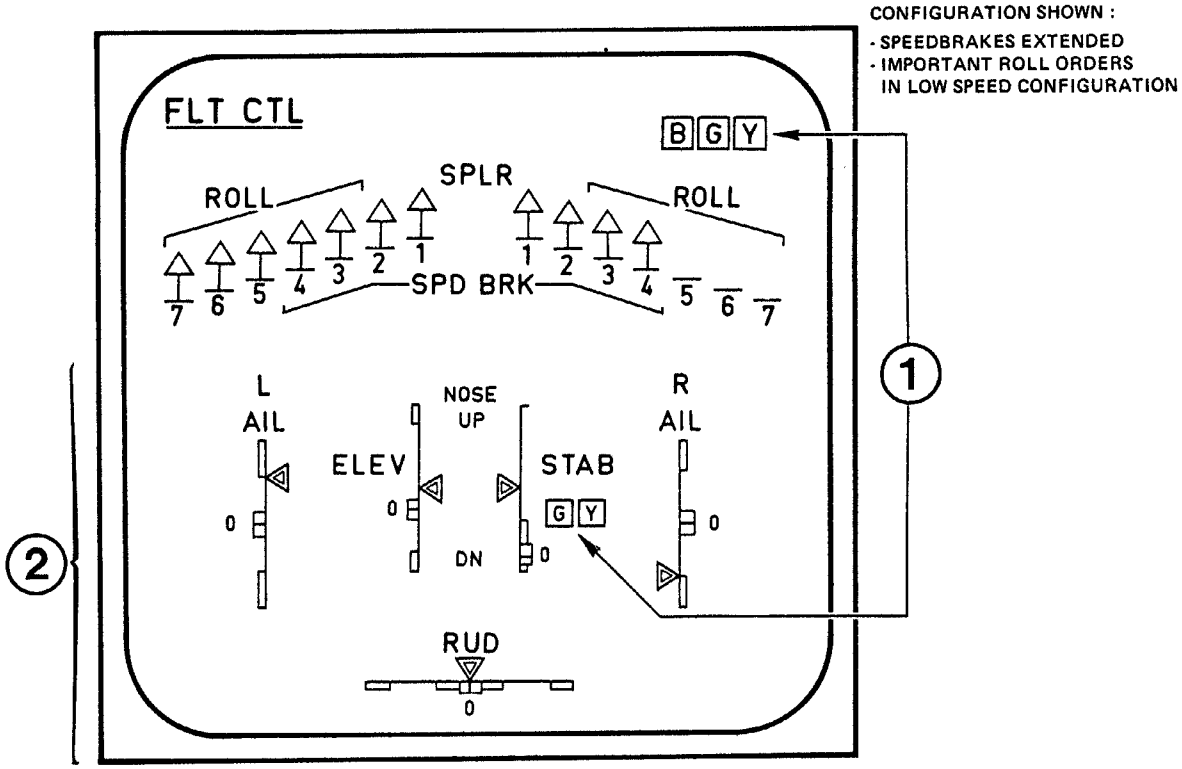
T.O CONFIG TEST Pushbutton Switch
Figure 025



THE FLT CTL PAGE OF THE SYSTEM DISPLAY (RIGHT ECAM DISPLAY UNIT) IS CALLED EITHER BY MANUAL SELECTION, OR AUTOMATICALLY WHEN A WARNING OCCURS ON A SYSTEM COVERED BY THIS PAGE.

-1- B, G, Y SYMBOLS
EACH AVAILABLE SYSTEM ON THE FLIGHT CONTROLS AND TRIMMABLE HORIZONTAL STABILIZER IS INDICATED BY A GREEN SYMBOL.
IN CASE OF SERVO CONTROL LOW PRESSURE DETECTION, THE CORRESPONDING SYMBOLS BECOME AMBER.

-2- PRIMARY FLIGHT CONTROL SURFACE POSITION DISPLAY
A WHITE SCALE CONVERING THE FULL TRAVEL RANGE IS PROVIDED FOR EACH SURFACE (ELEVATORS, RUDDER, ALL SPEED AILERONS AND TRIMMABLE HORIZONTAL STABILIZER).
AN INDEX INDICATING THE ACTUAL POSITION OF THE SURFACES ALONG EACH SCALE.

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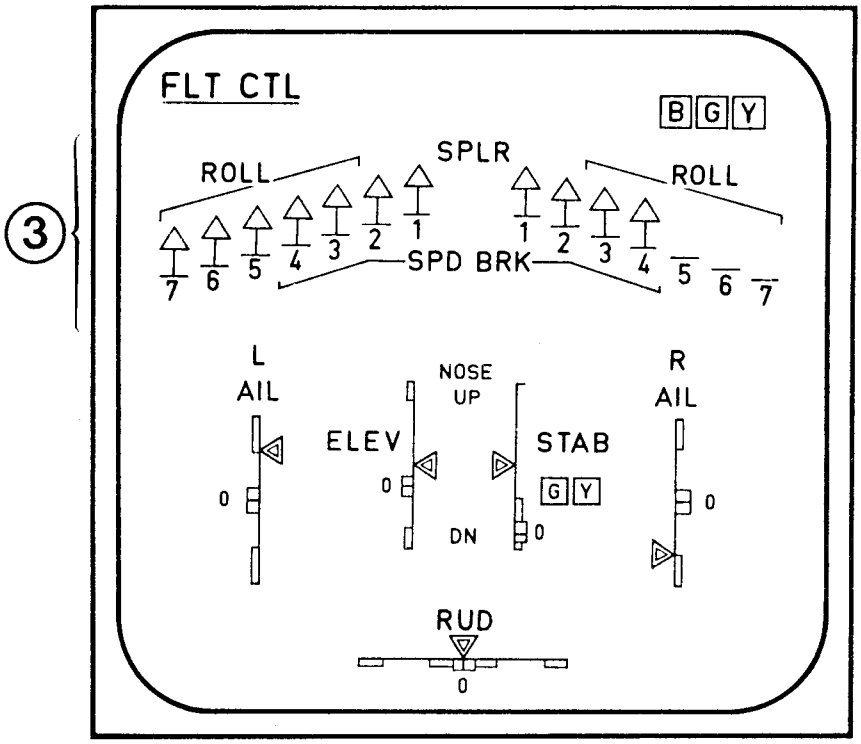
Control Surface Position Indicating (FLT CTL Page) (1 of 2)
Figure 026



CONFIGURATION SHOWN :
- SPEEDBRAKES EXTENDED
- IMPORTANT ROLL ORDERS IN LOW SPEED CONFIGURATION

-3- ROLL SPOILER AND SPEEDBRAKE SURFACE POSITION DISPLAY

EACH ROLL SPOILER AND SPEEDBRAKE SURFACE IS REPRESENTED AS FOLLOWS :

WHEN THE SURFACE IS COMPLETELY RETRACTED, IT IS SYMBOLIZED BY A SMALL DASH.

WHEN THE SURFACE IS DEFLECTED MORE THAN 2, A SMALL ARROW APPEARS ABOVE THE DASH.
IN NORMAL CONDITIONS, THESE INDICATIONS ARE GREEN

3 IN CASE OF FAILURE DETECTED FOR A GROUP OF SURFACE IN THE EFCU'S, THE NUMBERS IDENTIFYING THE SURFACES INVOLVED APPEAR BELOW THE DASH.

$\frac{4}{3}$ IN CASE OF HYDRAULIC FAILURE WHEN A SURFACE IS EXTENDED THE COLOR OF THE CORRESPONDING SYMBOL CHANGES FROM GREEN TO AMBER AND THE NUMBER APPEARS BELOW THE SYMBOL.

ON GROUND, AFTER LANDING, THE GREEN ARROW FLASHES WHEN THE SPOILER IS EXTENDED AND SPEED $\geq$ 70KT

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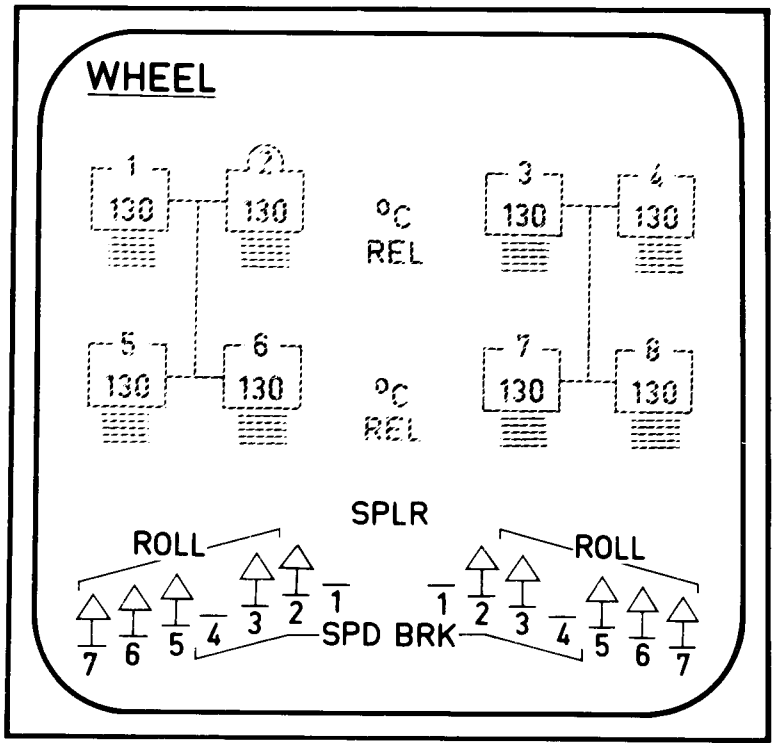
Control Surface Position Indicating (FLT CTL Page) (2 of 2)
Figure 027



CONFIGURATION SHOWN :

- GROUND SPOILERS EXTENDED
- FAILURE DETECTED ON 1-4 SURFACES CONTROL SYSTEM (SURFACES RETRACTED)

THE BRAKE PAGE OF THE SYSTEM DISPLAY IS CALLED AUTOMATICALLY AT LANDING.

-1- SPOILER PORTION DISPLAY
EACH SPOILER IS REPRESENTED IN THE SAME MANNER AS ON THE FLT CTL PAGE.
ON THE GROUND, AFTER LANDING, THE ARROW CORRESPONDING TO ANY SPOILER EXTENDED AND WHOSE CONTROL SYSTEM IS NOT FAILED, FLASHES WHEN SPEED IS ⩾ 70KT

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Control Surface Position Indicating (BRAKE Page)
Figure 028

3. Flight Controls Hydraulic Power Supply (Ref. Fig. 029, 030, 031) (Ref. Fig. 032)
The flight controls are powered by the three independent hydraulic systems ; redundancy is such that with two hydraulic systems failed, the remaining system can operate the aircraft within an acceptable range of the flight envelope.
Hydraulic characteristics of flight control components are given in the component description paragraphs.

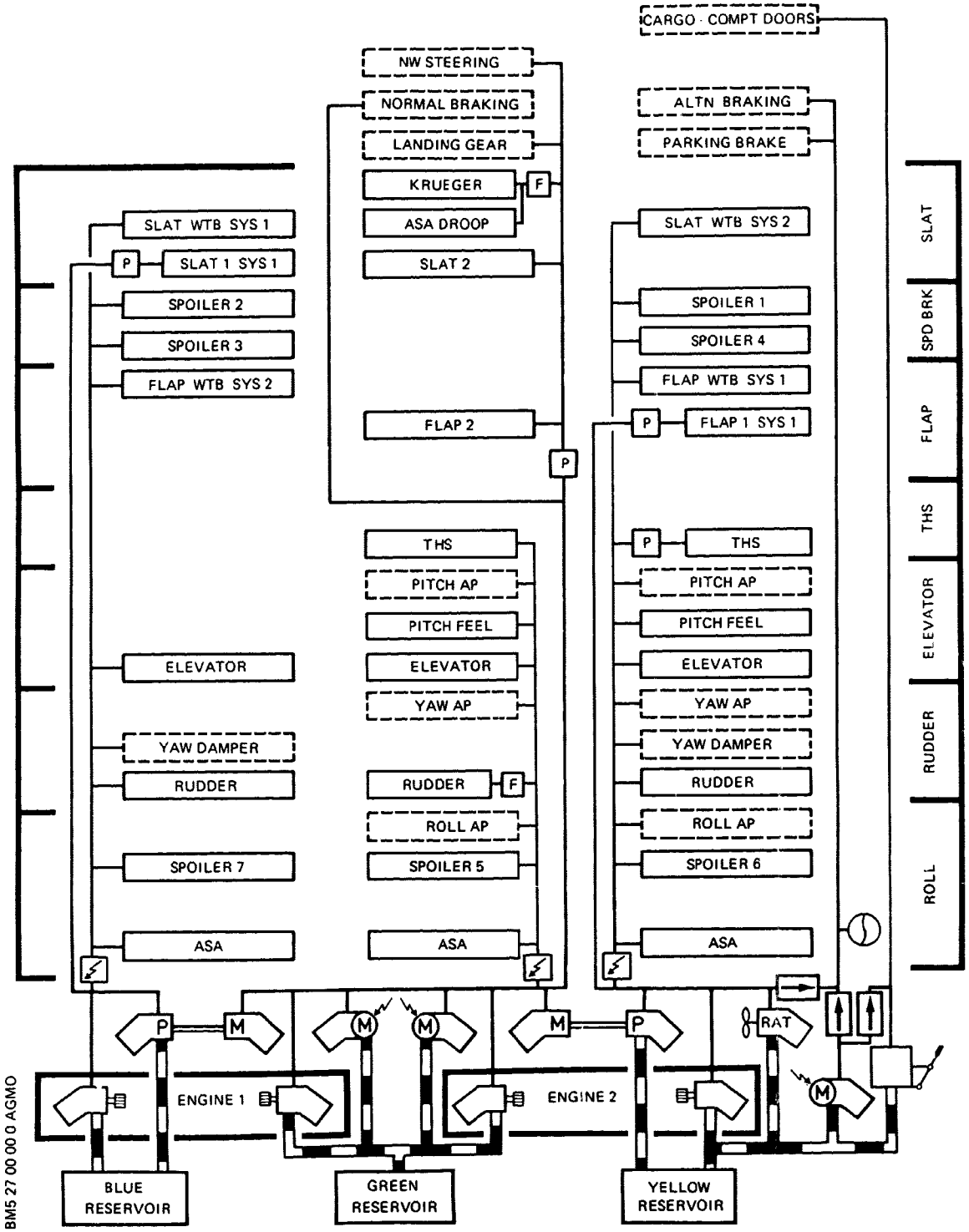
A. Servo Controls Selector Valve
In the event of control valve jamming in a servo control, an electrically controlled selector valve in the associated hydraulic system cuts off the hydraulic power supply to all the servo controls powered by this system (Ref. 27-14).

B. Priority Valves
Priority valves are installed upstream of the following components :
- Blue system : slat power control unit (PCU) motor
- Green system : flap and slat PCU motors and landing gear actuating cylinders
- Yellow system : flap PCU and THS actuator motors

in order to avoid supply pressure of the main flight control components dropping below approximately 130 bars (1885 psi) when various hydraulic user systems are operated simultaneously.

C. Isolation Valve Blocks
Ground maintenance isolation valve blocks are installed in the flight controls hydraulic supply lines to allow measurement of internal leakage of the components installed downstream of these valves.

D. Safety Valves
To preserve the Green system, safety valves are installed upstream of the following components :
- Krueger selector solenoid valve (in case of engine burst)
- Rudder servo control (in case of inflight collision).



Flight Controls Hydraulic Power Supply
Figure 029

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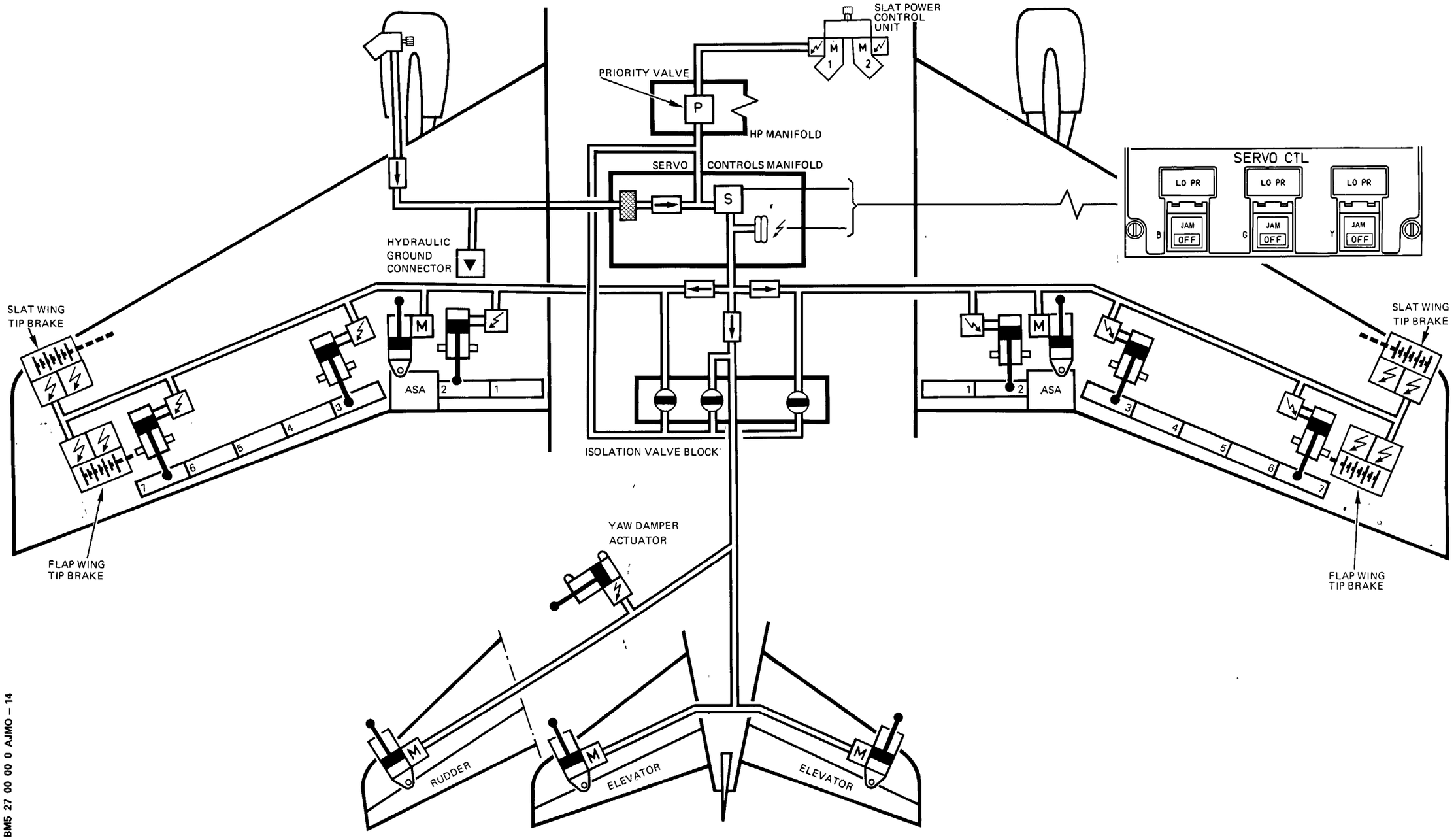

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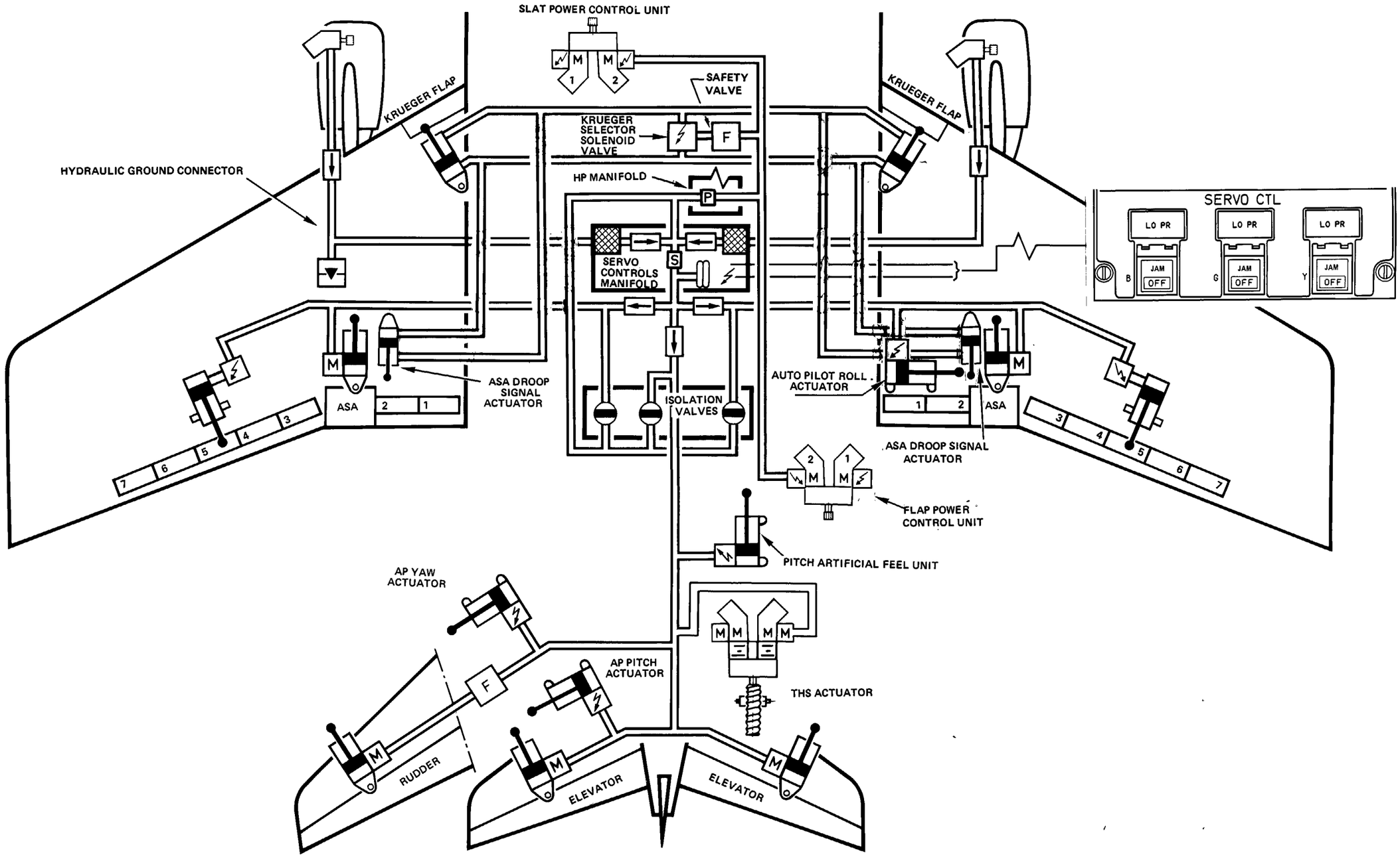
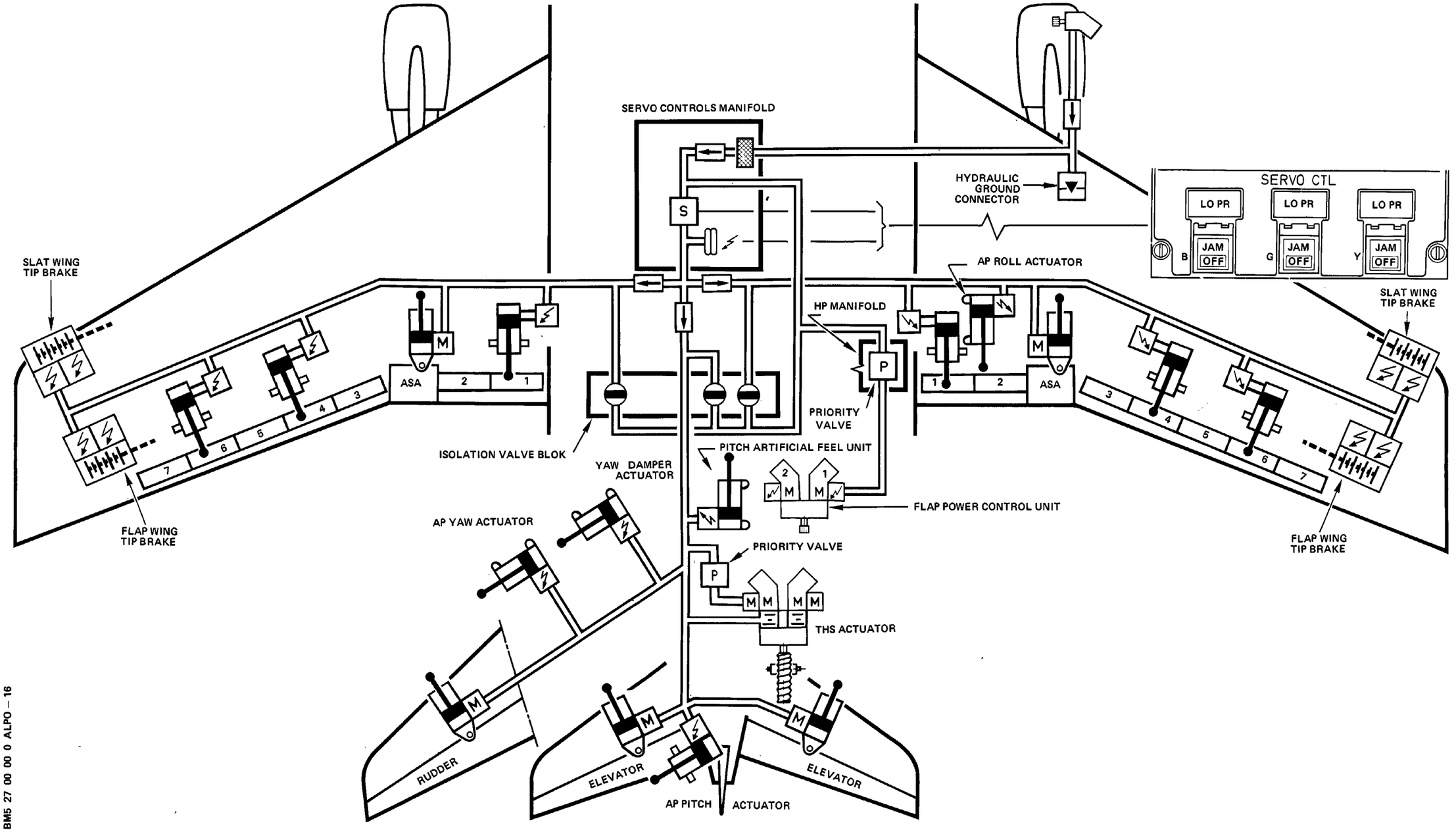
Flight Controls Blue Hydraulic Power Supply
Figure 030



Flight Controls Green Hydraulic Power Supply
Figure 031



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Flight Controls Yellow Hydraulic Power Supply
Figure 032

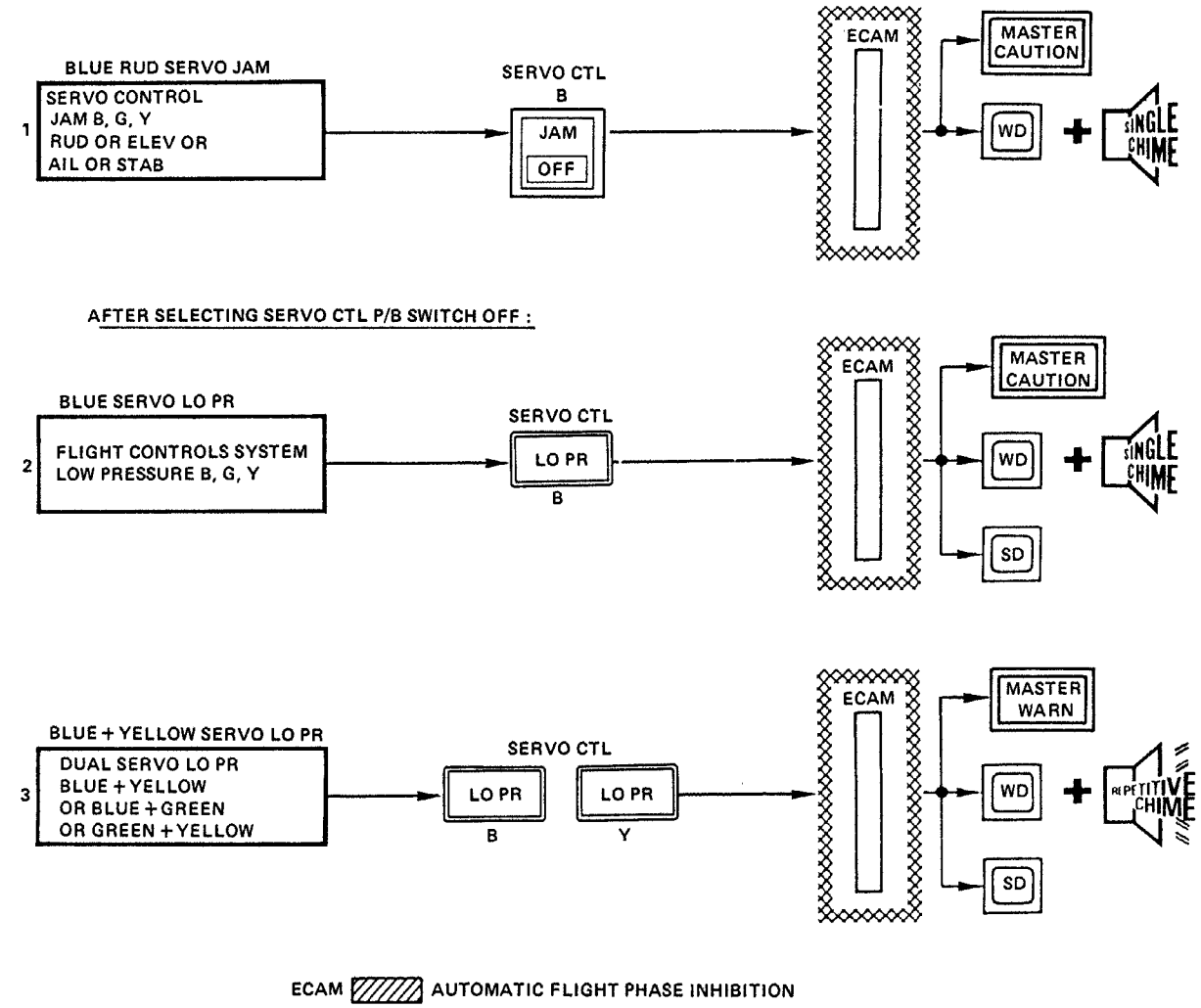
4. Flight Control Warnings (Ref. Chap. 31)
(Ref. Fig. 033)
(Ref. Fig. 034)
(Ref. Fig. 035)
(Ref. Fig. 036)
(Ref. Fig. 037)
(Ref. Fig. 038)
(Ref. Fig. 039)
(Ref. Fig. 040)

Flight control failures are indicated by local alerts, warning lights, and warning/caution wording on the ECAM display units.
The indications are provided via the ECAM system, the main functions of which are as follows :

- Allow the crew to :
  . be aware of a failure condition and know how serious it is,
  . identify the failed system without any ambiguity,
  . decide on the appropriate corrective action,
  . provide the crew with an operationally oriented diagnosis facility (the status function).

  To achieve this objective the system generates audio and visual signals. The audio signals are transmitted by loudspeakers and the visual signals by lights and on the ECAM CRT display units.
- Improve crew comfort by eliminating the need to refer constantly to the overhead panel for :
  . routine system trending,
  . system parameter trending (advisory mode),
  . immediate analysis of system configuration in failure cases,
  . indicating effective use of functions which are used only temporarily (the memo function).

In the event of loss of the ECAM CRT display units, redundancy is provided by availability of the local warnings on the overhead panel, centralized on panels 3VU and 5VU located on the forward center pedestal.
For this reason, the aircraft is still dispatchable without CRT display.



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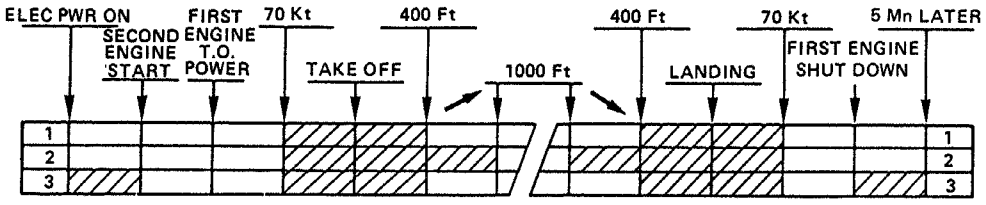
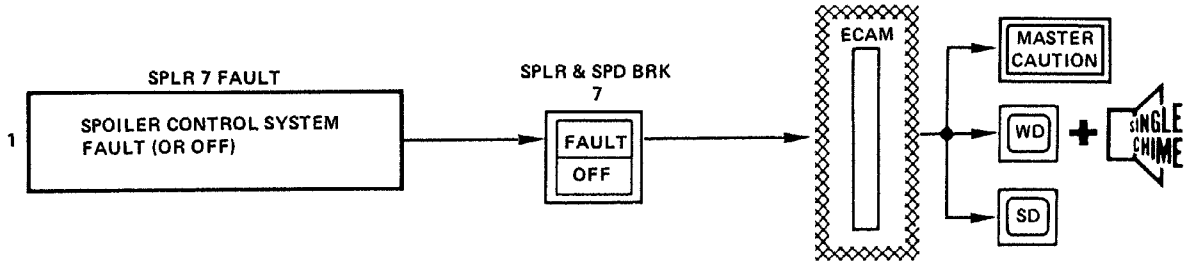
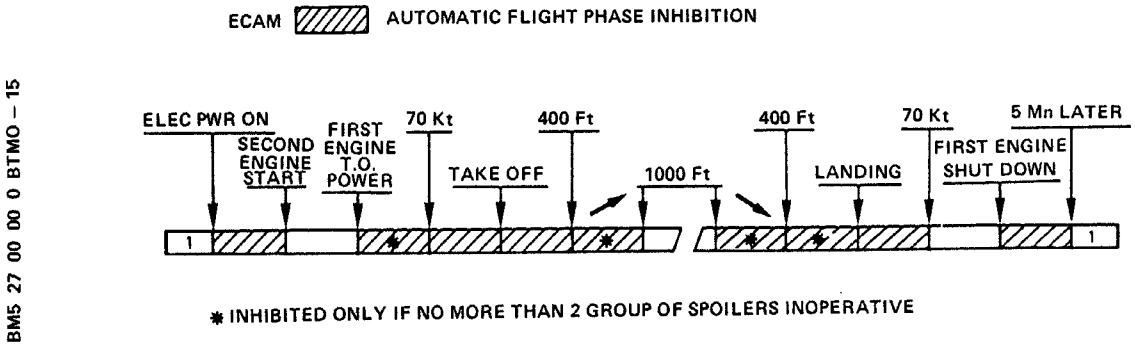


Servo Control Failure Warnings
Figure 033





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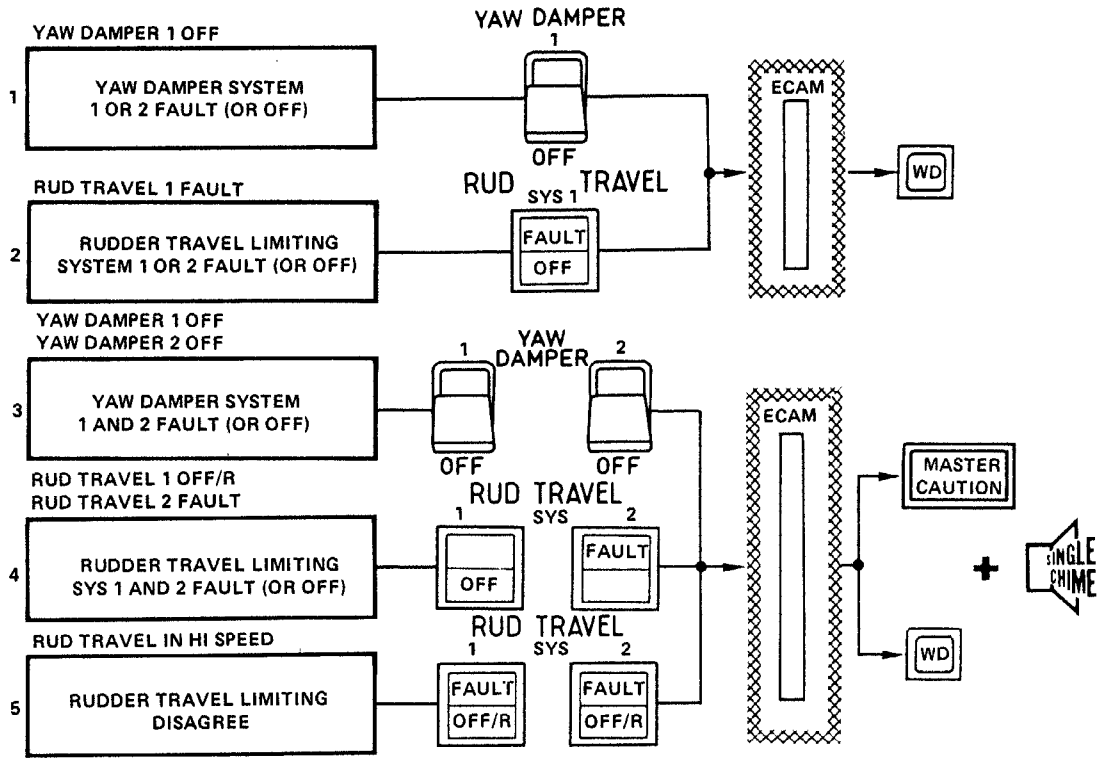
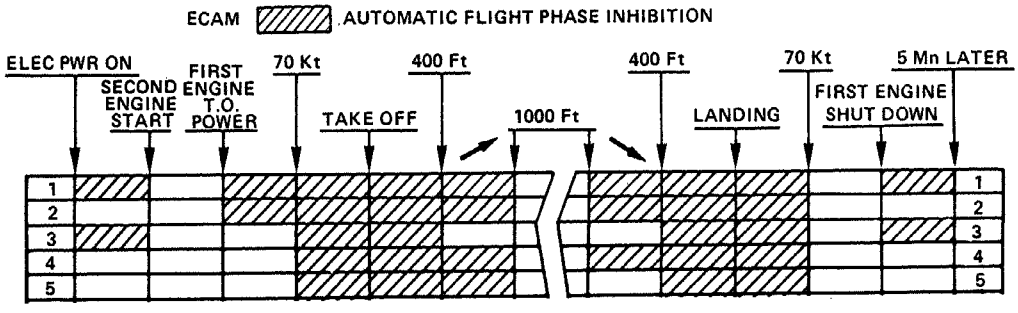
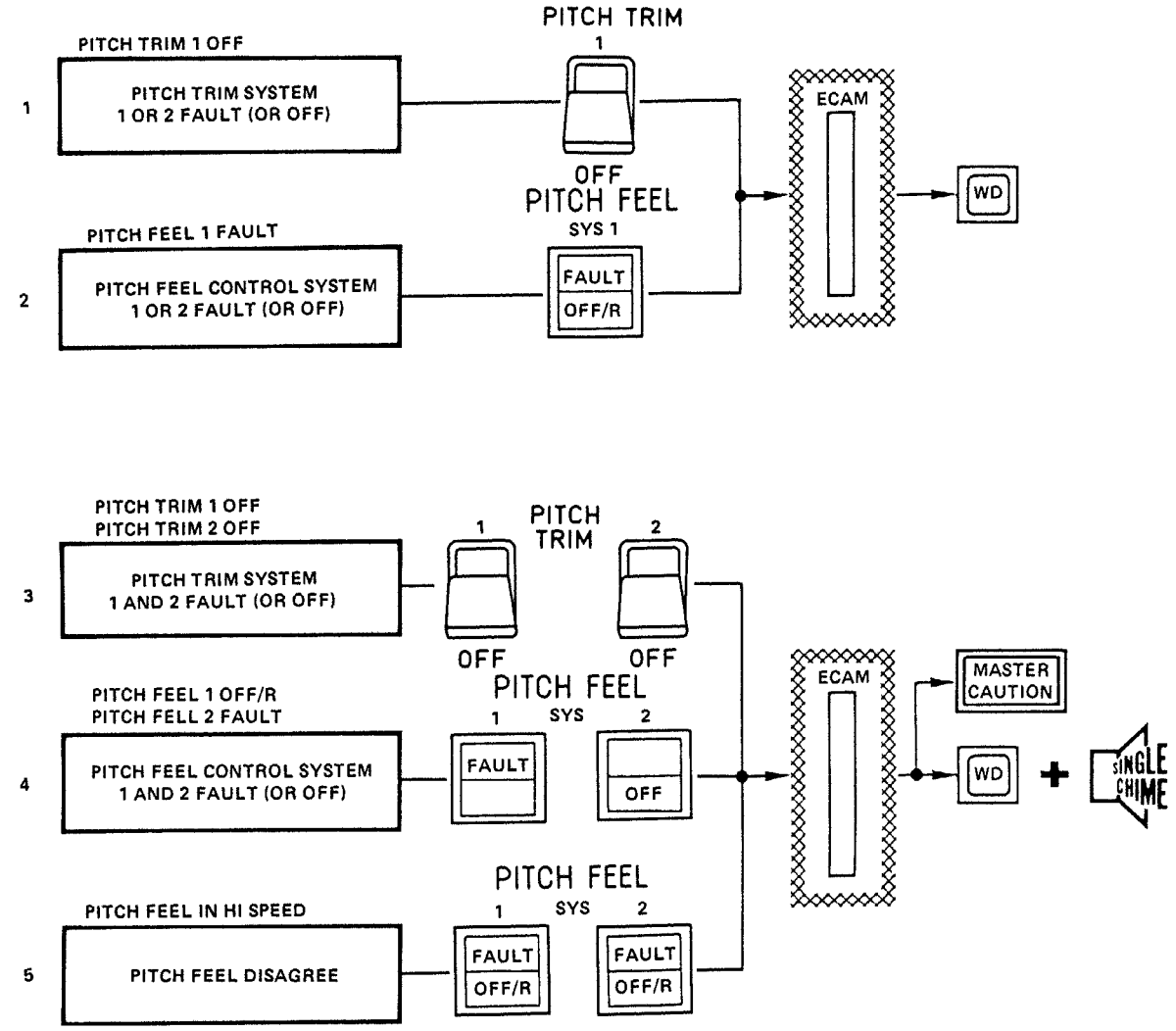
Roll Spoiler Control Failure Warnings
Figure 034



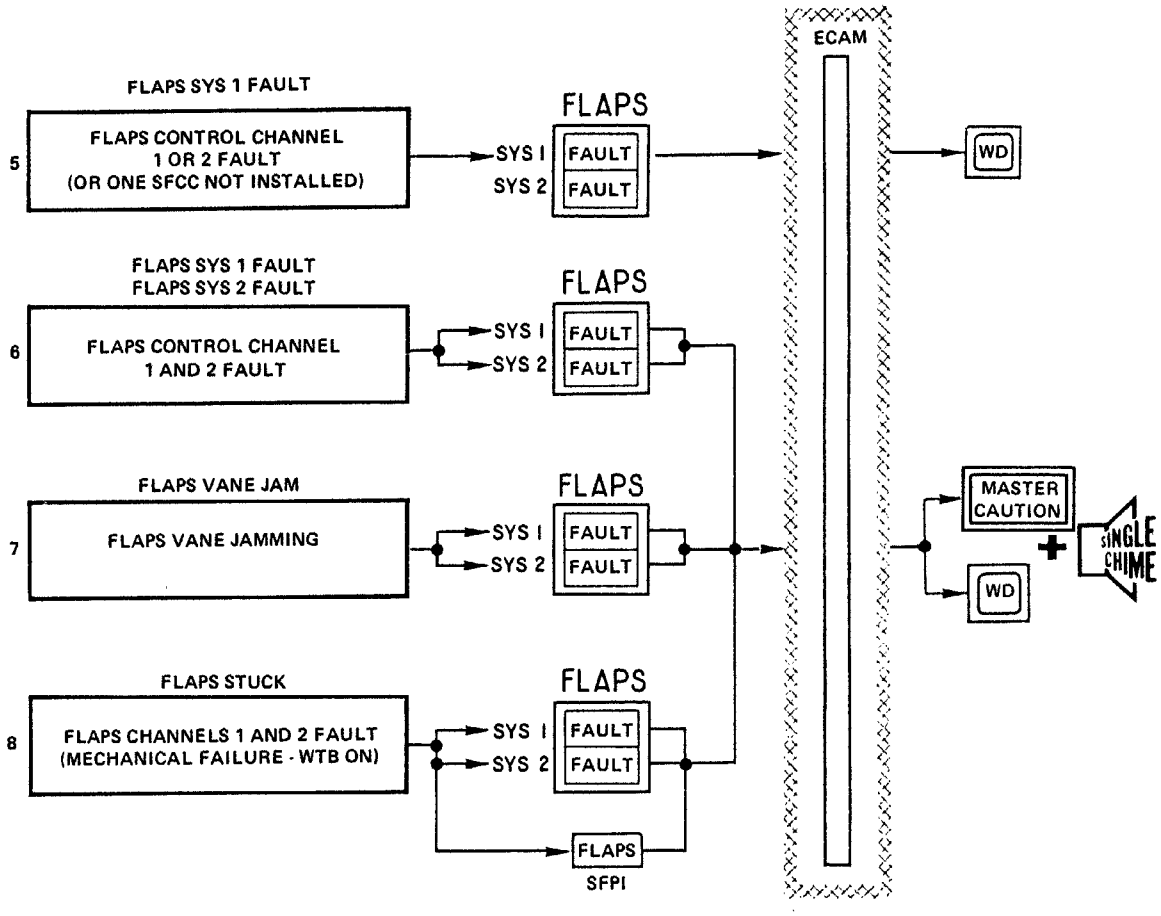


BM5 27 00 00 0 CTMO – 15

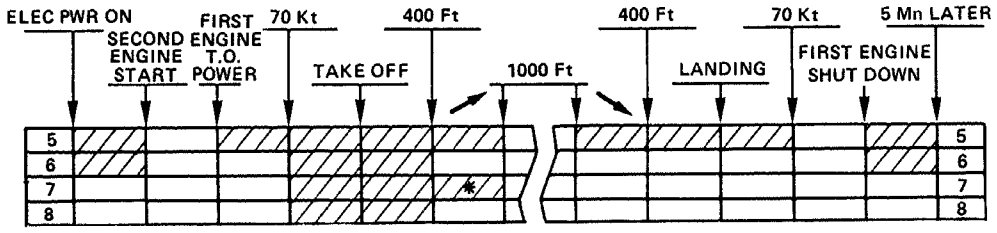
Rudder Control Failure Warnings
Figure 035



Pitch Control Failure Warnings
Figure 036

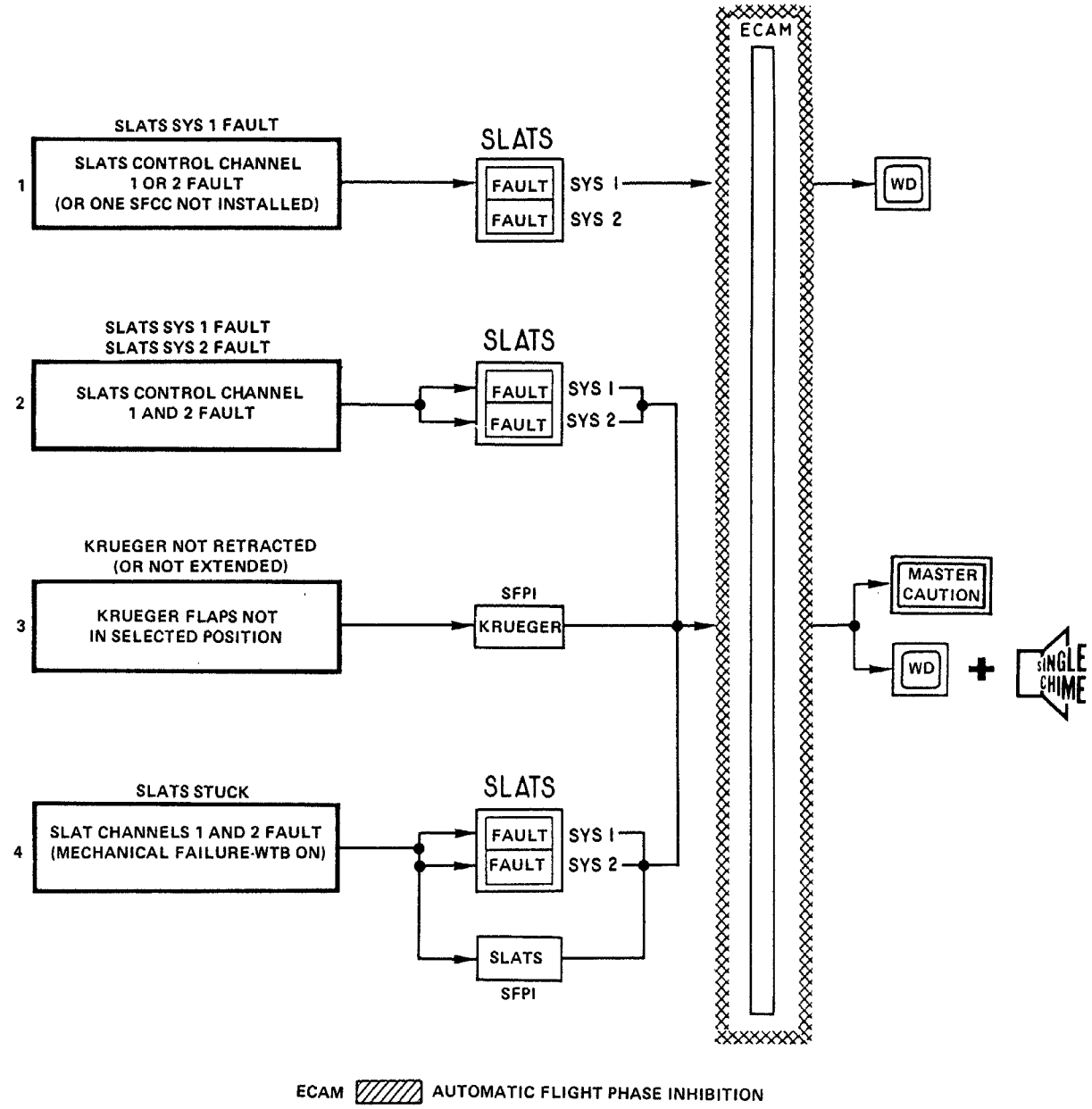


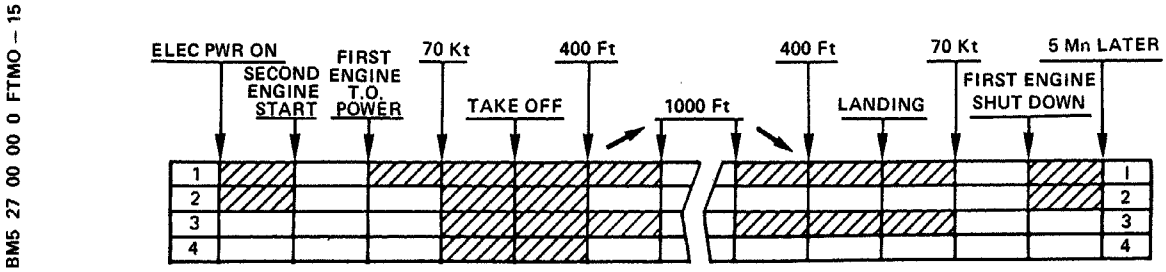
ECAM ▨ AUTOMATIC FLIGHT PHASE INHIBITION



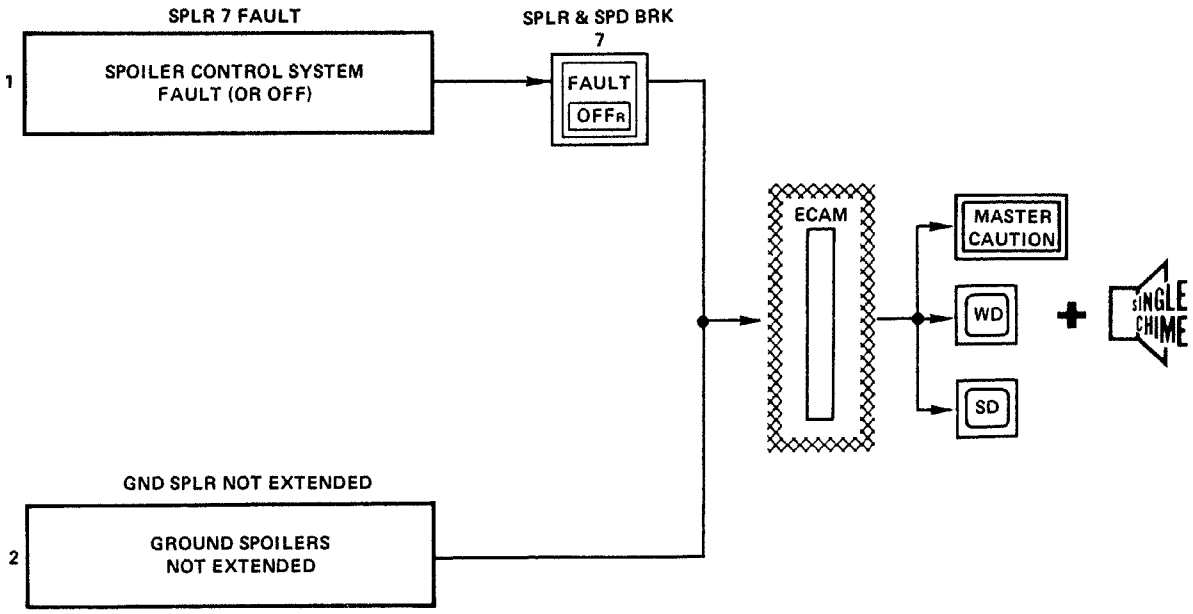
BM5 27 00 00 0 ETMO – 15

Flaps Control Failure Warnings
Figure 037

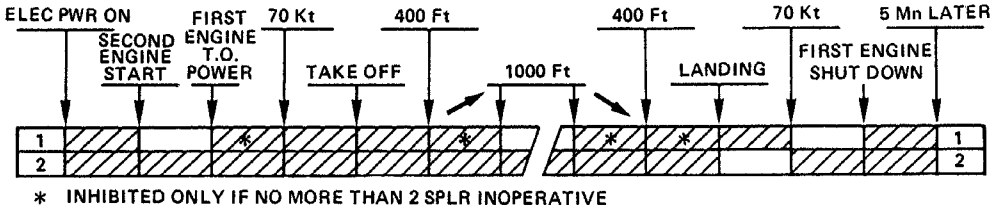




Slats Control Failure Warnings
Figure 038



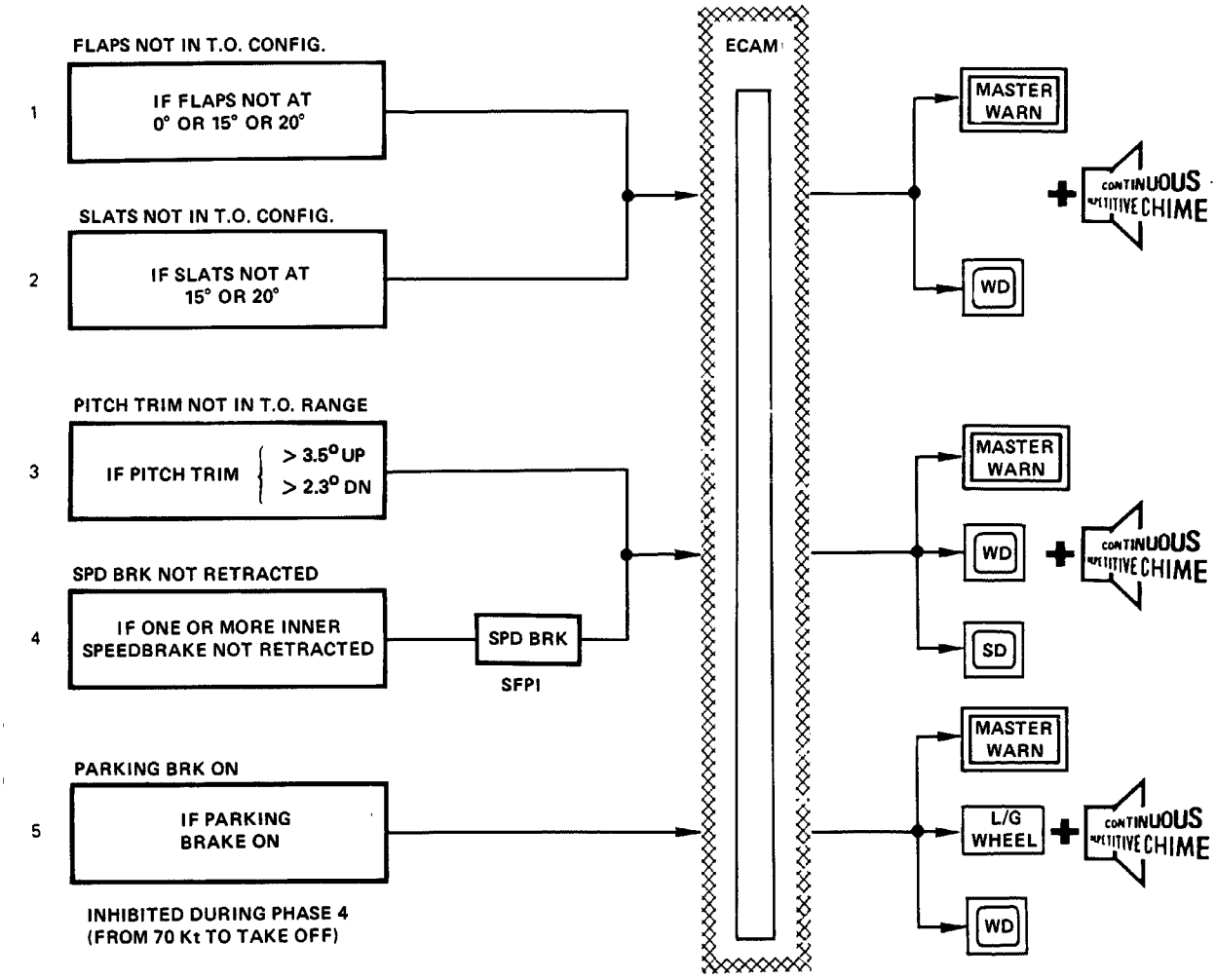
ECAM AUTOMATIC FLIGHT PHASE INHIBITION



BM5 27 00 00 0 GTMO – 15

Speed Brakes and Ground Spoilers Failure Warnings
Figure 039

DURING PHASES 3 AND 4 (FROM FIRST ENGINE TAKE OFF POWER TO TAKE OFF).



CONDITIONS 1, 2, 3 AND 4 CAN ALSO BE TESTED DURING PHASES 1 AND 2 (FROM ELEC PWR ON TO FIRST ENGINE TAKE OFF POWER) BY PRESSING T.O. CONFIG TEST PUSHBUTTON.

BM5 27 00 00 0 BNM0 – 01

Flight Controls Configuration Warnings
Figure 040

1. T.O CONFIG Warning Test

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

A. Reason for the Job

To make certain that the T.O CONFIG warning operates.
(1)THS (Trimmable Horizontal Stabilizer) Configuration.
(2)Flaps and slats configuration.
(3)Speed brake configuration.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-41-00, P. Block 501	Mechanical Control (THS)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
R - 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

R C. Job Set-Up

R WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
R (1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R Make certain that electronics racks ventilation is correct.
R (2)Pressurize Green, Blue, and Yellow hydraulic systems either :
R - using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
R or
R - using Green auxiliary power (Ref. 29-21-00, P. Block 301),
R Blue auxiliary power (Ref. 29-22-00, P. Block 301),
R and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
R (3)Make certain that Captain's and First Officer's control wheels are at zero (roll trim at zero).
R (4)Make certain that circuit breakers on overhead and aft panels are closed, particularly those associated with FLT CTL (133VU), and with FAC1 and

FAC2 (panel 21VU, line 103).

(5)On panel 133VU make certain that L/G PROX & DET RELAYS SYS1 & 2 circuit breakers are closed.

R (6)On SERVO CTL section of panel 428VU :

R - make certain that SERVO CTL/G, B and Y pushbutton switches are pressed (in) and legends are off.

R (7)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.

R (8)On ECAM control panel 11VU

R - press F/CTL pushbutton switch to display FLT CTL page on right ECAM display unit.

R - press CLR pushbutton switch until legend goes off.

R (9)On panel 472VU

R - place ANN LT switch in READ position.

R (10)On FLIGHT CONTROLS section of panel 471VU

R - make certain that EFCU BITE DISPLAY annunciator is off.

R If not, reset EFCU 1CP and 2CP in electronics rack 90VU by simultaneously pressing the two pushbutton switches of each card. Make certain that no failure code is displayed.

R In order to obtain certain messages on the left ECAM display unit, it is necessary to press the ECAM INHIBIT OVERRIDE pushbutton switch.

R (11)Make certain that PARKING BRAKE is released.

R (12)Install safety barriers.

R (13)Place flap and slat control lever in 2nd notch position. (slats 15, flaps 0).

R (14)Make certain that pitch trim control wheel is at neutral.

D. Test
(1)Test of THS take off config warning

	ACTION	RESULT
R	1. Turn pitch trim control wheel to bring THS to 3.5° ± 0.4° A/C nose up.	THS deflects downwards by value displayed on trim control wheel indicator.
R	2. On panel 417VU - press and hold T.O CONFIG TEST pushbutton switch.	On CAPT and F/O main instrument panels 3VU and 5VU - MASTER WARN lights flash - repetitive chime sounds On left ECAM display unit the following message appears : CONFIG PITCH TRIM NOT IN T.O RANGE On right ECAM display unit - FLT CTL page appears. - on STAB scale, bug reproduces THS deflection.
R	3. On panel 417VU - release T.O CONFIG TEST pushbutton switch.	- above warnings disappear.
R	4. Turn pitch trim control wheel to bring THS to 2.3° + 0.2° - 0.4° A/C nose down.	THS deflects upwards by value displayed on trim control wheel indicator.
R	5. On panel 417VU - press and hold T.O CONFIG TEST pushbutton switch.	On CAPT and F/O main instrument panels 3VU and 5VU - MASTER WARN lights flash - repetitive chime sounds. On left ECAM display unit the following message appears It must be : CONFIG PITCH TRIM NOT IN T.O RANGE On right ECAM display unit - FLT CTL page appears. - on STAB scale, bug reproduces THS deflection.
R	6. On panel 417VU - release T.O CONFIG TEST pushbutton switch.	- above warnings disappear.
R	7. Turn pitch trim control wheel to bring THS to zero.	THS returns to zero.

(2)Test of flaps and slats take off config warning

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26VAC/SYS2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS1	3CV	335/R65

(b)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS2	8CV	333/T64
133VU	FLT CTL/FLAPS/SYS2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS & SLATS/POS/ECAM	2CN	334/S65
133VU	FLT CTL/FLAPS & SLATS/POS/IND	1CN	334/S66
133VU	FLT CTL/FLAPS/SYS1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS1	9CV	335/R66
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS1	10CV	335/R67
133VU	FLT CTL/SLATS/WTB2	14CV	336/Q64
133VU	FLT CTL/SLATS/WTB1	13CV	336/Q65
133VU	FLT CTL/FLAPS/WTB1	11CV	336/Q66
133VU	FLT CTL/FLAPS/WTB2	12CV	336/Q67

(c)Test

ACTION	RESULT
1. Move slat/flap control lever on center pedestal to Flaps 40°.	- Flaps extend to 40° - Slat/flap indicator moves to FLAPS 40.
2. On panel 417VU - Press T.O CONFIG/TEST pushbutton switch and hold depressed.	Continuous repetitive chime sounds. On left ECAM display unit, the following message appears : CONFIG : FLAPS NOT IN T.O CONFIG
3. On panel 417VU - Release T.O CONFIG/TEST pushbutton switch.	Above warnings are cancelled.

R

ACTION	RESULT
4. Move slat/flap control lever to first notch position.	- Flaps retract to 0° position - Slat/flap indicator moves to FLAPS 0.
5. Open, safety and tag circuit breakers 1CV (location 335/R61) and 2CV (location 334/S62). Remove safety clips and tags and close circuit breakers 3CV (location 335/R65) and 4CV (location 335/R64).	
6. On panel 417VU - Press T.O CONFIG/TEST pushbutton switch and hold depressed.	Continuous repetitive chime sounds. On left ECAM display unit, the following message appears : CONFIG : SLATS NOT IN T.O CONFIG.
7. On panel 417VU - Release T.O CONFIG/TEST pushbutton switch.	Above warnings are cancelled.
8. Move slat/flap control lever to SLAT 30°.	- Slats extend to 30° - Slat/flap indicator moves to SLATS 30.
9. On panel 417VU - Press T.O CONFIG/TEST pushbutton switch and hold depressed.	Continuous repetitive chime sounds. On left ECAM display unit, the following message appears : CONFIG : SLATS NOT IN T.O CONFIG.
10. On panel 417VU - Release T.O CONFIG/TEST pushbutton switch.	Above warnings are cancelled.
11. Move slat/flap control lever to first notch position.	- Slats retract to 0° position - Slat/flap indicator moves to SLATS 0 position.

R (d)Remove safety clips and tags and close circuit breakers 1CV and 2CV.

(3)Test of speed brake take off config warning

R (a)Place slat/flap control lever in 2nd notch position (slats 15, flaps
R 0).

ACTION	RESULT
1. On center pedestal - move **SPEED BRAKE** control lever to 7th notch.	On Slat/Flap indicator - **SPD BRK** legend comes on.
2. On panel **417VU** - press and hold **TO CONFIG TEST** pushbutton switch.	On **CAPT** and **F/O** main instrument panels **3VU** and **5VU** - **MASTER WARN** lights come on - Continuous repetitive chime sounds On left **ECAM** display unit the following message appears : **CONFIG** **SPD BRK NOT RETRACTED.**
3. On panel **417VU** - release **TO CONFIG TEST** pushbutton switch.	All above warnings disappear.
4. On center pedestal - move **SPEED BRAKE** control lever to **RET** position.	On Slat/Flap indicator - **SPD BRK** legend goes off.

E. Close-up

R (1)Place slat/flap control lever in first notch position.

(2)Shut down hydraulic power supply. Depressurize systems. Where applicable, disconnect hydraulic ground power cart.

R (3)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R (4)Remove warning notice and safety barriers.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Control Cables and Pulleys (Ref. 20-29-00, P. Block 1)

2. Detection of Hard Spots at Control Surface and Servo Control Hinge Points

A. Reason for the Job
To locate any hard spot at any control surface attachment point.
It is to be noted that due to the normal variations in friction of servo controls only excessive hard spots may be detected.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platforms, 2.50 m to 12 m (6 ft. 6 in. to 39 ft. 4 in.)
(2)97A27902016000	Spring Scale Assy
(3)98A27603011000	Equipment - Load Measuring
(4)	Warning Notices
R (5)98A27503003000	Guard, Safety - Flap/Slat Control Lever
Referenced Procedures	
- 24-41-00, P. Block 301	External Power
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 21-20-00, P. Block 301	Ventilation of Electronics Racks
- 27-31-00, P. Block 501	Mechanical Control

C. Procedure
(1)Job set-up
(a)Position access platforms
(b)Make certain that circuit breakers associated to flight control systems are closed.
(c)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that ventilation of electronics racks operates (Ref. 21-20-00, P. Block 301).
(d)On SERVO CONTROLS panel 428VU
- make certain that the three ON-OFF switches are ON.
(e)Make certain that SPEED BRAKE control lever is in position and pressed in (Ground spoiler function not preselected).

(f)Make certain that slats and flaps control lever is in first notch position.
(g)Make certain that roll, pitch and yaw trim control are at Neutral.
(h)Connect hydraulic ground power cart and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(j)Move slats and flaps control lever to fifth notch (slats, flaps and Krueger flaps fully extended).
(k)Shut down pressurization of Green hydraulic system (Ref. 29-10-00, P. Block 301).
R (l)Install flap/slat control lever safety guard 98A27503003000.

(2)Check

NOTE : Refer to table below for the following operations.
Tool 98A27603011000 is to be installed on trailing edge of control surface concerned in line with corresponding control surface servo control.

(a)Roll control (ASA-SPOILERS)
1 Pressurize hydraulic system concerned.
2 Fully turn Captain's control wheel to the left (right).
3 Maintain control surface concerned in up position.
4 Install tool 98A27603011000 and spring scale assy 97A27902016000.
5 Shut down pressurization of hydraulic system concerned.
CAUTION : DISPLAY A WARNING NOTICE ON GROUND CONNECTORS AND ON HYDRAULIC POWER PANEL PROHIBITING PRESSURIZATION OF HYDRAULIC SYSTEMS.
6 Release Captain's control wheel.
7 Apply a load to control surface to return it to zero.
8 Record applied load value.
9 Remove tools.

(b)Pitch control
1 Pressurize hydraulic system concerned.
2 Move Captain's control column to nose up attitude.
3 Maintain elevators in up position.
4 Shut down pressurization of hydraulic system concerned.
5 Elevators must freely move down until in abutment against lower stops.
6 If not :
- place pitch uncoupling unit in unlocked position (Ref. 27-31-00, P. Block 501 - Functional Test)
- install tool 98A27603011000 and spring scale assy 97A27902016000
- release Captain's control column
- apply a load to elevator until in abutment against lower stops
- record applied load value
- remove tools
- place pitch uncoupling unit in locked position (Ref. 27-31-00, P. Block 501 - Functional Test).

(c)Yaw control
1 Pressurize hydraulic system concerned.
2 Move rudder pedals against right or left stop.
3 Maintain rudder full left or right.
4 Install tool 98A27603011000 and spring scale assy 97A27902016000.
5 Shut down pressurization of hydraulic system concerned.
6 Release Captain's rudder pedals.

7 Apply a load to rudder until positioned in neutral.
8 Record applied load value.
9 Remove tools.

(d)Speed brake control
1 Pressurize hydraulic system concerned.
2 Move **SPEED BRAKE** control lever to **FULL** position.
3 Maintain control surface concerned in up position.
4 Install tool **98A27603011000** and spring scale assy **97A27902016000**.
5 Shut down pressurization of hydraulic system concerned.
6 Move **SPEED BRAKE** control lever to **RET** position.
7 Apply a load to control surface until positioned in neutral.
8 Record applied load value.
9 Remove tools.

CONTROL SURFACE	SERVO CONTROL	PRESSURIZED HYDRAULIC SYSTEM	MAXIMUM LOAD daN	MAXIMUM LOAD Lbf.
A.S.A	EXTERNAL	BLUE	14	31.50
SPOILER 5	INNER	GREEN	10	22.50
SPOILER 6	CENTER	YELLOW	10	22.50
SPOILER 7	OUTER	BLUE	10	22.50
RUDDER	UPPER	BLUE	20	45.00
ELEVATOR	EXTERNAL	BLUE	6	13.50
INNER SPEED BRAKE 1	INNER 1	YELLOW	10	22.50
INNER SPEED BRAKE 2	INNER 2	BLUE	10	22.50
OUTER SPEED BRAKE 3	OUTER 1	BLUE	10	22.50
OUTER SPEED BRAKE 4	OUTER 2	YELLOW	10	22.50

(e)If load value to be applied to control surface concerned is greater than that given in appended chart, perform the following operations :
1 Remove concerned surface servo control(s).
Check that control surface moves freely at structure hinge points.
2 For each servo control, check free rotation at bearings.

(3)Close-up

R (a)Remove flap/slat control lever safety guard **98A27503003000**.
(b)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
CAUTION : **MAKE CERTAIN THAT THE TRAVEL RANGES OF SLATS AND FLAPS ARE CLEAR.**
(c)Move slats and flaps control lever to first notch position.
(d)Once slats and flaps are fully retracted shut down pressurization of Green hydraulic system.
(e)Remove access platforms.
(f)Disconnect hydraulic ground power cart.
(g)De-energize the aircraft electrical network and disconnect electrical ground power unit.
(h)Remove warning notices.

AILERON - DESCRIPTION AND OPERATION

1. General

(Ref. Fig. 001)

Roll control on each wing is achieved by means of an all speed aileron (operational at all speeds), and five spoilers (3 through 7).

The all speed aileron is controlled by means of a mechanical control system (Ref. 27-11).

The spoilers are electrically controlled (Ref. 27-61).

In addition to roll control, the two all speed ailerons are symmetrically drooped when the slats are extended, to improve lift characteristics of the wing.

Trim control signals are electrical (Ref. 27-12).

The artificial feel system (Ref. 27-13) operates independently of flight conditions.

NOTE : Per design, the aileron control linkage including the trim control is not weight balanced all along its complete travel.
As a result, the whole aileron control is submitted to asymmetrical loads during LH and RH turns.

Hydraulic actuation (Ref. 27-14 and 27-64) is achieved by three mechanical input servo controls for each all speed aileron, and one servo control assembly comprising a hydraulic actuator controlled by a separate electrical input valve group for each spoiler.

Position of the surfaces is indicated on the right ECAM display unit and on the Third Occupant ECAM display unit (Ref. 27-15).

R 2. Interface With Autopilot System (Ref. Chap. 22)

R An autopilot actuator is mounted adjacent to the right wing rear cable quadrant ; it drives the complete control via a detent lever which can be overridden by the pilots.

R Dynamometric rods are installed upstream of the cable tension regulators, they provide control signals to the control wheel steering system.

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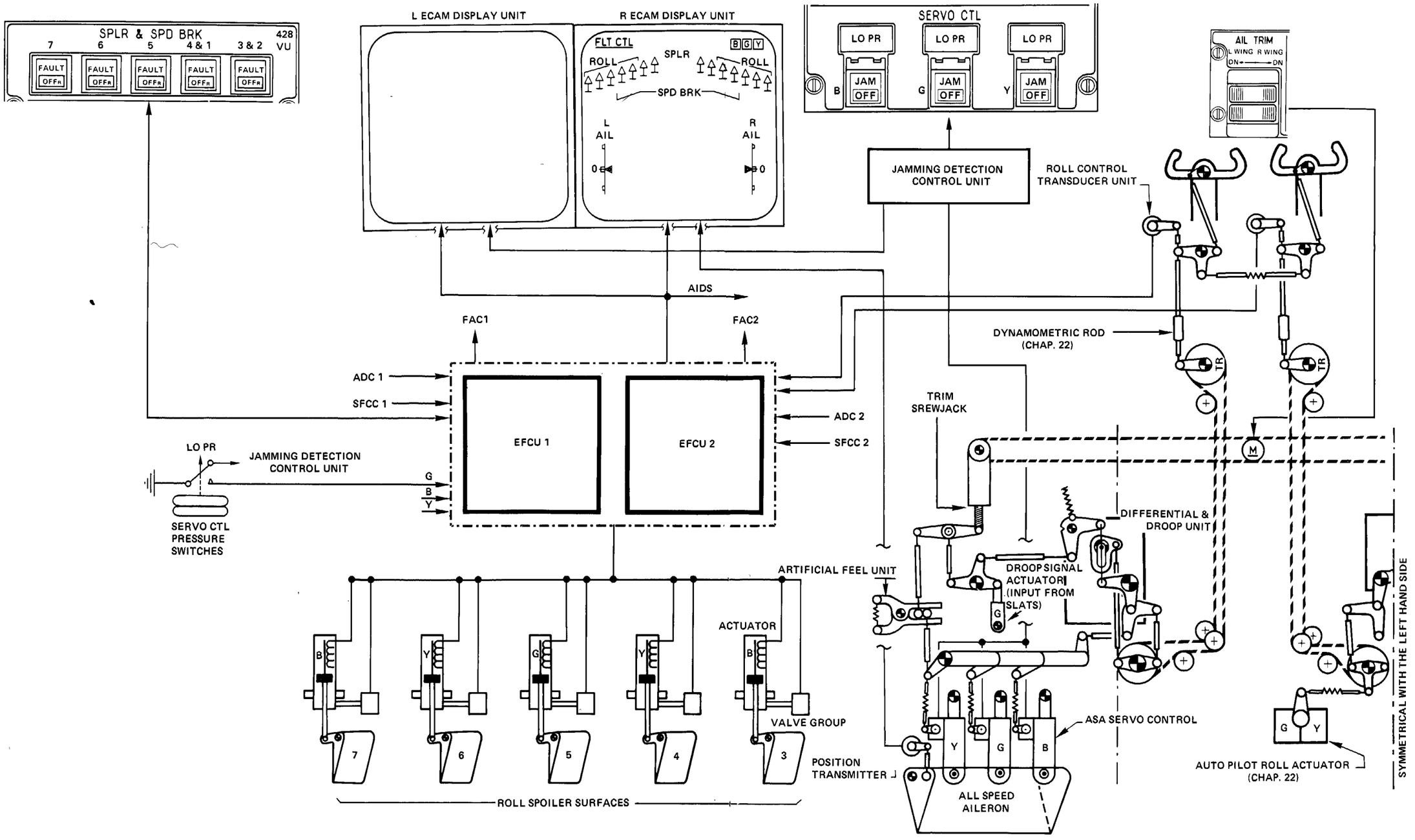


Aileron
Figure 001

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Pre-Stretching of Cable Linkage (Section 12, 13, 14, 15 and 25)

A. Equipment and Materials

	ITEM	DESIGNATION
R	(1)98A27003003000	Retaining Tool - Pre-streching Tension
R		Regulator
	(2)98A27901003000	Pin - Rigging, Aileron Control Tension Regulator
R	(3)98A27103501000	Pin - Rigging, Speed Aileron
	(4)98A27108024000	Pin - Rigging, ASA Trim Spindle
	(5)	Access Platform 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
	(6)	Circuit Breaker Safety Clips
	Referenced Procedures	
	- 06-41-57, P. Block 001	Wings - General
	- 24-41-00, P. Block 301	AC External Power Control
	- 27-10-00, P. Block 501	Aileron - Adjustment/Test
	- 27-10-00, P. Block 601	Aileron - Inspection/Check
	- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
	- 27-11-16, P. Block 401	Interconnecting Spring Rod - Removal/Installation
	- 29-21-00, P. Block 301	Green Auxiliary Power
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
	- 32-12-11, P. Block 301	Main Gear Main Door-(Ground Door(s) Opening)

B. Job Set-Up(Ref. Fig. 301)
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(2)Pressurize all three hydraulic systems :
- using ground power cart (Ref. 29-10-00, P. Block 301)
- using Green electric pumps (Ref. 29-21-00, P. Block 301).
(3)On SERVO CTL section of panel 428VU :
- make certain that B, G and Y (JAM/OFF) pushbutton switches are pressed and legends off.

(4)Cycle the control wheels 10 times fully left and right and then return them to zero.
(5)Make certain that flap and slat control lever is in first notch position (flaps and slats fully retracted).
(6)Open door 121BL.
(7)Disconnect interconnecting spring rod between Captain and First Officer sides (Ref. 27-11-16, P. Block 401).
(8)Position access platform under each wing and open access doors 575FB and 675FB (Ref. 06-41-57, P. Block 001).
(9)On both L and R sides, install rigging pin 98A27103501000 in the mechanical input of the differential and droop unit.
(10)Immobilize L and R ASA cable tension regulators using rigging pins 98A27901003000.
(11)Open main gear doors (Ref. 32-12-11, P. BLock 301).
(12)Position access platform and open access doors 575AB, 675AB (Ref. 06-41-57, P. Block 001).
(13)On rear circuit breaker panel 133VU :
- open, safety and tag FLT CTL/AIL/TRIM circuit breaker 3CG, position 331/V63.

R (Ref. Fig. 301)

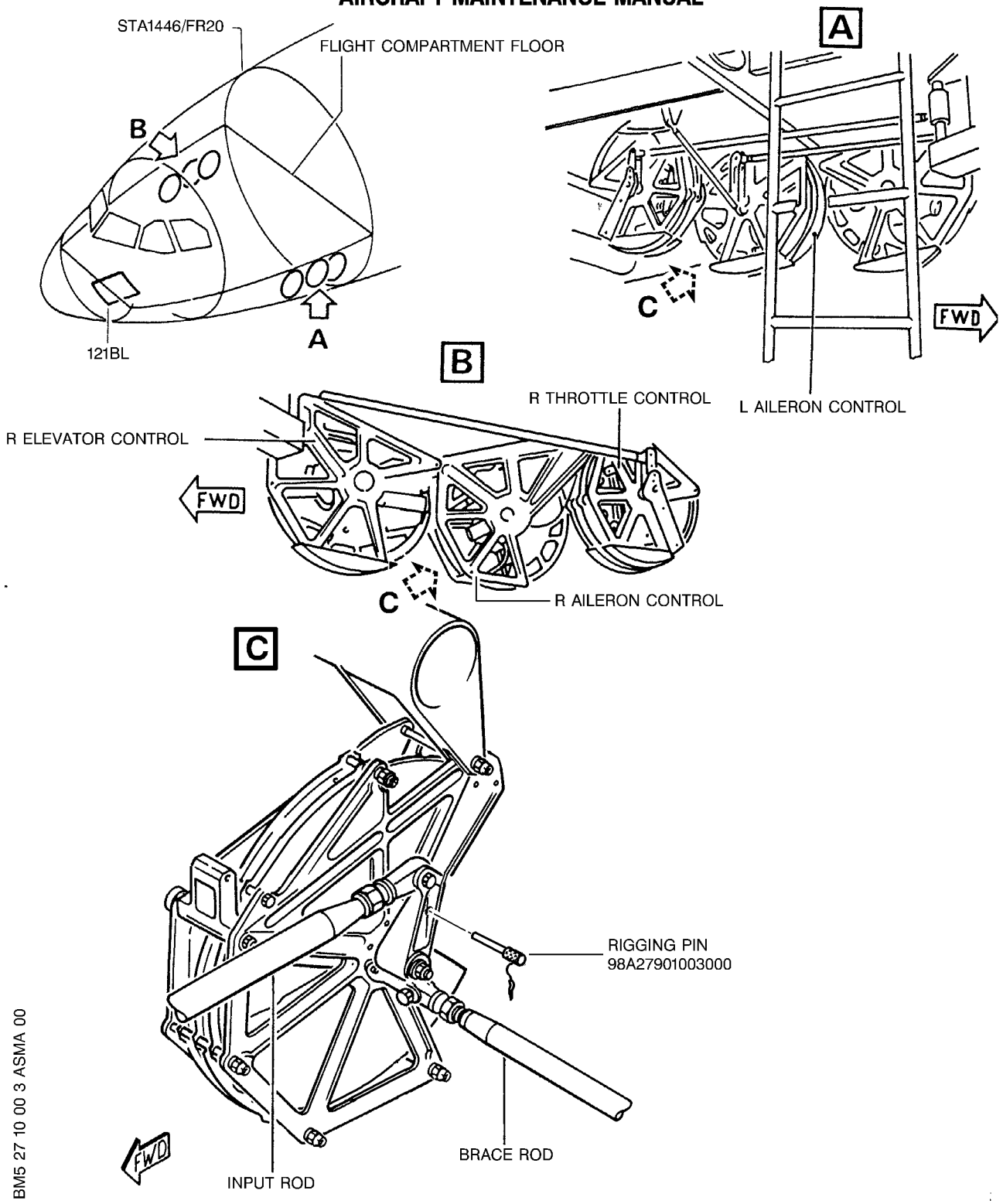
C. Procedure

NOTE : This procedure is for CAPT and F/O sides.

(1)Remove locking clips from turnbuckles.
(2)Turn turnbuckles until retaining tool 98A27003003000, can be installed on tension regulator.
(3)Turn turnbuckles until a tension between 50 and 55 daN is obtained on each cable.
(4)Install locking clips on turnbuckles but do not lock it in turnbuckle body.
(5)Linkage must remain in this pre-stretching configuration during 72 hours minimum.
NOTE : During this time the hydraulic systems can be depressurized.
NOTE : Rigging pins 98A27103501000 and 98A27901003000 remain engaged during the complete pre-stretching.
(6)Remove locking clips from turnbuckles.
(7)Turn turnbuckles until retaining tool 98A27003003000, can be removed from tension regulator.
(8)Connect interconnecting spring rod between Captain and First Officer sides (Ref. 27-11-16, P. Block 401).
(9)Perform a check of cable tension, aileron adjustment and tension regulator value (Ref. 27-10-00, P. Block 601).
(10)Remove all rigging pins.
(11)Perform an operational test of the aileron system (Ref. 27-11-00, P. Block 501).

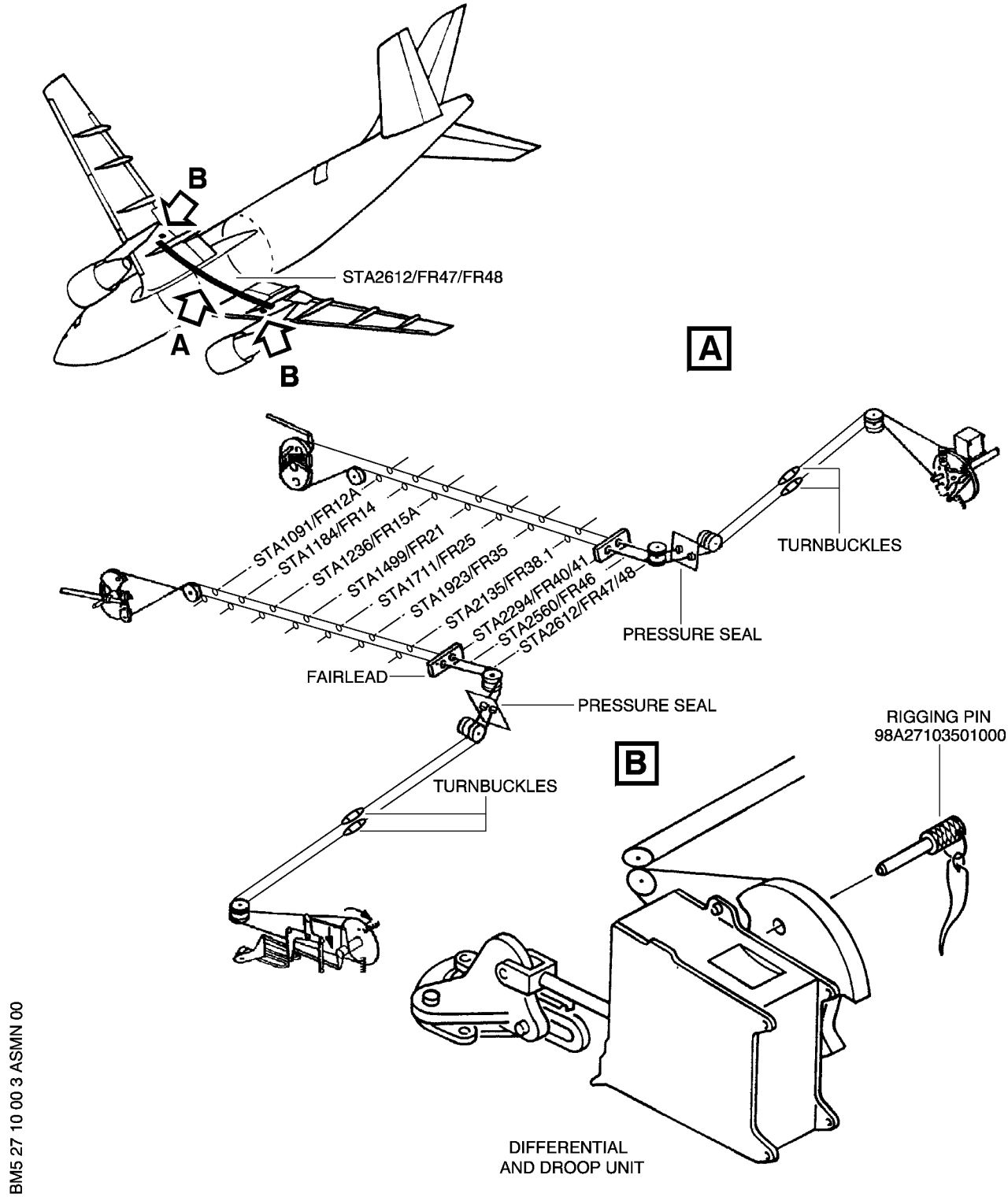
D. Close-up

(1)Make certain that locking clips are fitted and secured on all the turnbuckles.
(2)Depressurize all three hydraulic systems.
(3)De-energize the aircraft electrical network (Ref. 24-41-00,



Rigging Point Location
and Aileron Trim Control Cable Routing (Sheet 1/2)
Figure 301

R



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Rigging Point Location
and Aileron Trim Control Cable Routing (Sheet 2/2)
Figure 301

R

P. Block 301).
(4)Close access doors.
(5)Remove access platform.

AILERON - REMOVAL/INSTALLATION

CAUTION : THIS PROCEDURE MUST BE PERFORMED IN A HANGAR.
WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

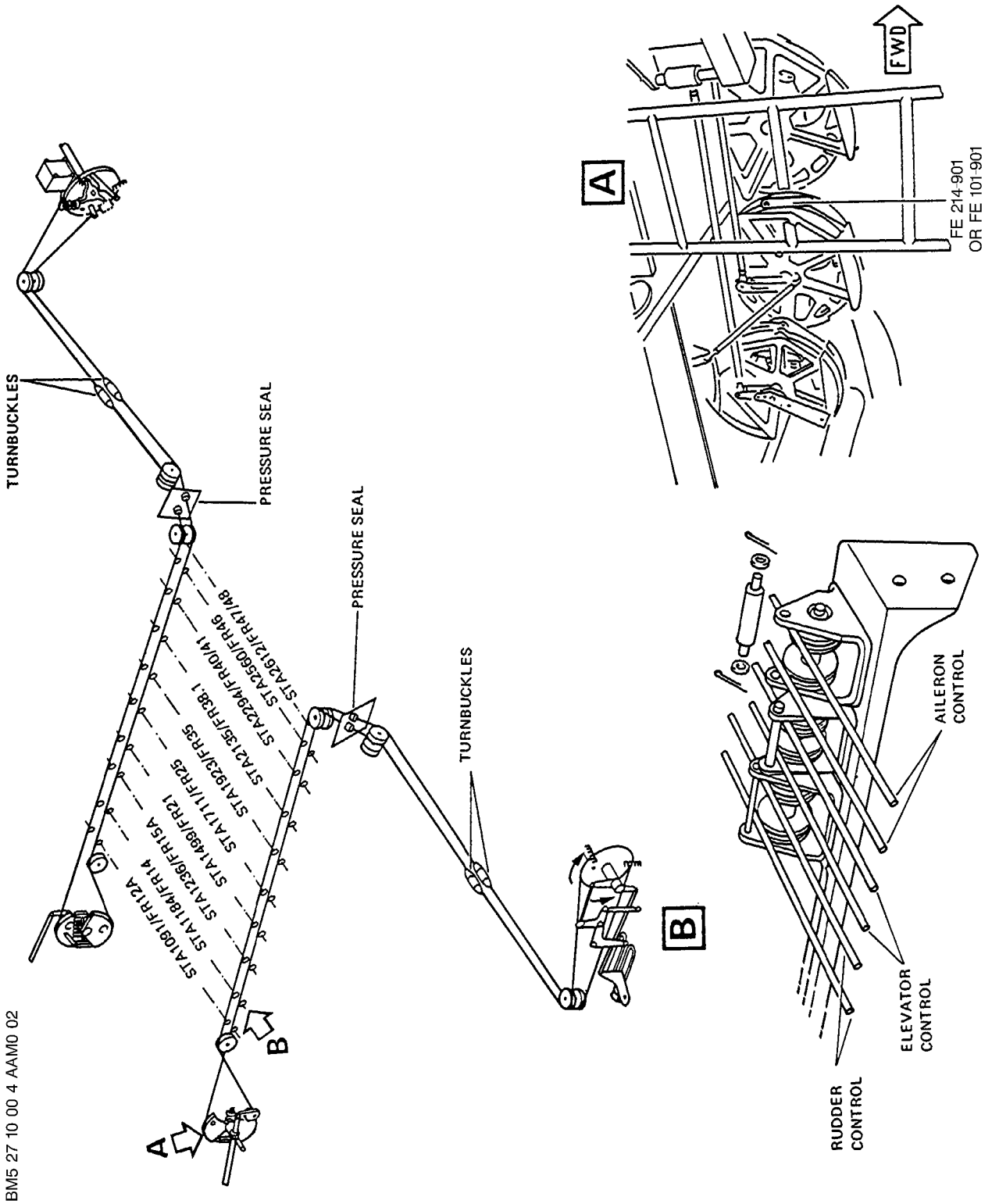
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. ASA Control Cables
(Ref. Fig. 401)
R (Ref. Fig. 402)

A. Equipment and Materials

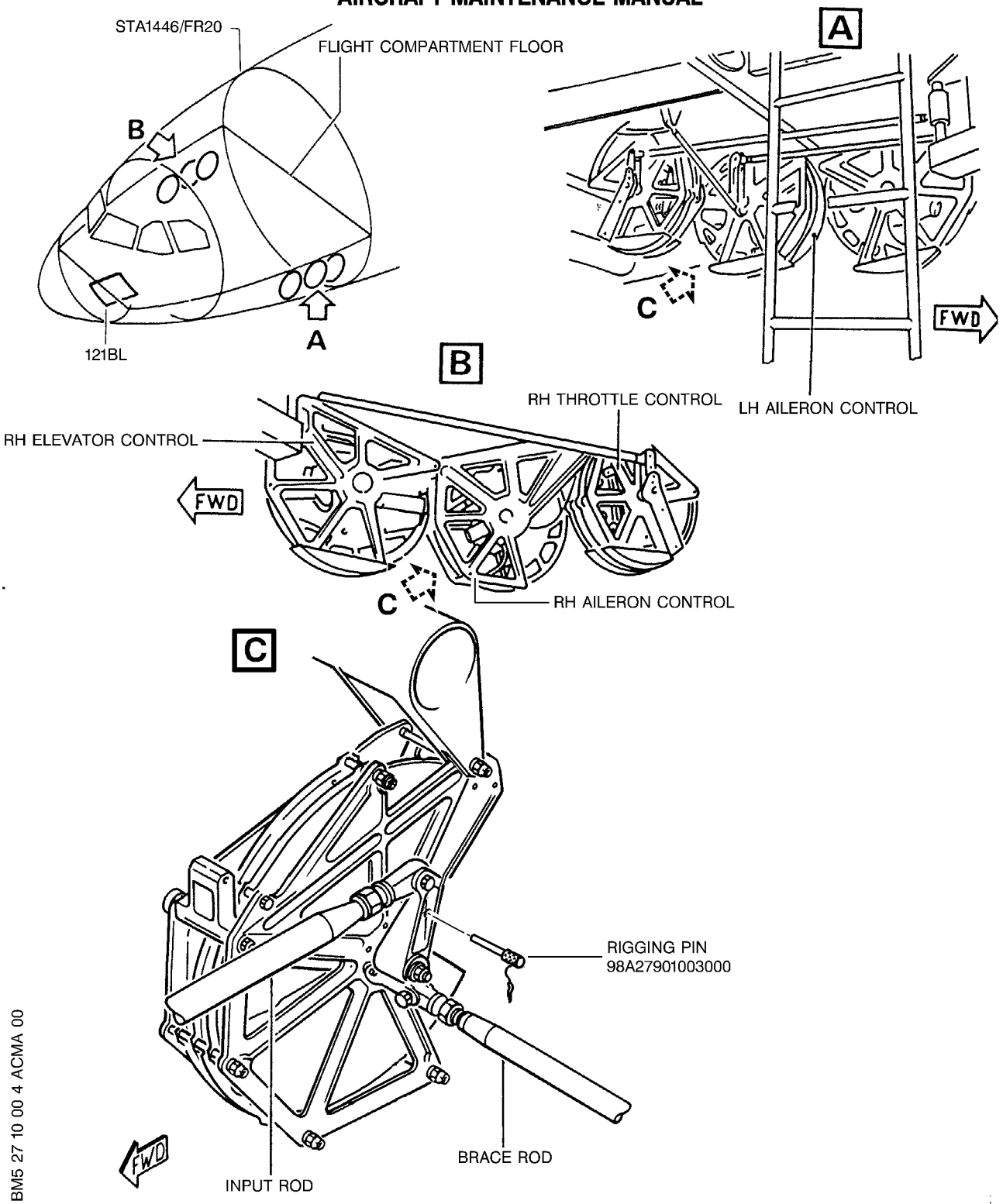
ITEM	DESIGNATION
(1)	Access Platform - 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
(2)	Circuit Breakers Safety Clips
(3)FE214901 or FE101901	Locking Equipment - Cable Tension Regulator
(4)98A27003003000	Retaining Tool - Pre-stretching Tension Regulator
(5)98A27103501000	Pin - Rigging, Speed Aileron
(6)98A27901003000	Pin - Rigging, Aileron Control
(7)	Tensiometer
(8)	Thermometer
(9)	Lockwire - Corrosion Resistant Steel Dia. 0.8 mm (0.032 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-17, P. Block 401	Tension Regulator - All Speed Aileron Cable
- 29-21-00, P. Block 301	Green Auxiliary Power
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)
- 27-10-00, P. Block 501	Aileron

B. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Pressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block



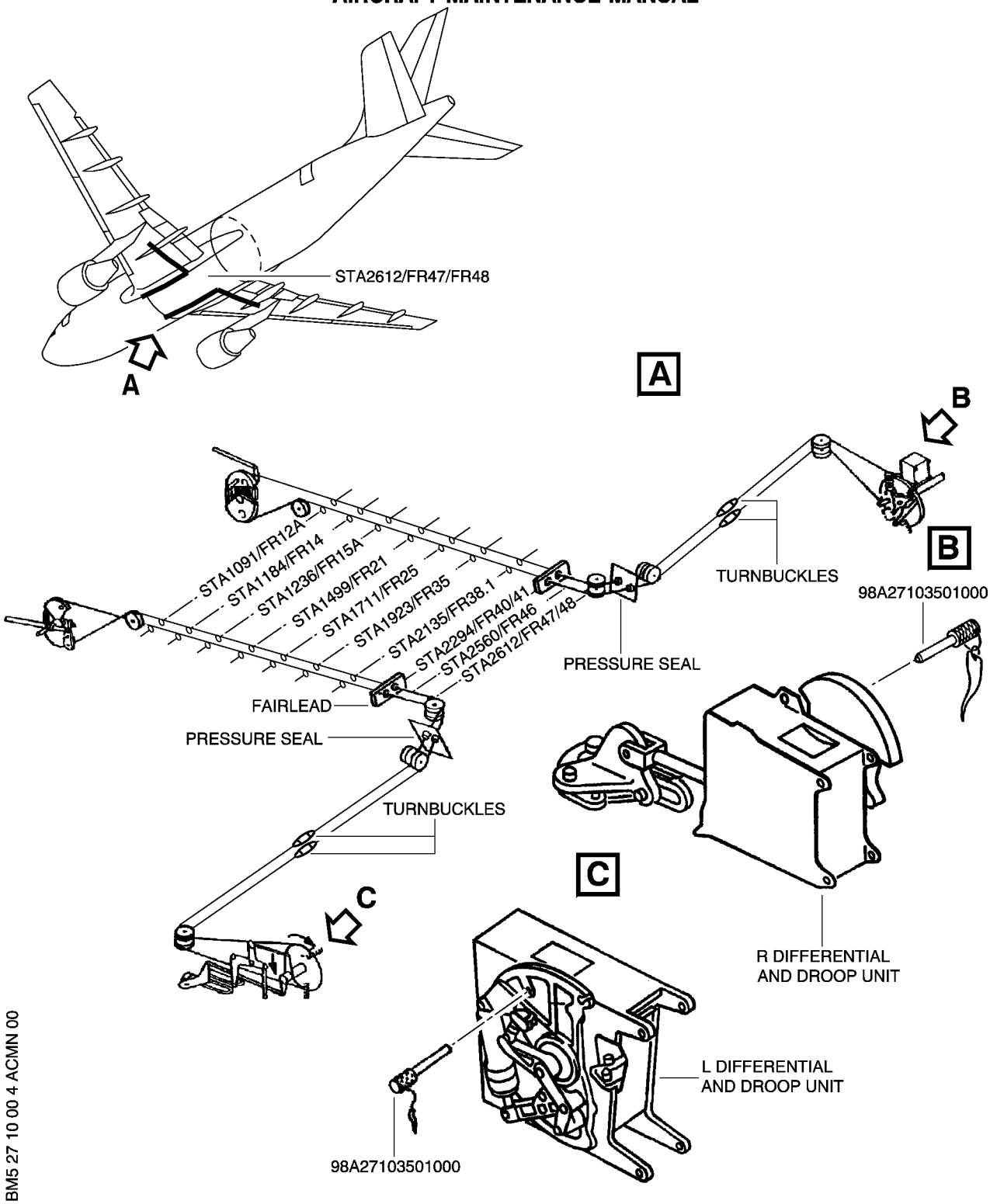
Cable Linkage Routing
Figure 401

R



Rigging Point Location (Sheet 1/2)
Figure 402

R



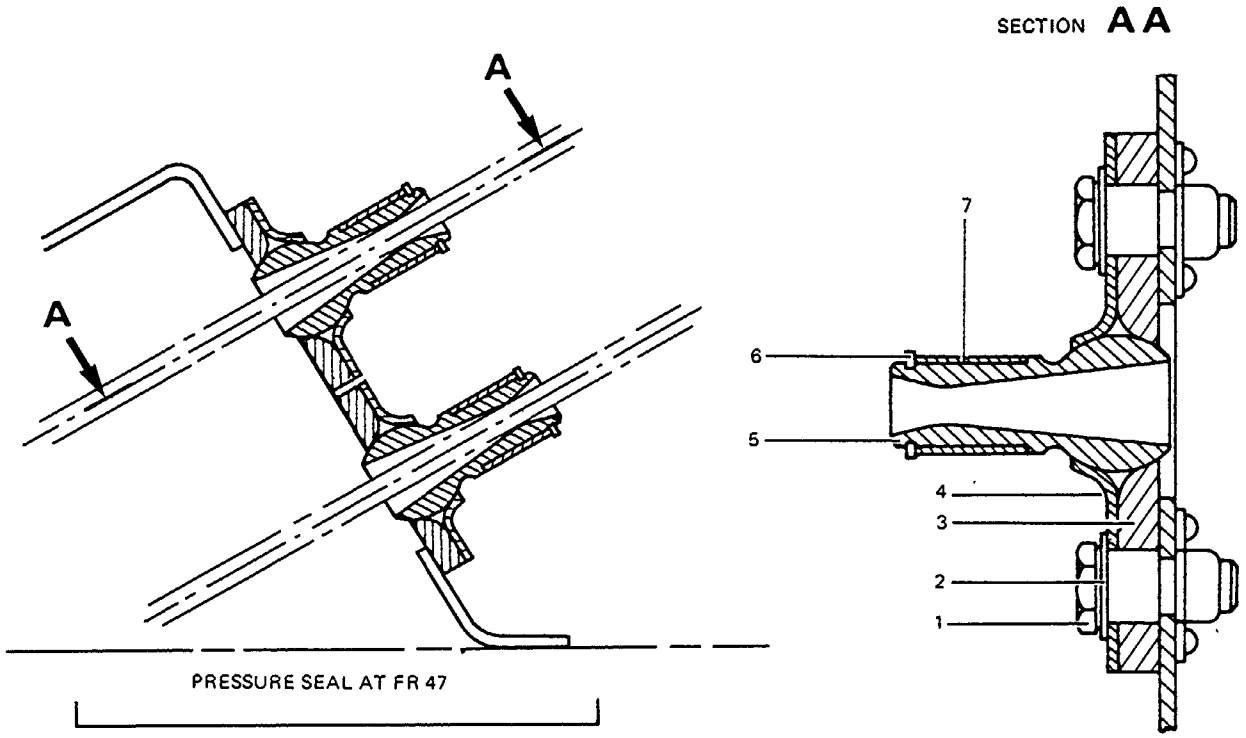
Rigging Point Location (Sheet 2/2)
Figure 402

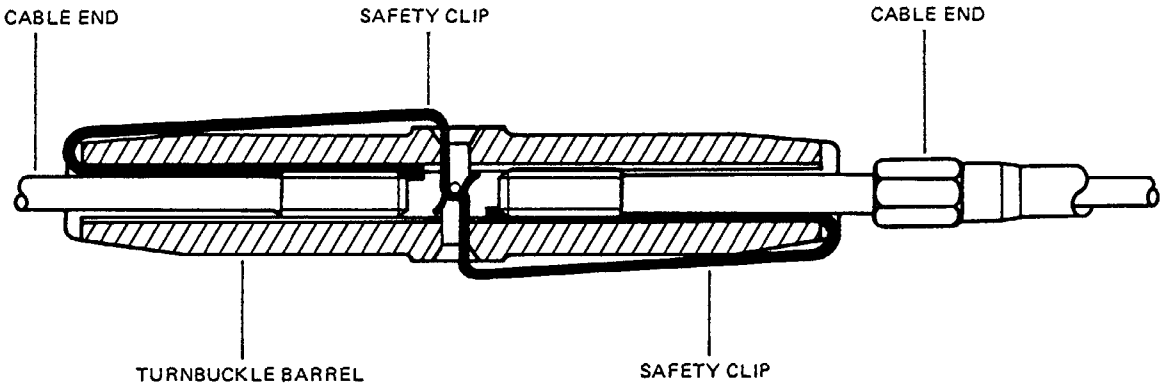
R

301).
(c)On SERVO CTL section of panel 428VU
- make certain that SERVO CTL/B, G and Y (JAM/OFF) pushbutton switches are pressed (in) and legends off.
(d)Make certain that Captain's and First Officer's control wheels are at zero (aileron trim control at zero).
(e)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/AIL/TRIM	3CG	331/V63

(f)Make certain that flap and slat control lever is in first notch position (slats and flaps fully retracted).
(g)Open access doors 121BL, 131AZ and 132AZ.
(h)Open main gear doors (Ref. 32-12-11, P. Block 301).
(j)Position access platform.
(k)Open access doors 575AB, 675AB.
(l)Shut down pressurization of Green auxiliary hydraulic systems.
(m)Display a warning notice on overhead panel prohibiting pressurization of hydraulic systems.
CAUTION : MAKE CERTAIN THAT RIGGING PINS HAVE NOT BEEN INSTALLED.
(n)In zone 571 (671), slacken ASA control cables to enable installation
R of cable tension regulator locking equipment FE214901 or FE101901 on
R roll cable tension regulator at access door 121BL.
R NOTE : For cable tension regulator FE136, use cable tension regulator
R locking equipment FE101901.
R For cable tension regulator FE225, use cable tension regulator
R locking equipment FE214901.
(p)Install rigging pin 98A27103501000 in mechanical input of differential and droop unit.
(q)In avionics compartment, insert rigging pin 98A27901003000 in input lever of aileron cable tension regulator.
(r)In forward cargo compartment, remove ceiling panels.
(s)Between STA2241/FR39 and STA2612/FR47/48, remove floor panels.
(2)Removal of forward cable run (Ref. Fig. 403)
(a)In zone 571 (671), remove and retain turnbuckle barrel and disengage cable ends. Stow end of cable remaining on the aircraft, on structure.
(b)Remove cable guards from pulley mounts
(c)Remove cable guards from cable tension regulator (Ref. 27-11-17, P. Block 401)
(d)Remove cable end from tension regulator cable quadrant.
(e)On pressure seal at STA2612/FR47/48.
1 Cut and remove lockwire, remove screws (1), retain washers (2).
2 Separate plate (4).
NOTE : plate (3) remains on structure.
3 Remove circlip (6), sleeve (7), then separate the two guide halves (5)
4 Remove forward cable run
5 Retain sleeve (7) and plate (4).
(3)Installation of forward cable run
NOTE : If you cannot adjust the control cables, do a visual inspection





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Pressure Seals and Cable Turnbuckles
Figure 403

on the pulleys and the tension regulator. If they are in good condition, replace the control cables.

(a)Insert cable end in retaining notch on cable tension regulator quadrant.

(b)Engage cables on pulleys.

(c)At pressure seal at STA2612/FR47/48.

1 Equip cable end with sleeve (7) and plate (4).

CAUTION : MAKE CERTAIN THAT SLEEVE (7) AND PLATE (4) ARE CORRECTLY POSITIONED. PLATE (3) REMAINS ON STRUCTURE.

(d)Engage cable ends in turnbuckle.

(e)Install cable guards on pulley mounts.

(f)Install cable guards on cable tension regulator (Ref. 27-11-17, P. Block 401).

(g)At pressure seal

1 Position guide halves (5) on plate (4). Assemble guide halves with sleeve (7) and circlip (6).

2 Slide assembly into plate (3). Secure with screws (1) and washers (2). Safety with lockwire.

(h)Increase cable tension progressively until cable tension regulator locking equipment FE214901 or FE101901 can be removed from cable tension regulator.

NOTE : Make certain that fairlead ball ends of pressure seals are free to rotate and that cables freely slide in cable pressure seals. If not replace pressure seal by a new one.

(j)Proceed with cable tension adjustment (Ref. 27-10-00, P. Block 501).

R (4)Pre-stretching of forward cable run

R NOTE : This procedure of pre-stretching is only applicable when cables are replaced by new ones.

R (a)Using turnbuckles, gradually release cable tension until retaining tool 98A27003003000 can easily be installed on cable tension regulator. Turnbuckles for cables are located behind the Rear Spar between Ribs 2 and 3. LH wing turnbuckle is located near the Blue Hydraulic Reservoir. RH wing turnbuckle is located near the Yellow Hydraulic Reservoir.

R (b)Progressively tighten cables, using turnbuckles until a tension of 70 +5 -0 daN(157.4 +11.2 -0 lbf) is obtained on each cable.

R (c)Install safety clips on turnbuckles but do not lock them in turnbuckle bodies.

R (d)Linkage must remain in this pre-stretching configuration for 72 hours.

R NOTE : Rigging pins 98A27103501000 and 98A27901003000 remain engaged during the complete pre-stretching.

R (e)Remove safety clips fitted to turnbuckles and, using these turnbuckles, gradually release linkage tension until retaining tool 98A27003003000 can easily be removed from tension regulator.

R (f)Remove retaining tool 98A27003003000 and rigging pins 98A27103501000 and 98A27901003000.

R (5)Adjustment of forward cable run

R (a)Proceed with cable tension adjustment (Ref. 27-10-00, P. Block 501).

R (6)Removal of aft cable run in zone 571 (671).

R (a)In zone 571 (671) remove and retain turnbuckle barrel and disengage cable ends. Stow end of cable remaining on the aircraft on structure.

R (b)Remove cable guards from pulley mounts and upper section of fairleads.
R (c)On differential and droop unit cable quadrant remove cable end from retaining notch.
R (d)Remove cable run
R (7)Installation of aft cable run
R
R NOTE : If you cannot adjust the control cables, do a visual inspection on the pulleys and the cable quadrant. If they are in good condition, replace the control cables.
R (a)Insert cable end in retaining notch on differential and droop unit cable quadrant.
R (b)Engage cable on pulleys and on fairleads.
R (c)Engage cable ends in turnbuckle barrel.
R (d)Install cable guards on pulleys.
R (e)Increase cable tension progressively until cable tension regulator locking equipment FE214901 or FE101901 can be removed.
R (8)Pre-stretching of aft cable run
R NOTE : This procedure of pre-stretching is only applicable when cables are replaced by new ones.
R (a)Using turnbuckles, gradually release cable tension until retaining tool 98A27003003000 can easily be installed on cable tension regulator. Turnbuckles for cables are located behind the Rear Spar between Ribs 2 and 3. LH wing turnbuckle is located near the Blue Hydraulic Reservoir. RH wing turnbuckle is located near the Yellow Hydraulic Reservoir.
R (b)Progressively tighten cables, using turnbuckles until a tension of 70 +5 -0 daN(157.4 +11.2 -0 lbf) is obtained on each cable.
R (c)Install safety clips on turnbuckles but do not lock them in turnbuckle bodies.
R (d)Linkage must remain in this pre-stretching configuration for 72 hours.
R NOTE : Rigging pins 98A27103501000 and 98A27901003000 remain engaged during the complete pre-stretching.
R (e)Remove safety clips fitted to turnbuckles and using these turnbuckles, gradually release linkage tension until retaining tool 98A27003003000 can easily be removed from tension regulator.
R (f)Remove retaining tool 98A27003003000 and rigging pins 98A27103501000 and 98A27901003000.
R (9)Adjustment of aft cable run
R (a)Proceed with cable tension adjustment (Ref. 27-10-00, P. Block 501).
R (10)Close-up
R (a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (b)Make certain that rigging pins 98A27103501000, 98A27901003000 and retaining equipment 98A27003003000 are removed.
R (c)Remove safety clip and tag and close circuit breaker 3CG.
R (d)Install ceiling panels in forward cargo compartment. Install floor panels.
R (e)Close main gear doors (Ref. 32-12-11, P. Block 301).
R (f)Close access doors.
R (g)Remove access platform.
R (h)De-energize the aircraft electrical network (Ref. 24-41-00,

R P. Block 301).

R 2. Aileron Trim Control Cables

R A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2 to 6 m (6 ft 7 in. to 19 ft 8 in.)
(2)	Circuit Breaker Safety Clips
(3)98A27108024000	Rigging Pin - ASA Trim Spindle
(4)43938	Pin - Rigging, Rudder and Aileron Trim Actuators
(5)	Lockwire - Corrosion Resistant Steel dia 0.8 mm (0.032 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s)) Opening
- 27-10-00, P. Block 501	Aileron

R B. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)Pressurize Green auxiliary system (Ref. 29-21-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU

- make certain that SERVO CTL/B, G and Y (JAM/OFF) pushbutton switches are pressed (in) and legends off.

(d)Make certain that Captain's and First Officer's control wheels are at zero (aileron trim control at zero).

(e)Open, safety and tag the following circuit breaker.

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/AIL/TRIM	3CG	331/V63

(f)Make certain that flap and slat control lever is in first notch position (flaps and slats fully retracted).

(g)Shut down pressurization of Green auxiliary system.

(h)Open main gear doors (Ref. 32-12-11, P. Block 301).

(j)Remove cowls from either side of trim actuator.

(k)On trim actuator, cut and remove lockwire and remove plug blanking rigging pin hole. Screw plug on actuator body. Check actuator output shaft mid travel position (indicator visible on actuator lower section).

(l)Insert rigging pin 43938 in trim actuator.

(m)Install access platform.

(n)Open access doors 575BB, 675BB.

(p)On L (R) trim screw jack body

- locate position of any one gear tooth with respect to trim screwjack body (make a pencil matching mark).

Install rigging pin 98A27108024000.

(q)Remove cable turnbuckle safety clips.

(2)Removal of chain section in zone 147 (148).

(Ref. Fig. 404)

(a)Unscrew turnbuckles to slacken cables. Retain turnbuckles. Stow both ends of cable/chain, remaining on aircraft, on structure.

(b)On trim gearbox, remove protective cover corresponding to chain to be removed.

(c)Remove chain section.

(3)Installation of chain section in zone 147(148).

(a)Position chain section on trim gearbox sprocket, making certain that the two ends of the chain are equidistant from the sprocket shaft.
The difference between these two lengths must be less than one chain half pitch.

(b)Connect chain/cable run and chain section with turnbuckles.

(c)On whole length of linkage check cables to avoid cross installation.

(d)Tighten cables

(e)Proceed with cable tension adjustment (Ref. 27-10-00, P. Block 501).

(f)Install protective cover on trim gearbox sprocket.

(4)Removal of chain/cable run in L (R) wing.

(a)Unscrew turnbuckles to slacken cables. Retain turnbuckles. Stow both ends of chain remaining on aircraft, on structure.

(b)Remove cable guards from pulley mounts.

(c)Remove fairleads.

(d)On trim screwjack gearbox, remove protective cover.

(e)Remove chain/cable run

(5)Installation of chain/cable run in L (R) wing

(a)Position chain section on trim screwjack gearbox sprocket, making certain that the two ends of the chain are equidistant from the sprocket shaft.
The difference between these two lengths must be less than one chain half pitch.
CAUTION : MAKE CERTAIN THAT GEAR TOOTH AND TRIM SCREWJACK BODY PENCIL MATCHING MARKS DRAWN ON REMOVAL ARE ALIGNED.

(b)Engage chain/cable run on pulley and in fairleads.

(c)Connect chain/cable run and chain section with turnbuckles.

(d)On whole length of linkage check cables to avoid cross installation.

(e)Tighten cables

(f)Install cable guards on pulley mounts.

(g)Install upper halves of fairleads. Tighten nuts.

(h)Proceed with cable tension adjustment (Ref. 27-10-00, P. Block 501).

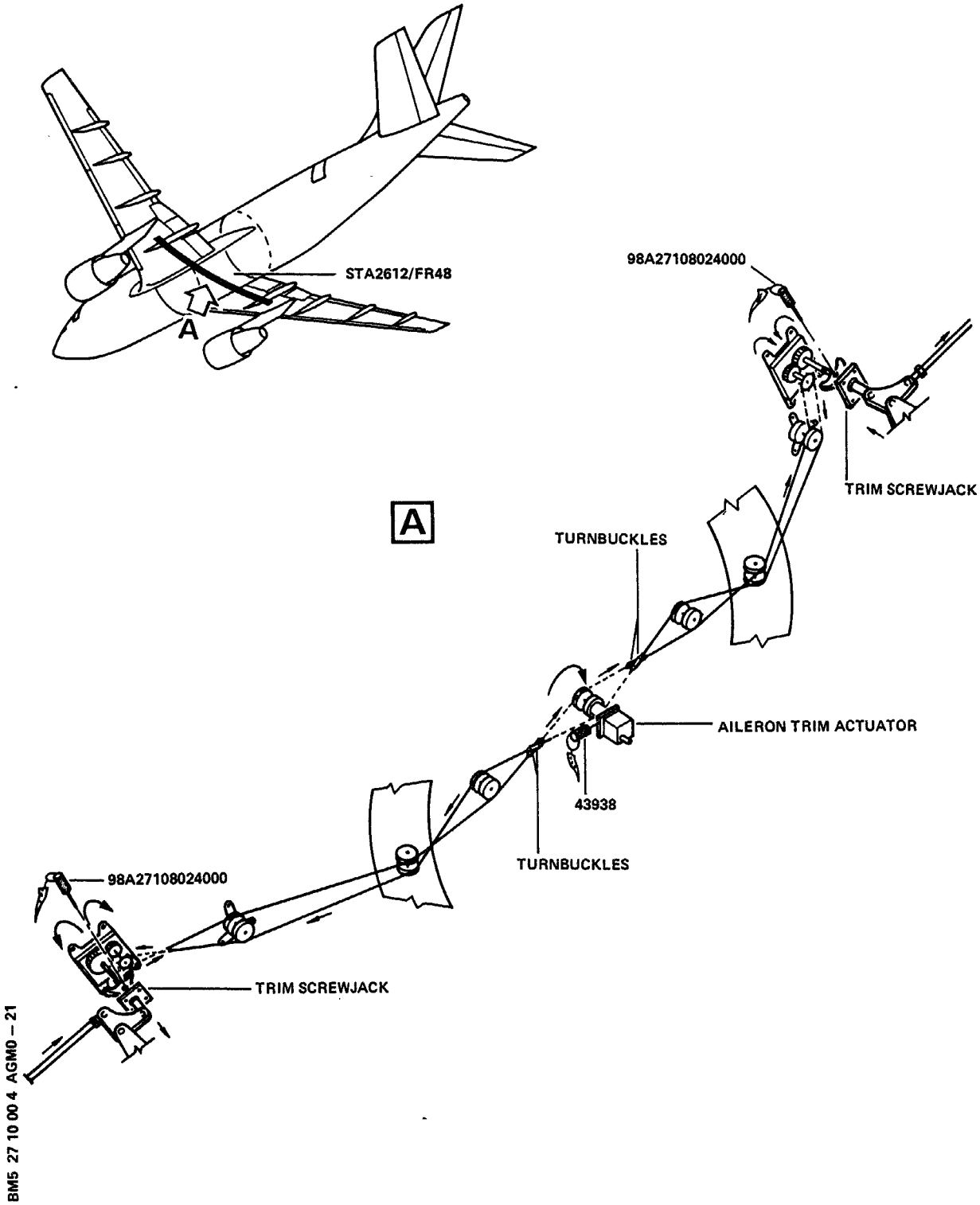
(j)Install protective cover on trim screwjack gearbox sprocket.

(6)Close-up

(a)On trim actuator
- remove rigging pin
- blank rigging hole with plug. Safety with lockwire.

(b)On either side of trim actuator, install cowls.

(c)Remove all rigging pins and equipment.
Make certain that working area is clean and clear of tools and miscellaneous items of equipment. Close access doors.



Aileron Trim Control Cable Routing
Figure 404

(d)Remove access platform.
(e)Close main gear doors (Ref. 32-12-11, P. Block 301).
(f)Remove safety clip and tag and close circuit breaker 3CG.
(g)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

AILERON - ADJUSTMENT/TEST

CAUTION : THIS PROCEDURE MUST BE PERFORMED IN A HANGAR.
WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Adjustment of Cable Length on ASA Control Linkage

A. Equipment and Materials

ITEM	DESIGNATION
(1)98A27901003000	Pin - Rigging, Aileron Control
(2)98A27103501000	Pin - Rigging, Speed Aileron
(3)98A27108024000	Pin - Rigging, ASA Trim Spindle
(4)	Access Platform 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
(5)	Circuit Breaker Safety Clips
(6)	Thermometer
Referenced Procedures	
- 06-41-57, P. Block 001	Wings - General
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 32-12-11, P. Block 301	Main Gear Main Door-(Ground Door(s) Opening)

B. Procedure

R (Ref. Fig. 501)

(1)Job set-up

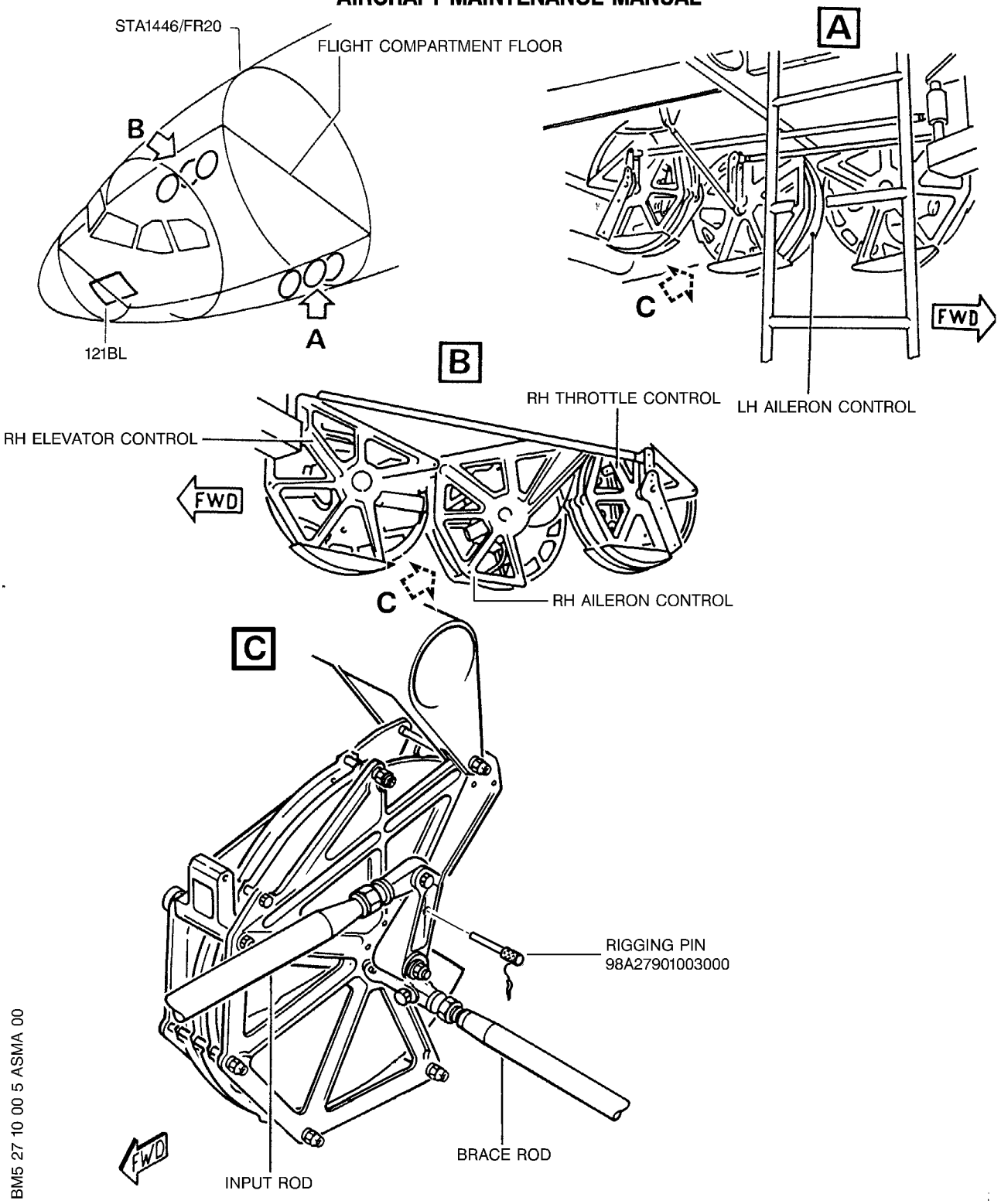
(Ref. Fig. 502)

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)The aircraft must stay at least 3 hours with its forward lower cargo door open in order to obtain a uniform stabilized temperature.

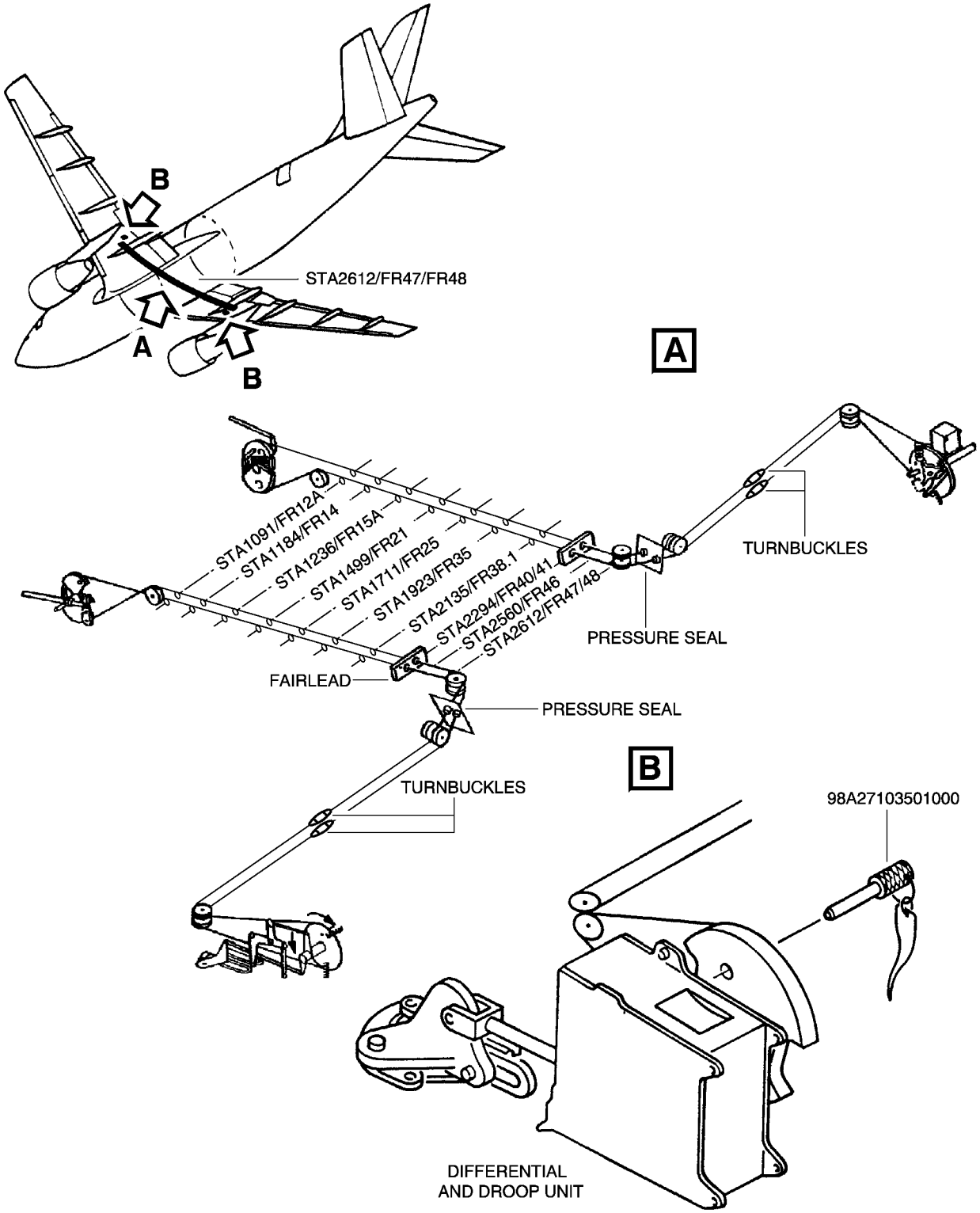
(c)Pressurize all three hydraulic systems :
- using ground power cart (Ref. 29-10-00, P. Block 301)
- using Green electric pumps (Ref. 29-21-00, P. Block 301).

(d)On SERVO CTL section of panel 428VU
- make certain that SERVO CTL/B, G and Y (JAM/OFF) pushbutton switches are pressed and legends off.



Rigging Point Location
and Aileron Trim Control Cable Routing (Sheet 1/2)
Figure 501

R



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Rigging Point Location
and Aileron Trim Control Cable Routing (Sheet 2/2)
Figure 501

R

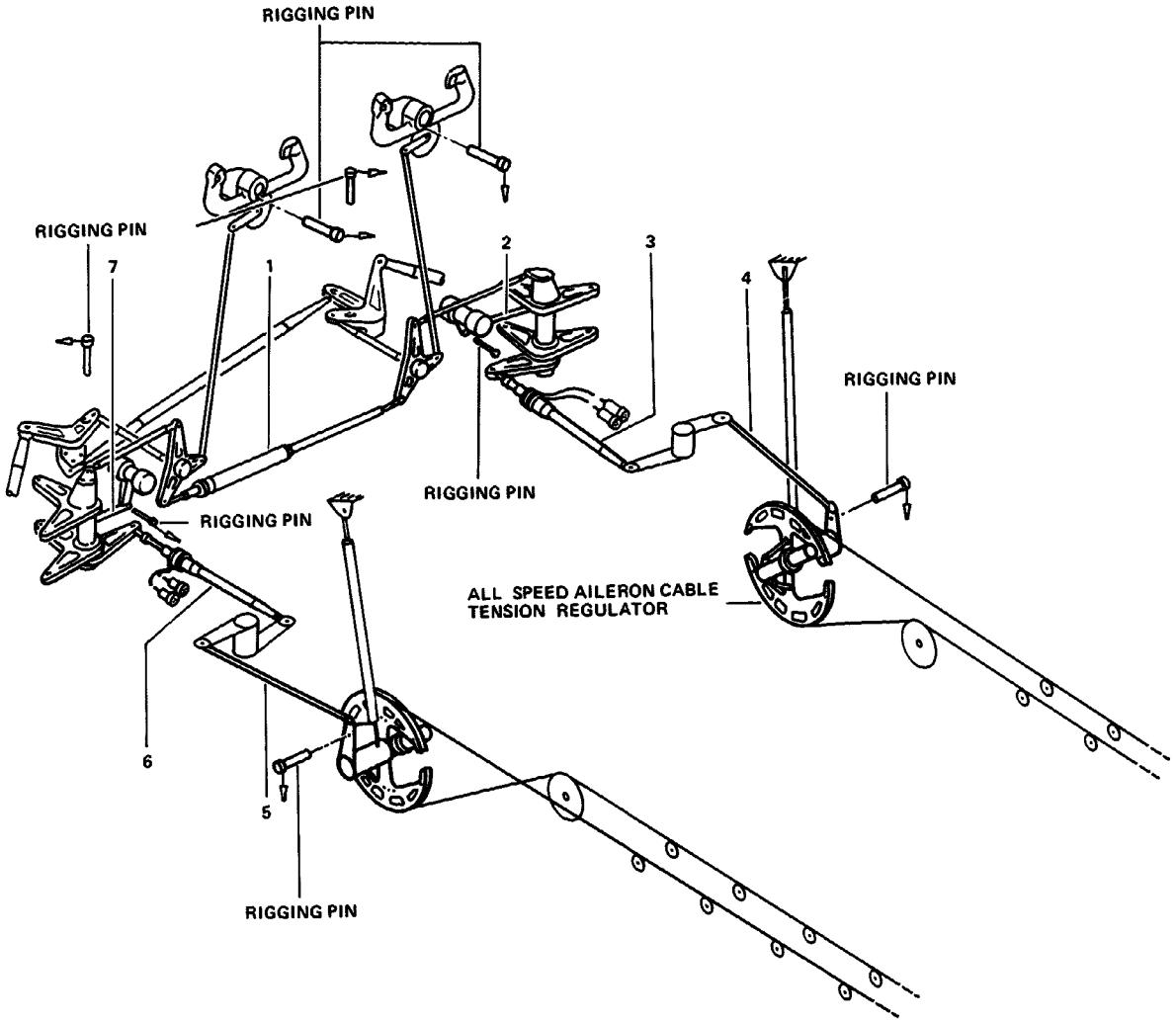
(e)Cycle the control wheels 10 times fully left and right and then return them to zero.
(f)Make certain that flap and slat control lever is in first notch position (flaps and slats fully retracted).
(g)Open door 121BL.
(h)Disconnect interconnecting rod (1) between Captain and First Officer sides (Ref. Fig. 502).
(j)Immobilize L and R ASA cable tension regulators using rigging pins 98A27901003000.
(K)Open main gear doors (Ref. 32-12-11, P. Block 301)
(l)Position access platform and open access doors 575AB, 675AB (Ref. 06-41-57, P. Block 001).
(m)On panel 133VU :
- open, safety and tag FLT CTL/AIL/TRIM circuit breaker 3CG, position 331/V63.
(n)Position access platform under each wing and open access doors 575BB and 675BB (Ref. 06-41-57, P. Block 001).
(p)Check that the rigging pin 98A27108024000 can be inserted on left (right) trim screwjack (Ref. Fig. 505). If pin cannot be inserted then adjust the aileron trim cable system (See paragraph 2. of this procedure).

(2)Adjustment of cable length
(a)On both L and R sides check that rigging pin 98A27103501000 can be inserted into the differential and droop unit.
- If this is not possible then flex the 2 cables equally so that the tension regulator quadrants are moved and repeat the check.
- If it is still not possible then pull on one cable to see which one has to be adjusted to allow free rigging pin insertion. Adjust the corresponding cable as described in the following steps.

R Turnbuckles for the cables are located behind the Rear Spar between
R Ribs 2 and 3. LH wing turnbuckle is located near the Blue Hydraulic
R Reservoir. RH wing turnbuckle is located near the Yellow Hydraulic
R Reservoir.

(b)Remove safety clip from the turnbuckle and adjust the identified cable until the rigging pin can be inserted in the corresponding differential and droop unit.
NOTE : If maximum possible shortening adjustment does not allow rigging pin insertion then shorten the cable length (See paragraph 3. of this procedure).

(3)Adjustment of cable tension (Ref. Fig. 503)
(a)Record the ambient temperature.
NOTE : Prior to taking readings, make sure that the cable area temperature and the external temperature are the same at ± 2 deg. C (± 3.6 deg. F).
It is necessary to wait three hours before you start the adjustment in order to get a uniform stabilized temperature in the aircraft.
(b)On both L and R sides check and if necessary gradually adjust cable tension by simultaneously adjusting both cables by the same amount and in the same direction (as described above) until the pointer on the tension regulator is opposite the relevant compensation scale graduation, determined against the ambient temperature, by means of the



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Linkage Between Control Wheel and Cable Tension Regulator
Figure 502

R

cable tension adjustment graph.

NOTE : Select the nearest graduation below the lower line of the adjustment range (towards R identifier) within a half turn of the turnbuckle.

NOTE : During and after tensioning operation, flex the two cables equally and release sharply. When releasing cables, check that tension regulator locking cross beam slides freely.

(c)On L and R sides make certain that rigging pins 98A27901003000 and 98A27103501000 can be removed and inserted freely in the tension regulator and the differential droop unit respectively.

NOTE : If you cannot adjust control cables :

- do a visual inspection of the aileron mechanical control for correct cable routing
- if the visual inspection is correct, shorten the length of the aileron control cables.

(d)Lock turnbuckles with safety clips and check that clip installation is correct by pulling on clip vertically.

(e)Connect interconnecting rod (1) between Captain and First Officer sides (Ref. Fig. 502).

(f)Remove all rigging pins and items of equipment.

(g)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(h)Remove access platform.

(j)Close main gear doors (Ref. 32-12-11, P. Block 301).

(k)Remove safety clip and tag and close circuit breaker 3CG.

(4)Test

(a)Do the operational test of the ailerons (Ref. 27-11-00, P. Block 501).

(b)On each cable tension regulator, check that pointer is opposite the same graduation on the compensation scale.

(c)Immobilize cable tension regulators with rigging pins 98A27901003000.

(d)Make certain that rigging pins 98A27103501000 can be inserted/removed freely into/from differential droop units.

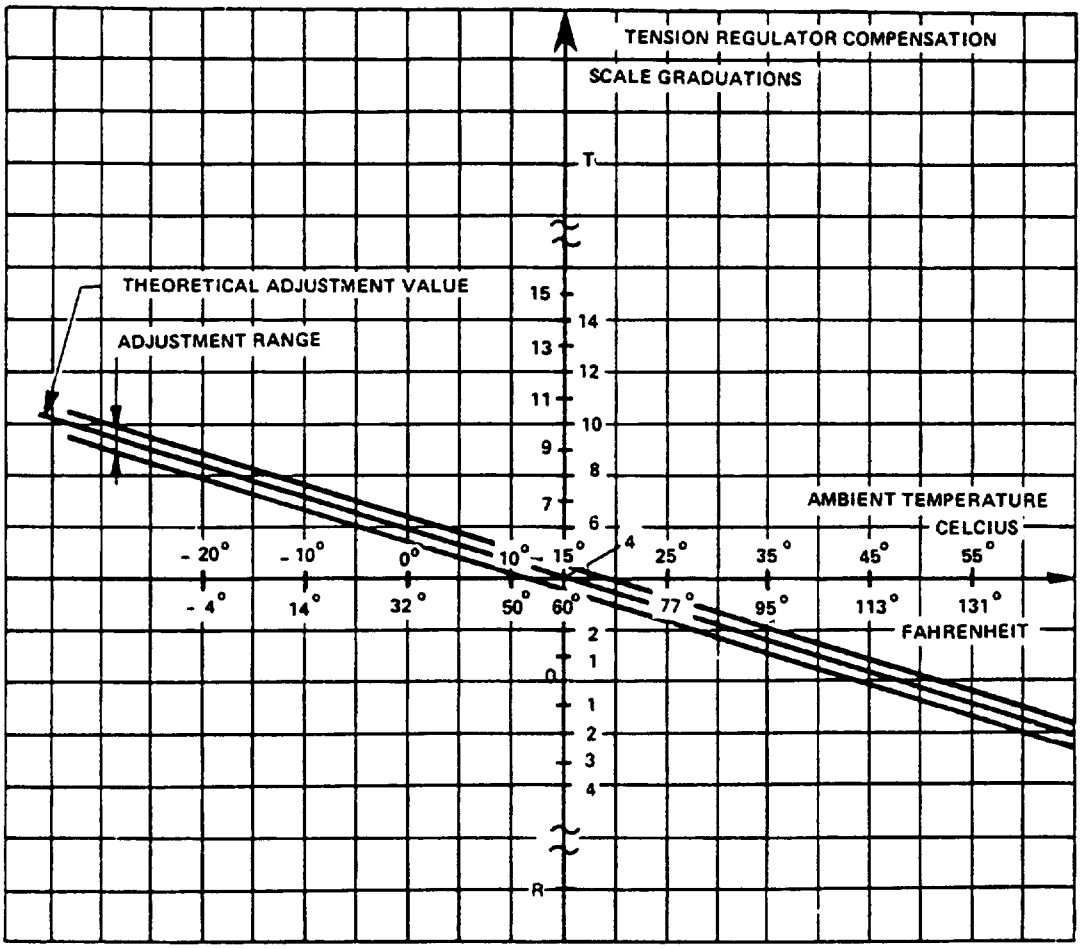
(5)Close-up

(a)Remove all rigging pins.

(b)Shut down pressurization of hydraulic systems.

(c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(d)Close access doors.



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All Speed Aileron Cable Tension Adjustment Graph
Figure 503

2. Adjustment of Cable Tension on Aileron Trim Control Linkage

A. Equipment and Materials

ITEM	DESIGNATION
(1)98A27108024000	Rigging Pin - ASA Trim Spindle
(2)98A27901000000	Pin - Rigging, Aileron Control Wheel
(3)98A27901007000	Pin - Rigging, Elevator Control
R (4)98A27103501000	Pin - Rigging, Speed Aileron
(5)43938	Pin - Rigging, Rudder and Aileron Trim Actuators
(6)	Access Platform 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
(7)	Tensiometer
(8)	Thermometer
(9)	Lockwire - Corrosion Resistant Steel, dia 0.8 mm (0.032 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 32-12-11, P. Block 301	Main Gear Main Door-(Ground Door(s) Opening)

B. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks is correct.

(b)Pressurize Green Hydraulic system
- either using ground power supply cart (Ref. 29-10-00, P. Block 301)
- or using Green electric pumps (Ref. 29-21-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU
- make certain that SERVO CTL/B, G and Y (JAM/OFF) pushbutton switches are pressed (in) and legends off.

(d)Make certain that Captain's and First Officer's aileron control wheels are at zero.

(e)On panel 133VU
Open, safety and tag FLT CTL/AIL/TRIM circuit breaker 3CG, position 331/V63.

(f)Make certain that flap and slat control lever is in first notch position (flaps and slats fully retracted)

(g)Open one main gear door (Ref. 32-12-11, P. Block 301)

(h)On either side of aileron trim control actuator remove cable protective fairings

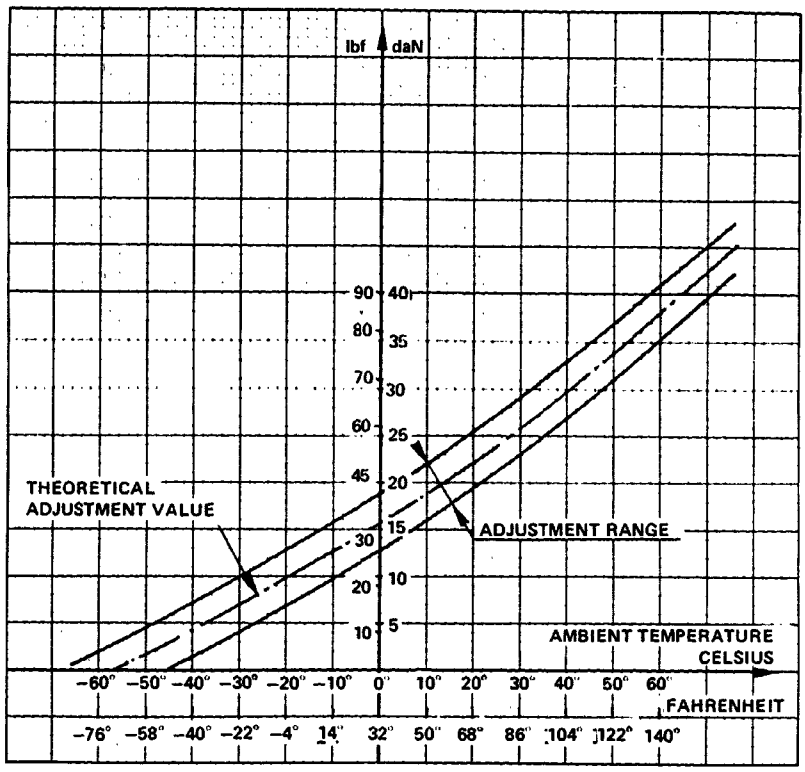
(j)Position access platform

(k)Open access doors 575AB, 575BB, 675AB and 675BB.

(l)Immobilize L and R ASA cable quadrants with rigging pins
R 98A27103501000.

(m)Remove safety clips from cable turnbuckles.

(2)Adjustment (Ref. Fig. 505, 504)
(a)At level of actuator and trim screwjacks check that chain ends are approximately equidistant from the shaft of the sprockets on which they are engaged. The difference between these two lengths shall be less than a chain half pitch.
(b)Install rigging pin 98A27108024000 on left (right) trim screwjack.
(c)Record the ambient temperature.
NOTE : Before adjusting cable tension, allow temperature of cable area to equalize outside temperature.
(d)Using the cable tension adjustment graph, adjust cable tension to value corresponding to ambient temperature recorded.
CAUTION : NO THREADS SHALL REMAIN VISIBLE ON EACH CABLE END WHEN SPECIFIED CABLE TENSION HAS BEEN REACHED
(e)On trim actuator
Cut lockwire and unscrew blanking plug from rigging hole. Screw blanking plug on actuator body.
(f)Check trim actuator output shaft mid travel position (indicator visible in slot on actuator lower section).
Make certain that rigging pin 43938 can be inserted and removed freely in rigging hole. If required repeat cable tension adjustment to obtain this result while meeting requirements of previous operations.
(g)Remove all rigging pins.
(h)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(j)Pressurize Green hydraulic system.
- either using hydraulic ground power supply cart (Ref. 29-10-00, P. Block 301).
- or using Green electric pumps (Ref. 29-21-00, P. Block 301)
(k)Remove safety clip and tag and close circuit breaker 3CG.
(l)On panel 408VU
Move AIL TRIM/L WING/DN and AIL TRIM/R WING/DN switches so as to operate the aileron trim actuator to stabilize cables then set aileron trim to zero (indication on Captain's and First Officer's aileron control wheels)
NOTE : Small trim adjustments might be necessary to insert the rigging pin 43938. Do this by operating the AIL TRIM/L WING/DN and AIL TRIM/R WING/DN switches (on panel 408VU) in small increments, making sure to remove the rigging pin 43938 and that it is never inserted for each trim input.
(m)On Captain's and First Officer's aileron control wheels remove cover plate and insert rigging pins 98A27901000000
(n)Open access door 121BL and immobilize Captain's and First Officer's control column with rigging pin 98A27901007000
(p)Open access doors 575CB and 675CB
(q)Make certain that artificial feel units on each wing are at neutral (stops in contact with input lever shaft). If not, immobilize trim screwjack with rigging pin 98A27108024000 and adjust length of control rod (12) at screwjack side ((Ref. 27-11-00, P. Block 501) Adjustment of Trim Control) to set artificial feel unit threshold position. Tighten locknuts and safety with lockwire.
(r)Remove rigging pin. Remove blanking plug from actuator body and



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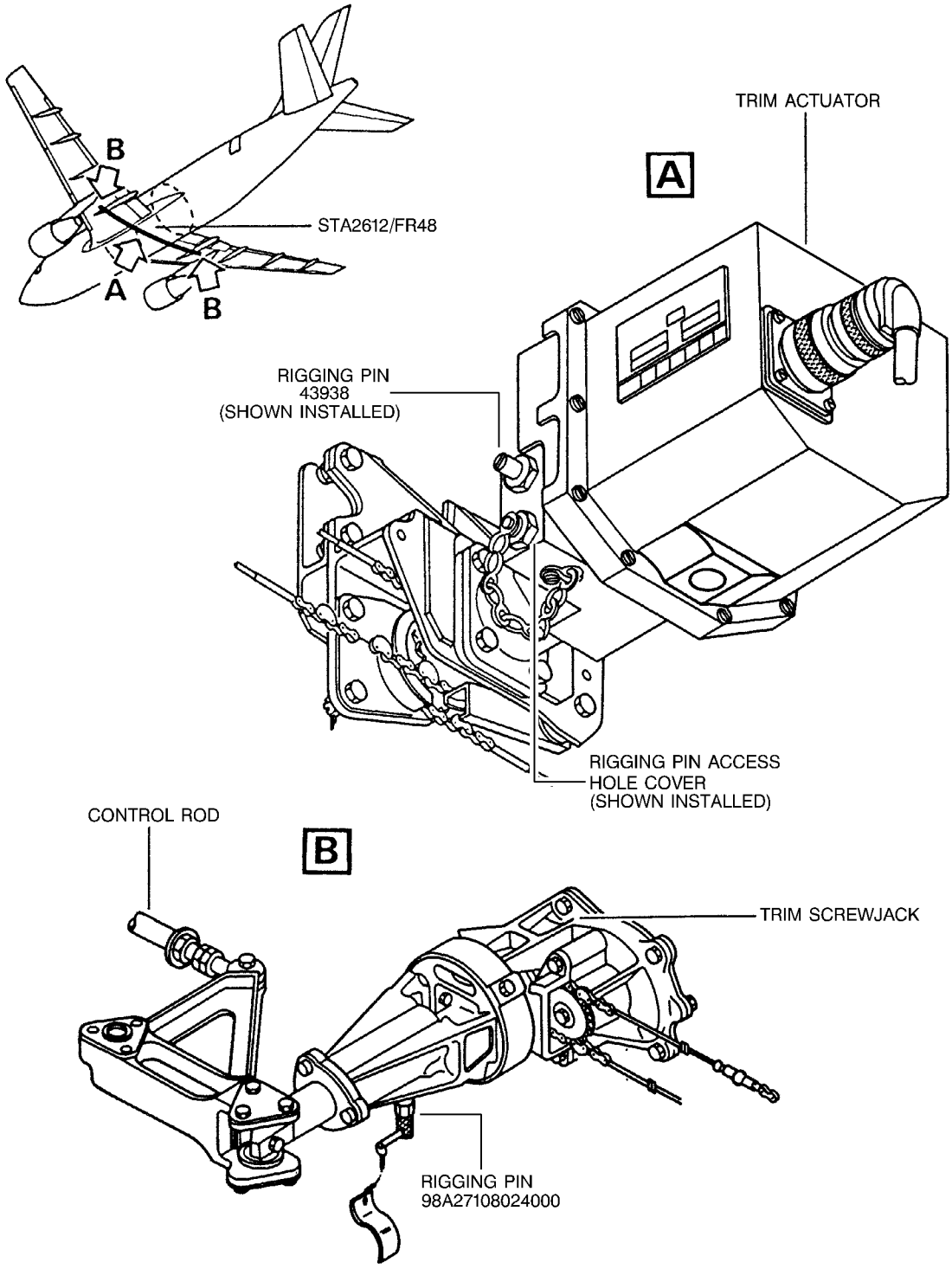
Aileron Trim Control Cable Tension Adjustment Graph
Figure 504



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Roll Trim - Rigging Points
Figure 505

R

screw into rigging hole. Fully tighten blanking plug and safety with lockwire.

(s)Remove all rigging pins.

(t)Lock turnbuckles with safety clips and check that clip installation is correct by pulling on clip vertically.

(u)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(v)Install cable fairings.

(w)Close main gear doors (Ref. 32-12-11, P. Block 301).

(3)Test

(a)Do the operational test of aileron trim system (Ref. 27-12-00, P. Block 501).

(4)Close-up

(a)Shut down pressurization of Green hydraulic system.

(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(c)Close access doors.

R 3. Shortening of the Aileron Cable Length

R CAUTION : THIS PROCEDURE MUST BE PERFORMED IN A HANGAR.

R WARNING : MAKE SURE THAT THE SAFETY DEVICES AND THE WARNING NOTICES ARE IN POSITION BEFORE YOU START A TASK ON OR NEAR :
- THE FLIGHT CONTROLS
- THE FLIGHT CONTROL SURFACES
- THE LANDING GEAR AND THE RELATED DOORS
- COMPONENTS THAT MOVE.
MOVEMENT OF COMPONENTS CAN KILL OR INJURE PERSONS.

R CAUTION : MAKE SURE THAT THE AIRCRAFT IS IN THE TEMPERATURE CONDITIONS (STABLE AMBIENT TEMPERATURE) SPECIFIED IN THE MAINTENANCE CONFIGURATION PARAGRAPH.
CHANGES IN THE TEMPERATURE CAN CAUSE INCORRECT MEASUREMENTS.

R A. Reason for the Job

Do this procedure when it is no longer possible to adjust the length of the aileron control cable (turnbuckles on the stops).

R B. Job Set-up Information

(1)Equipment and materials

ITEM	DESIGNATION
(a)	Thermometer
(b)	Warning notice
(c)	Access platform 2.5 m (8 ft. 2 in.)
(d)	Access platform 5.0 m (16 ft. 5 in.)
(e)98A27103501000	Pin - Rigging, Speed Aileron
(f)FE214901	Locking Equipment - Cable Tension Regulator
(g)98A27901003000	Pin - Rigging, Aileron Control
Referenced Procedures	
- 12-33-21, P. Block 301	Ground Air Pre-conditioning
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-00, P. Block 501	Ailerons
- 29-10-00, P. Block 301	Main Hydraulic Power Pressurization/ Depressurization
- 52-30-00, P. Block 301	Cargo Compartment Doors
	Cable Fabrication Manual

R C. Job Set-up

(1)Get access

(a)Put the access platform in position at the FWD cargo compartment door.

(b)Open the FWD cargo compartment door (Ref. 52-30-00, P. Block 301).

(c)Put the access platform in position below the access doors 575AB, 675AB.

(d)Open the access doors 575AB, 675AB.

(e)In the zone 131, remove the cargo compartment ceiling panels 131KC, 132KC.

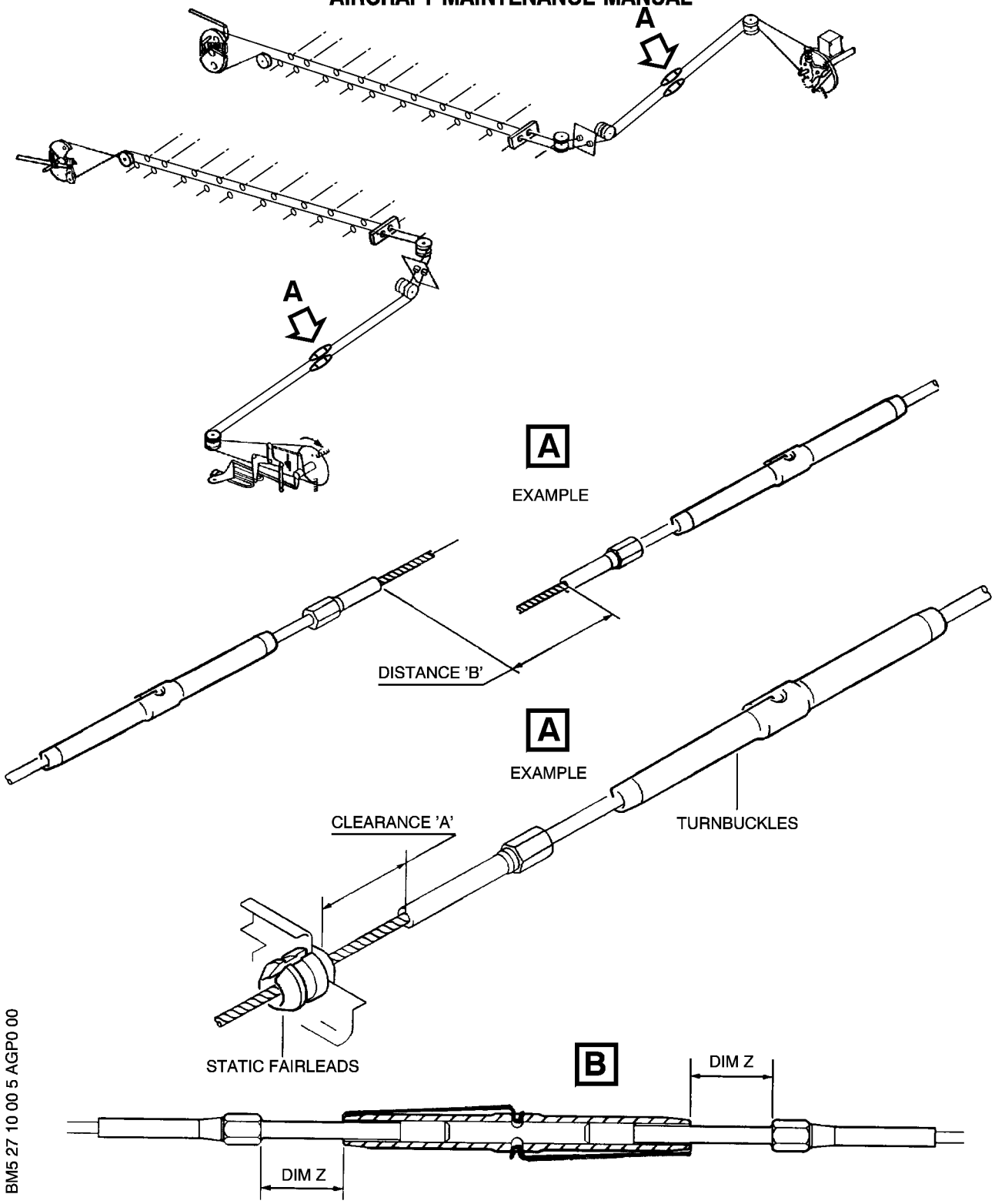
(2)Aircraft maintenance configuration

(a)Make sure that the aircraft electrical circuits are de-energized

(Ref. 24-41-00, P. Block 301).
(b)Make sure that the air conditioning is de-energized (Ref. 12-33-21, P. Block 001).
(c)The aircraft must stay in a hangar for 3 hours at least with all its doors open.
(d)The ambient temperature should be within a range of between 0 deg. C (32.00 deg. F) and 30 deg. C (86.00 deg. F).
NOTE : The cable routing area must not be lit by neon located close to the cable itself.
(e)Energize the aircraft electrical circuits (Ref. 24-41-00, P. Block 301).
(f)Pressurize the Green Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(g)Move the aileron control wheel to the RH turn stop and measure and record the clearances between the 4 turnbuckles and their static fairleads.
(h)Move the aileron control wheel to the LH turn stop and measure and record the clearances between the 4 turnbuckles and their static fairleads.
(j)Operate the aileron control wheel fully more than ten times and set it to the zero position.
(k)Make sure that the aileron trim control is in the '0' position.
(l)Put the warning notice in position in the flight compartment to tell persons not to operate the aileron control wheel and aileron trim control.
(m)Install the speed aileron rigging pin 98A27103501000 in the mechanical input of the differential and droop unit.
(n)In the avionics compartment, insert the aileron control rigging pin 98A27901003000 in the aileron cable tension regulator input lever.
(p)Make sure that the cable tension regulator locking equipment FE214901 is not installed on the cable tension regulator.
(q)Depressurize the Green, Blue and Yellow hydraulic systems (Ref. 29-00-00, P. Block 301).
(r)De-energize the aircraft electrical circuits (Ref. 24-41-00, P. Block 301).

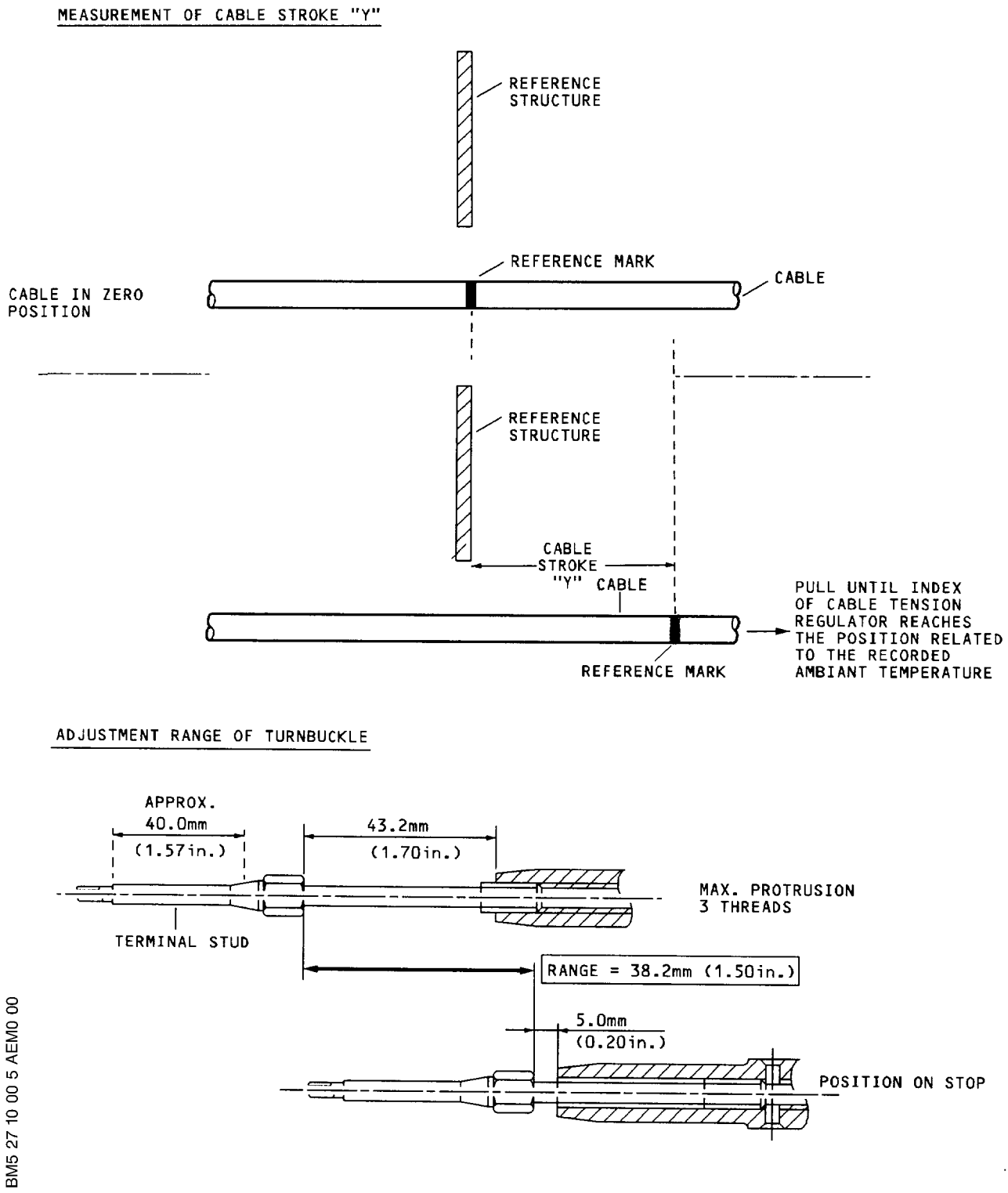
D. Procedure

R (Ref. Fig. 506)
(Ref. Fig. 507)
R (1)Shortening of the aileron cable length
R (a)Measure and record the cable zone temperature and the external
R temperature with a thermometer. Make sure that the temperature is the
R same at +/- 2 deg. C (+/- 3.6 deg. F).
R (b)Adjust all four turnbuckles to the dimension 'Z' = 30 mm (1.1811 in.).
R (c)Define the value to shorten the cable length.
R NOTE : Cut both cables by the same value.
R 1 Put marks on both cables where the cable routing is straight and
R nearby the structure.
R 2 In the fuselage between two static fairleads, pull simultaneously on
R both cables until the index of the tension regulator reaches the
R position related to the recorded ambient temperature.



Aileron Cable Turnbuckles
Figure 506

R



Cable Stroke 'Y'
Figure 507

R NOTE : Pull the cables downwards to get the necessary force and measure the cable stroke 'Y' on the aircraft axis.
R 3 Measure with the marks (on the cables and on the structure) the cable stroke 'Y' on each cable. This will correspond to the overall length change.
R 4 Subtract 40 mm (1.5748 in.) for each cable from the value measured before.
R NOTE : 40 mm (1.5748 in.) is the cable penetration into the terminal stud of one turnbuckle.
R 5 The value 'X' (to shorten the cable length) = 'Y' (cable stroke) - 40 mm (1.5748 in.).
R Example : Measured cable stroke 'Y' for each cable = 110 mm
R Cable penetration into the terminal stud = 40 mm
R Value 'X' to shorten the cable length = 110 mm - 40 mm
R = 70 mm
R Cut each cable by 70 mm (2.7559 in.).
R (d)Use the measured clearance between the turnbuckles and the static fairleads to decide to cut the front or the rear cable junction by the calculated value.
R NOTE : Cut both cables by the same value.
R (e)Install the cable tension regulator locking equipment FE214901 on the cable tension regulator.
R (f)Install new turnbuckles on the cable (Ref. Cable Fabrication Manual).
R (g)Do the adjustment of the aileron cable tension (Ref. 27-11-00, P. Block 501).
R (h)Make sure that the clearance 'A' between the four turnbuckles and the fairleads is minimum 40 mm (1.5748 in.) over the full travel range of the aileron control
R (Ref. Fig. 506).
R (j)Make sure that the distance 'B' between the ends of the turnbuckles in each aileron control cable is more than 0 mm (0 in.) in any position.
R (k)Make sure that the turnbuckles are in the adjustment range of 38.2 mm (1.5039 in.).
R (Ref. Fig. 507).

R E. Close-up
R (1)Close access
R (a)Make sure that the work area is clean and clear of tools and other items.
R (b)Remove the speed aileron rigging pin 98A27103501000 from the differential and droop unit.
R (c)In the avionics compartment, remove the aileron control rigging pin 98A27901003000 in the aileron cable tension regulator input lever.
R (d)Remove the cable tension regulator locking equipment FE214901 on the cable tension regulator.
R (e)Close the access doors 575AB, 675AB.
R (f)Close the FWD cargo compartment door (Ref. 52-30-00, P. Block 301).
R (g)Remove the access platform(s).

(h)In the zone 131, install the cargo compartment ceiling panels 131KC,

132KC.

(j)Remove the ground support and maintenance equipment, the special and standard tools and all other items.

(2)Put the aircraft back to its initial configuration

(a)Remove the warning notice(s).

CAUTION : THIS PROCEDURE MUST BE PERFORMED IN A HANGAR.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job
   A. Check of Cable Tension on ASA Control Linkage
   B. Check of Aileron Adjustment and Tension Regulator Index Value
   C. Check of Cable Tension on Aileron Trim Control Linkage
R D. General Visual Inspection of Actuators and Hydraulic Line

2. Check of Cable Tension on ASA Control Linkage

   A. Equipment and Materials

ITEM	DESIGNATION
(1)98A27901003000	Pin - Rigging, Aileron Control
(2)	Access Platform, 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.
(3)	Circuit Breaker Safety Clips
(4)	Thermometer
(5)	Tensiometer
Referenced Procedures	
- 06-41-57, P. Block 001	Wings - General
- 24-41-00, P. Block 301	AC External Power Control
- 27-10-00, P. Block 501	Aileron Adjustment/Test
- 27-11-17, P. Block 401	Cable Tension Regulator Removal/Installation
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power

   B. Procedure
      (1)Job set-up
         (a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)Pressurize Green hydraulic system
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green system electric pumps (Ref. 29-21-00, P. Block 301)

(c)Cycle the control wheels 10 times and return to zero.

(d)Make certain that Captain's and First Officer's aileron control wheels are at neutral.

(e)Make certain that flap and slat control lever is in first notch position (flaps and slats fully retracted).

R (f)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/AIL/TRIM	3CG	331/V63

(g)Open access door 121BL.

(h)Immobilize L and R all speed aileron cable tension regulators using rigging pins 98A27901003000.

(j)Install access platform and open access doors 575AB, 675AB.

(2)Check

NOTE : Perform the following checks for both L and R sides.

(a)Make certain that the tension regulator is not seized and not on a stop :
- bend the 2 cables by the same amount and release them quickly. When you release the cables, make sure that the tension regulator quadrants move easily (no seizing).

Position a tensiometer on each of the two cables near tension cable regulators at least 200 mm (7.87 in.) from junction or terminal.
Repeat this operation twice to validate the measurement.
Check that tension of each cable is 12 ± 3 daN (27 ± 6.74 lbf).
If the result of the check is not correct, replace the tension regulator (Ref. 27-11-17, P. Block 401).

(b)After check remove all rigging pins and items of equipment.

R (c)Remove safety clip and tag and close circuit breaker 3CG.

(3)Close-up

R (a)Make certain that working area is clean and clear of tools and
R miscellaneous items of equipment.
R (b)Depressurize Green hydraulic system. If applicable, disconnect hydrau-
R lic ground power cart.
R (c)De-energize the aircraft electrical network (Ref. 24-41-00,
R P. Block 301).
R (d)Close access doors. Remove access platform.

R 3. Check of Aileron Adjustment and Tension Regulator Index Value

A. Equipment and Materials

ITEM	DESIGNATION
(1)98A27901000000	Pin - Rigging
(2)98A27901003000	Pin - Rigging, Aileron Control
(3)98A27901007000	Pin - Rigging
(4)98A27103501000	Pin - Rigging, Speed Aileron
(5)	Access Platform, 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
(6)	Circuit Breaker Safety Clips
(7)	Tensiometer
(8)	Thermometer
(9)43938	Pin - Rigging, Rudder and Aileron Trim Actuators
Referenced Procedures	
- 06-41-57, P. Block 001	Wings - General
- 24-41-00, P. Block 301	AC External Power Control
- 27-10-00, P. Block 501	Aileron Adjustment Test
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron) - Adjustment/Test
- 29-10-00, P. Block 301	Main Hydraulic Power Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground door(s) Opening)

B. Procedure (Ref. Fig. 601, 602)

NOTE : All steps of this procedure need to be carried out completely and in sequence. Partial performance of the following steps could result in an incorrect aircraft configuration for the checks.

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)The aircraft must stay at least 3 hours with its forward lower cargo door open in order to obtain a uniform stabilized temperature.

(c)Pressurize all three hydraulic systems :
- using ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green electric pumps (Ref. 29-21-00, P. Block 301), (Ref. 29-22-00, P. Block 301), (Ref. 29-23-00, P. Block 301).

(d)On SERVO CTL section of panel 428VU :
- make certain that SERVO CTL/B, G and Y (JAM/OFF) pushbutton switches are pressed and legends off.

(e)Make certain that flap and slat control lever is in first notch position (flaps and slats fully retracted).

(f)Cycle the control wheels 10 times fully left and right and then return them to zero.

(2)Verification of Trim in zero position

(a)Make certain that Captain's and First Officer's aileron control wheels are in zero position (which is an indication that roll trim is close to zero).
(b)Open main gear doors (Ref. 32-12-11, P. Block 301).
(c)On trim actuator (in MLG bay) :
Cut lockwire and unscrew blanking plug from rigging hole. Screw blanking plug on actuator body (Ref. Fig. 602).
(d)Check trim actuator output shaft mid travel position (indicator visible in slot on actuator lower section).
(e)Make certain that rigging pin 43938 can be inserted (screwed in) and removed freely in rigging hole of trim actuator.
NOTE : Small trim adjustments might be necessary to insert the rigging pin 43938. Do this by operating the AIL TRIM/L WING/DN and AIL TRIM/R WING/DN switches (on panel 408VU) in small increments, making sure to remove the rigging pin 43938 and that it is never inserted for each trim input.
(f)Once it has been established that rigging pin 43938 can be inserted in the trim actuator, remove it from the trim actuator and do not apply any more trim inputs.
R (g)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/AIL/TRIM	3CG	331/V63

(h)Position access platform under each wing and open access doors 575FB and 675FB (Ref. 06-41-57, P. Block 001).
(j)Check that the rigging pin 98A27108024000 can be inserted on left (right) trim screwjack (Ref. Fig. 602). If pin cannot be inserted then adjust the aileron trim cable system (Ref. 27-10-00, P. Block 501).
(3)Check of cable adjustment and tension regulator index
NOTE : The aileron control cable (between tension regulator and differential droop unit) is correctly adjusted on each side when at the same time the following condition exists :
- the rigging pin can be inserted in the tension regulator
- the rigging pin can be inserted in the differential droop unit
- the pointer on the tension regulator is in the correct position (for the given temperature).
(a)Position access platform under each wing and open access doors 575AB and 675AB (Ref. 06-41-57, P. Block 001).
(b)On both L and R sides insert rigging pin 98A27901003000 into the tension regulator. If the pin cannot be installed, turn the control wheels slightly to achieve rigging pin insertion.
(c)On both L and R sides check that rigging pin 98A27103501000 can be inserted into the differential and droop unit.
- If this is not possible then flex the 2 cables equally so that the tension regulator quadrants are moved and repeat the above checks.
- If it is still not possible then perform an adjustment of cable length (Ref. 27-10-00, P. Block 501).
(d)Record the ambient temperature.

NOTE : Prior to taking readings, allow temperature of cable area to equalize outside temperature.

(e)On both L and R sides check that the pointer (index) on the tension regulator is opposite the relevant compensation scale graduation, for the given ambient temperature, by means of the cable tension adjustment graph (Ref. Fig. 603).
If the pointer is not in the correct position then adjust the tension of both cables by the same amount (Ref. 27-10-00, P. Block 501).

(4)Check of linkage between control wheels and tension regulators

(a)Immobilize Captain's aileron control wheel at zero using rigging pin 98A27901000000.

(b)Check that rigging pin 98A27901003000 can be freely inserted in tension regulator on Captain side. If this is not possible then perform an adjustment of the linkage between control wheel and cable tension regulator (Ref. 27-11-00, P. Block 501).

(c)Immobilize First Officer's aileron control wheel at zero using rigging pin 98A27901007000. Check that pin can be freely installed and removed. If not then adjust the interconnecting rod (1) (Ref. Fig. 604).

(d)Check that rigging pin 98A27901003000 can be freely inserted in tension regulator on First Officer's side. If this is not possible then perform an adjustment of the linkage between control wheel and cable tension regulator (Ref. 27-11-00, P. Block 501).

R (e)Remove all rigging pins (differential droop units, tension regulators, control wheels and trim actuator).

R (f)Remove safety clip and tag and close circuit breaker 3CG.

R (5)Close-up

R (a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

R (b)Depressurize Green hydraulic system. If applicable, disconnect hydraulic ground power cart.

R (c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R (d)Close access doors. Remove access platform.

R 4. Check of Cable Tension on Aileron Trim Control Linkage

A. Equipment and Materials

ITEM	DESIGNATION
(1)98A27103501000	Pin - Rigging, Speed Aileron
(2)	Tensiometer
(3)	Thermometer
Referenced Procedures	
- 27-10-00, P. Block 501	Aileron
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground door(s) Opening)

B. Procedure

(1)Job set-up

(a)Make certain that Captain's and First Officer's aileron control wheels are at neutral.

(b)Open one main gear door (Ref. 32-12-11, P. Block 301).
(c)Check trim actuator output shaft mid travel position (indicator visible in slot on actuator lower section) (Ref. Fig. 602).
(d)On either side of aileron trim actuator remove fairings protecting cables.

(2)Check
(a)Position access platform under each wing and open access doors 575AB and 675AB (Ref. 06-41-57, P. Block 001).
(b)On both L and R sides insert rigging pin 98A27103501000 into the differential and droop unit.
(c)On either side of aileron trim actuator, check that the two ends of the chain are approximately equidistant from the axis of the sprocket shaft on which chain is meshed.
The difference between these two lengths must be less than one half pitch of the chain. If this is not the case then adjust the tension on aileron trim control linkage (Ref. 27-10-00, P. Block 501).
(d)Record ambient temperature.
NOTE : Prior to take readings, allow temperature of cable area to equalize temperature of outside area.
(e)Position a tensiometer on each cable at approximately 1 meter (39.4 in.) from the aileron trim actuator.
(f)Check that tension read on tensiometer corresponds with temperature as indicated on corresponding graph (Ref. 27-10-00, P. Block 501).

(3)Close-up
(a)Install fairings.
(b)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(c)Close main gear door (Ref. 32-12-11, P. Block 301).

R (Ref. Fig. 601)

R 5. General Visual Inspection of Actuators and Hydraulic Lines

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
Referenced Procedures	
- 20-29-12, P. Block 1	Control Cable Check
- 20-29-14, P. Block 1	Control Cable Rejection Criteria
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-00, P. Block 601	Mechanical Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) Make certain that electronics racks ventilation is correct.

(b)Pressurize Green hydraulic system
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green electric pumps (Ref. 29-21-00, P. Block 301).

WARNING : MAKE CERTAIN THAT FLAP AND SLAT TRAVEL RANGE IS CLEAR.

(c)Place flap and slat control lever in fifth notch position.

(d)Depressurize Green hydraulic system.

(e)Install access platform.

(f)Open access doors 121BL, 575AB, 675AB, 575BB, 675BB, 575CB and 675CB.

(g)Open one main gear door (Ref. 32-12-11, P. Block 301).

(h)Remove forward cargo compartment ceiling panels located below cable routing.

(2)Check

(a)At all attachment and hinge fittings, check that
- all nuts and bolts are fully tightened
- all safetying devices (cotter pins, lockplates, lockwire) are correctly installed.

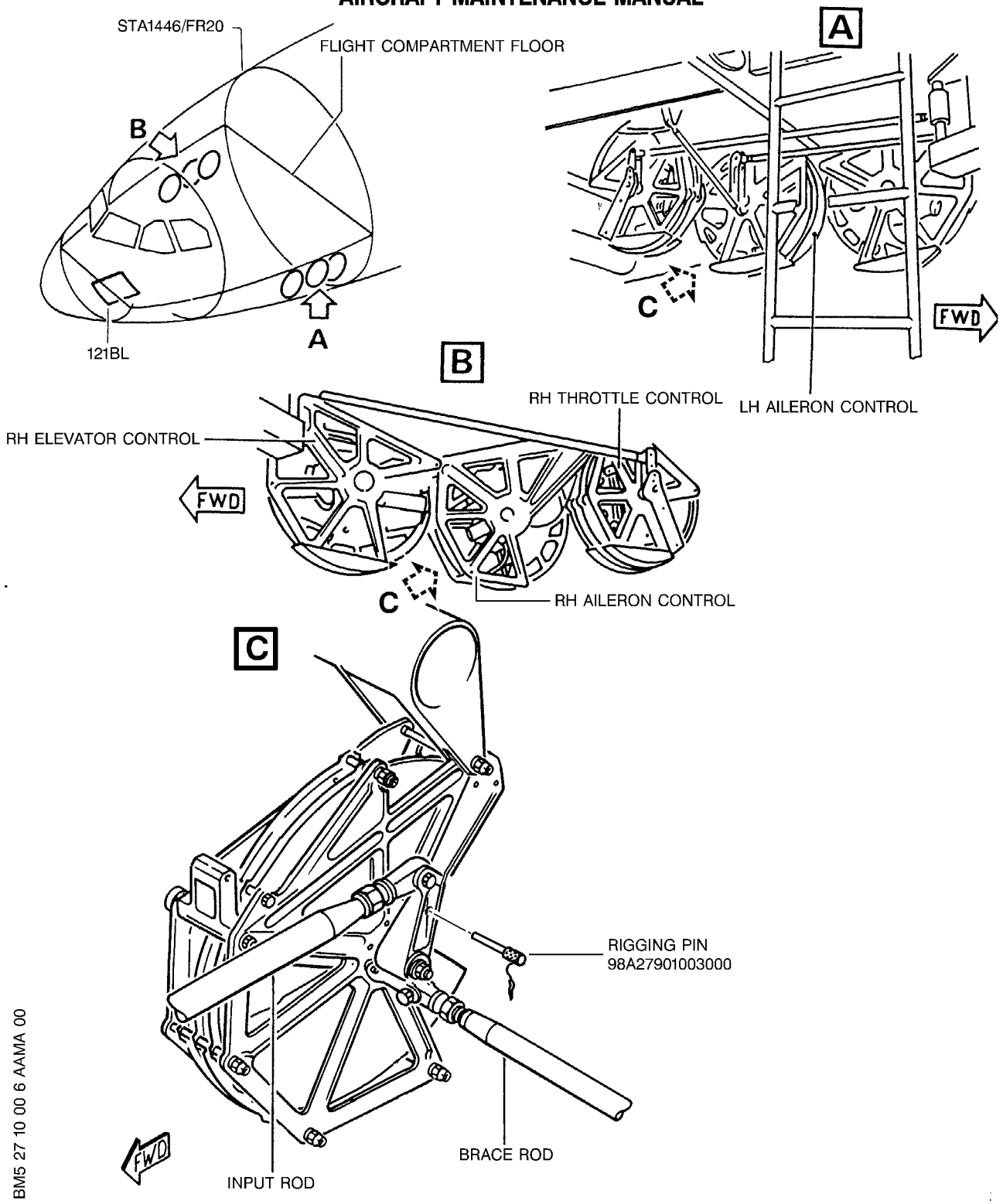
(b)Check that pins, bolts, washers, nuts are in satisfactory condition (no oxidation).

(c)Make certain that identification placards are correctly fixed.

(d)Make certain that bonding jumpers are in fully satisfactory condition.

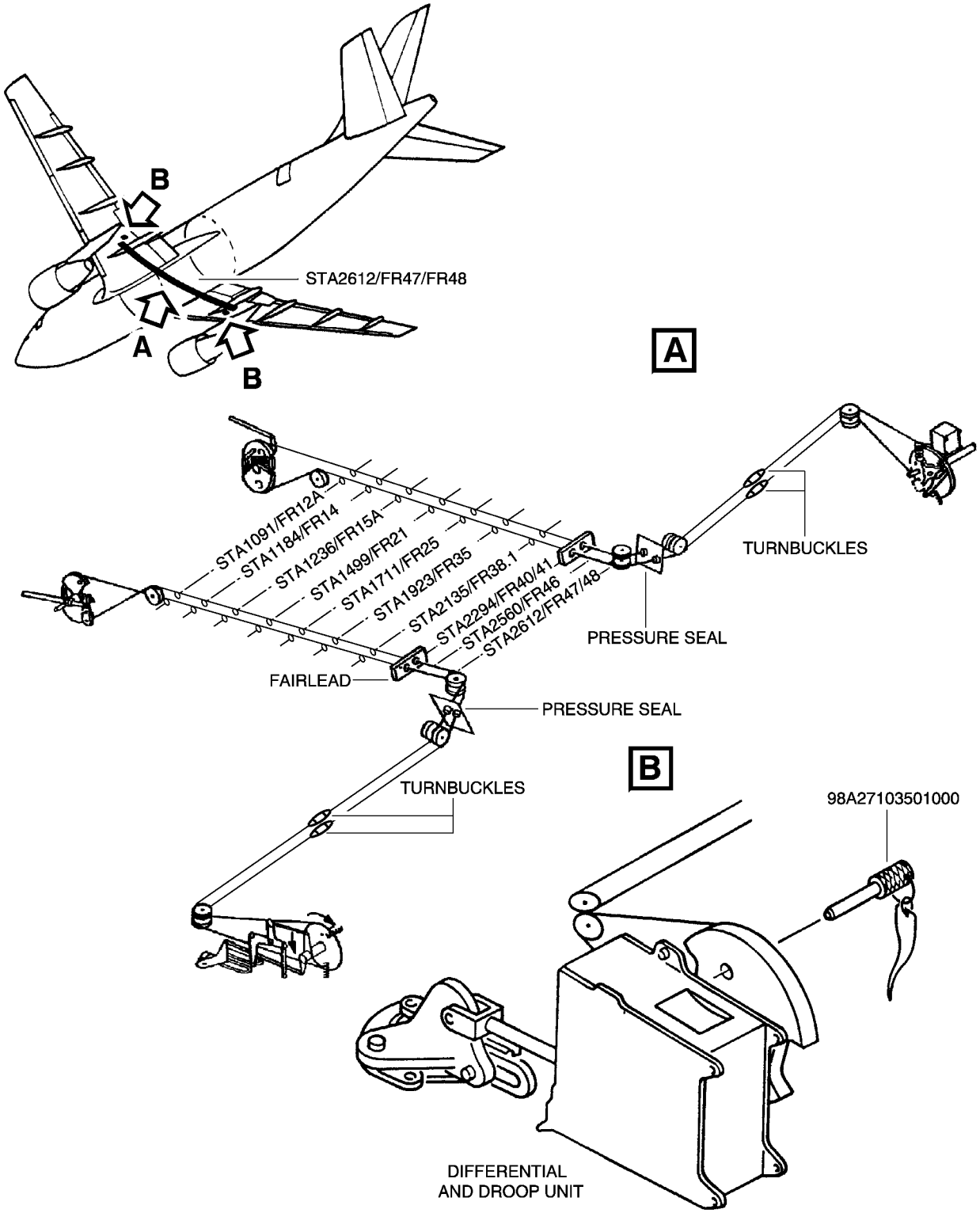
(e)Check hose clamps for correct diameter, satisfactory condition, and correct installation. Check that there are no signs of wear on hoses at any attachment points due to vibration, pressure surges, etc...

(f)Check that hoses are correctly positioned :
- that there is no friction with other lines, bulkheads or components
- that hoses are not twisted.



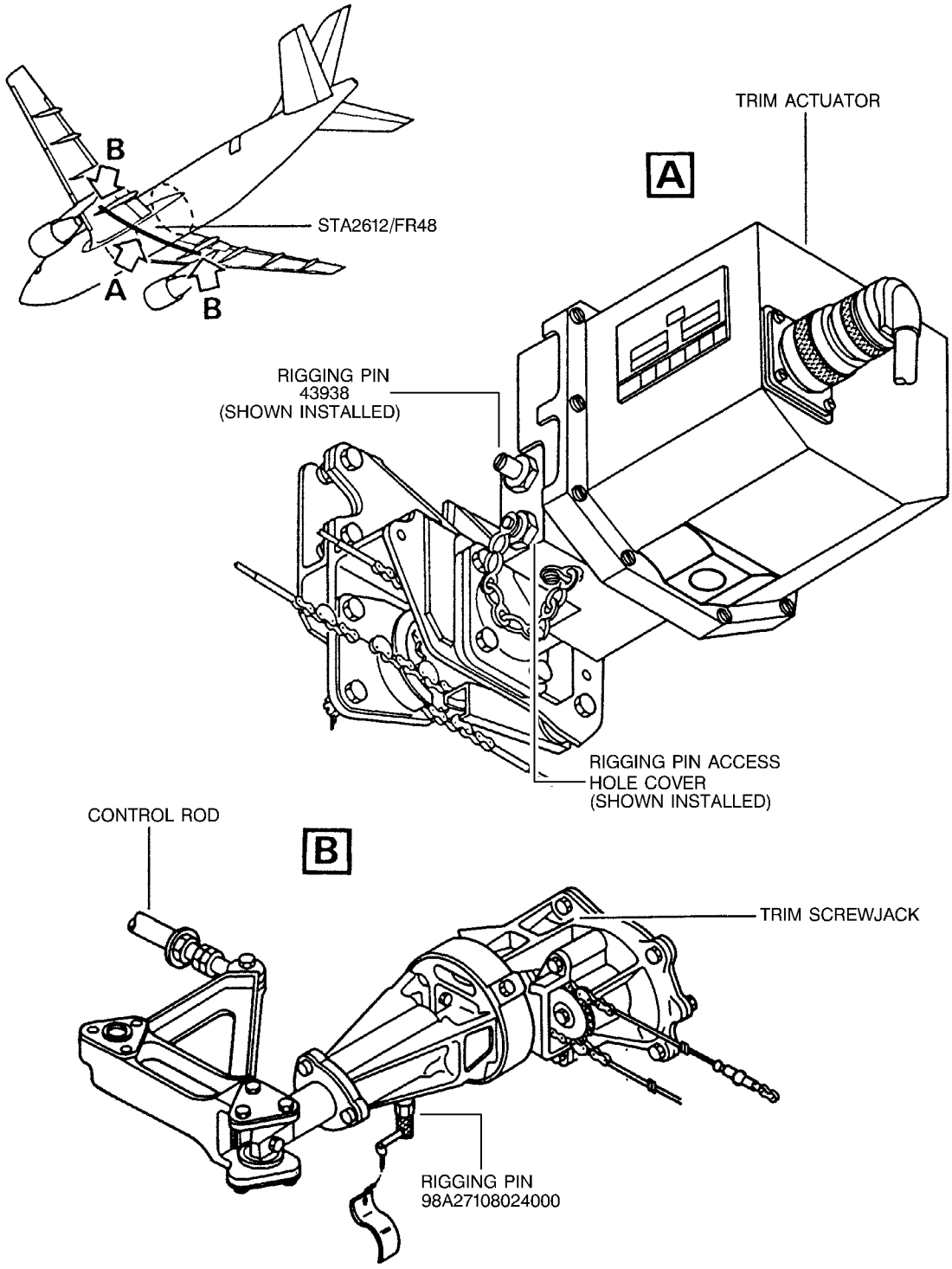
Rigging Point Location and Aileron Trim Control Cable Routing (Sheet 1/2)
Figure 601

R



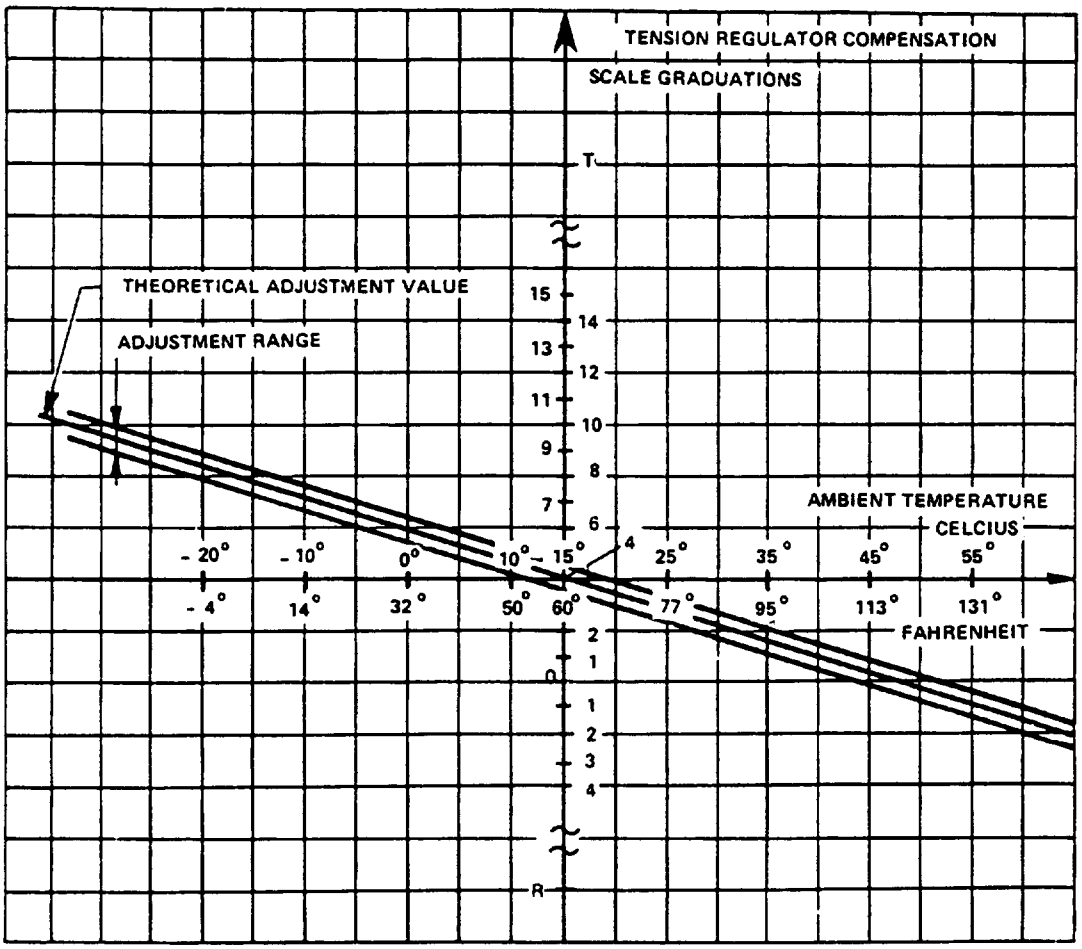
Rigging Point Location and Aileron Trim Control Cable Routing (Sheet 2/2)
Figure 601

R



BM5 27 10 00 6 ACN0 00

Roll Trim - Rigging Points
Figure 602



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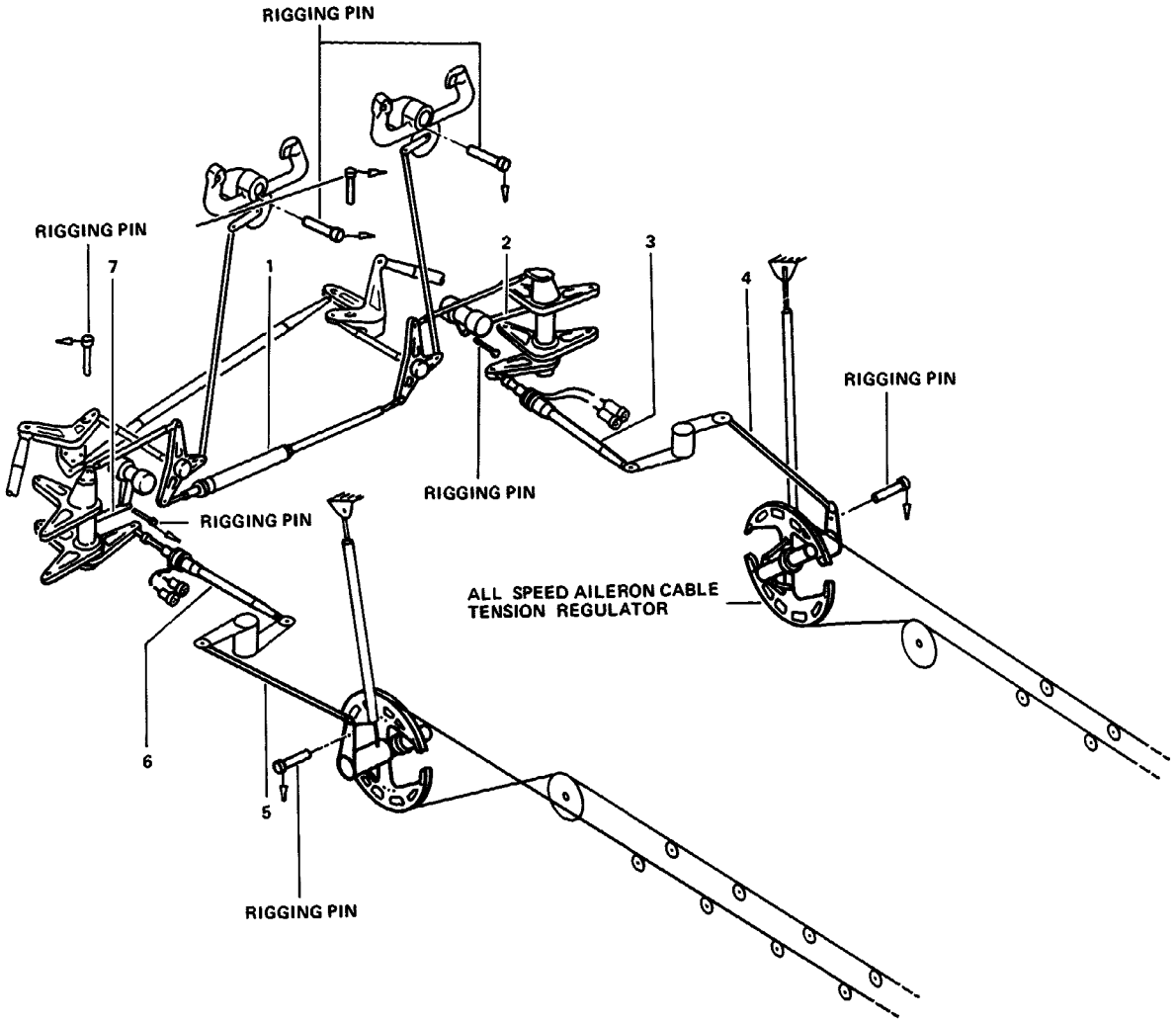
All Speed Aileron Cable Tension Adjustment Graph
Figure 603



BM5 27 10 00 6 AGM0 00

Linkage Between Control Wheel and Cable Tension Regulator
Figure 604

(g)Check pipes for deformation, incipient cracks, and dents especially at elbows and at unions connecting pipes to components.
(h)Check that there is no possibility of metal parts, clamps or rails causing damage to pipes at attachment points.
(j)Make certain that pipe supports and clamps are correctly tightened.
(k)Check condition of hydraulic equipment attach fittings and of safety devices.
(l)Check for fluid leakage in the areas where hydraulic equipment is installed.
(m)Check condition of fork and eye joints on components actuated mechanically.
R (n)Check condition of pulleys (Ref. 20-29-14, P. Block 1). Check cables for wear (Ref. 20-29-12, P. Block 1).
R (p)Check bellcranks for corrosion or damage.

(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment
(b)Close access doors and remove access platforms. Install ceiling panels
(c)Pressurize Green hydraulic system

WARNING : MAKE CERTAIN THAT FLAP AND SLAT TRAVEL RANGE IS CLEAR.

(d)Place flap and slat control lever in first notch position
(e)Close main gear door (Ref. 32-12-11, P. Block 301)
(f)Shut down pressurization of Green hydraulic system. If applicable, disconnect hydraulic ground power cart.
(g)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301)

MECHANICAL AND ELECTRICAL CONTROL (AILERON)
DESCRIPTION AND OPERATION

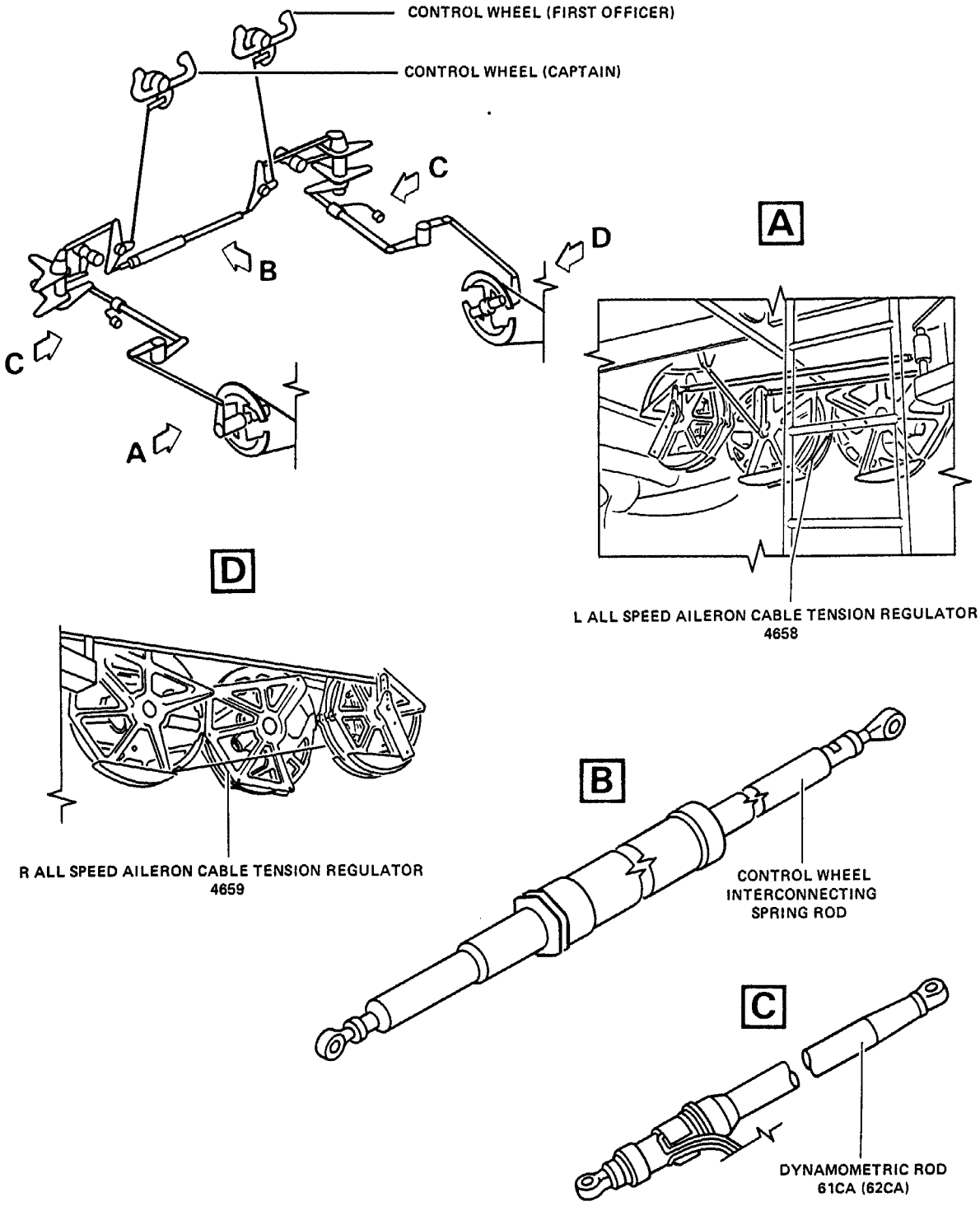
1. General

- Aircraft roll control is performed by the all speed ailerons and spoilers.
- The alf speed ailerons are mechanically operated.
- The spoilers are electrically operated (Ref. 27-61-00).

2. Component Location

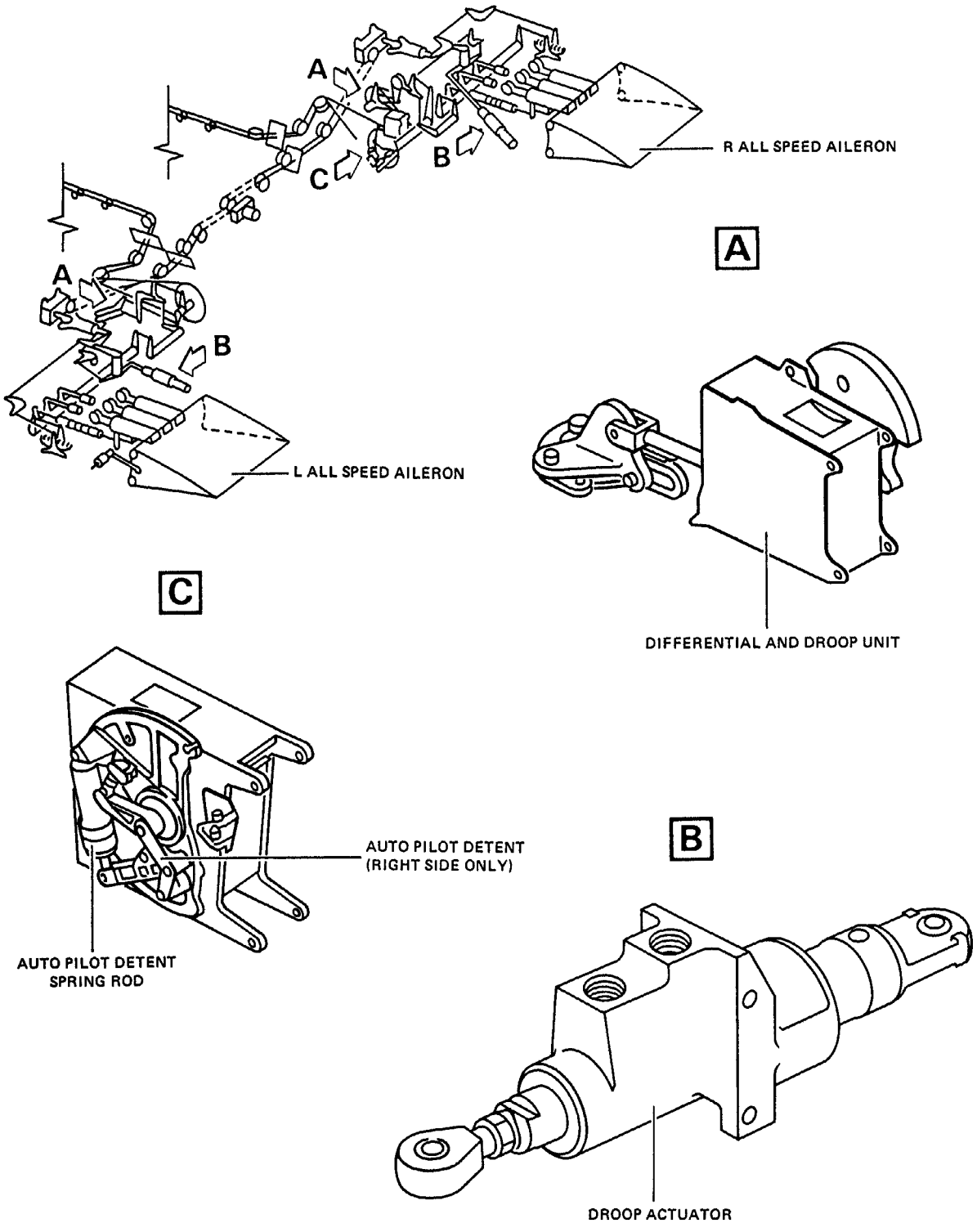
(Ref. Fig. 001, 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
1668	ACTUATOR-DROOP SIGNAL, L ASA		575	575BB	27-11-71
1669	ACTUATOR-DROOP SIGNAL, R ASA		675	675BB	27-11-71
4658	TENSION REG-ASA CABLE, L		121	121BL	27-11-17
4659	TENSION REG-ASA CABLE, R		122	121BL	27-11-17
	CONTROL WHEEL-CAPT		211		27-11-11
	CONTROL WHEEL-F/O		212		27-11-11
	SPRING ROD-CONTROL WHEEL INTERCONNECTING		121	121BL	27-11-16
	DIFFERENTIAL AND DROOP UNIT-L		575	575BB	27-11-22
	DIFFERENTIAL AND DROOP UNIT-R		675	675BB	27-11-22
	AILERON-ALL SPEED, L		576		27-11-28
	AILERON-ALL SPEED, R		676		27-11-28
	SPRING ROD-AUTO PILOT DETENT		675	675AB	27-11-29
	DETENT-AUTO PILOT		675	675AB	27-11-31
61CA	ROD-DYNAMOMETRIC		121	121BL	27-11-19
62CA	ROD-DYNAMOMETRIC		122	121BL	27-11-19



BM5 27 11 00 0 BTMO – 15

Component Location
Figure 001



Component Location
Figure 002

3. Mechanical Control (Ref. Fig. 004)

A. General

Each all speed aileron (ASA) is operated by three mechanically controlled servo controls.

The two interconnected control wheels drive two symmetrical control systems, composed of levers, rods, cables, tension regulators, routed along each side of the fuselage up to the input levers of the servo controls.

A differential and droop unit is installed in the control linkage upstream of the servo controls. The unit receives two inputs. One is from the control wheels (pilots input), the other is a droop signal from the slat control system which droops the all speed ailerons 6,6 deg. when the slats are extended, in order to optimize aerodynamic efficiency of the wing.

When the droop signal is applied, all speed aileron deflection is not simply modified by 6,6 deg. throughout the travel range. Instead response of the all speed ailerons to control wheel motion is modified so that the maximum up and down deflections remain close to those without droop input.

The droop signal also drives a differential mechanism between the trim screwjack and the artificial feel unit. The mechanism pivots the artificial feel unit, thus allowing the spring rod to remain at neutral.

B. Component Description

(1)Cable tension regulators (Ref. Fig. 008)

Two tension regulators maintain a constant tension on the cables 12.5 ± 2.35 daN (28.13 ± 5.30 lbf). They are identical apart from the input lever position ; they incorporate provision for installation of a special tool used for installing the regulator on the aircraft.

(2)Differential and droop unit (Ref. Fig. 003)

(3)Servo control actuating spring rod.

The three ASA servo control actuating spring rods prevent runaway of the control system if an input lever jams on its servo control body.

(4)Control wheel interconnecting spring rod

The two control wheels are interconnected by a spring rod in order to allow one of the crew members to control half the surfaces, in the event of any single item jamming in the mechanical control system.

(5)Rods, cables (Ref. Fig. 005)

(a)Rods

Push-pull rods are SARMA type rods of adjustable or non adjustable length, fitted with replaceable ends.

(b)Cables

The flexible cables (Dia. 3.2 mm/0.126 in.) are made of zinc-coated carbon steel.

The cable end fittings are equipped with barrels, for quick installation and fool proofing ; turnbuckles are cliplocked.

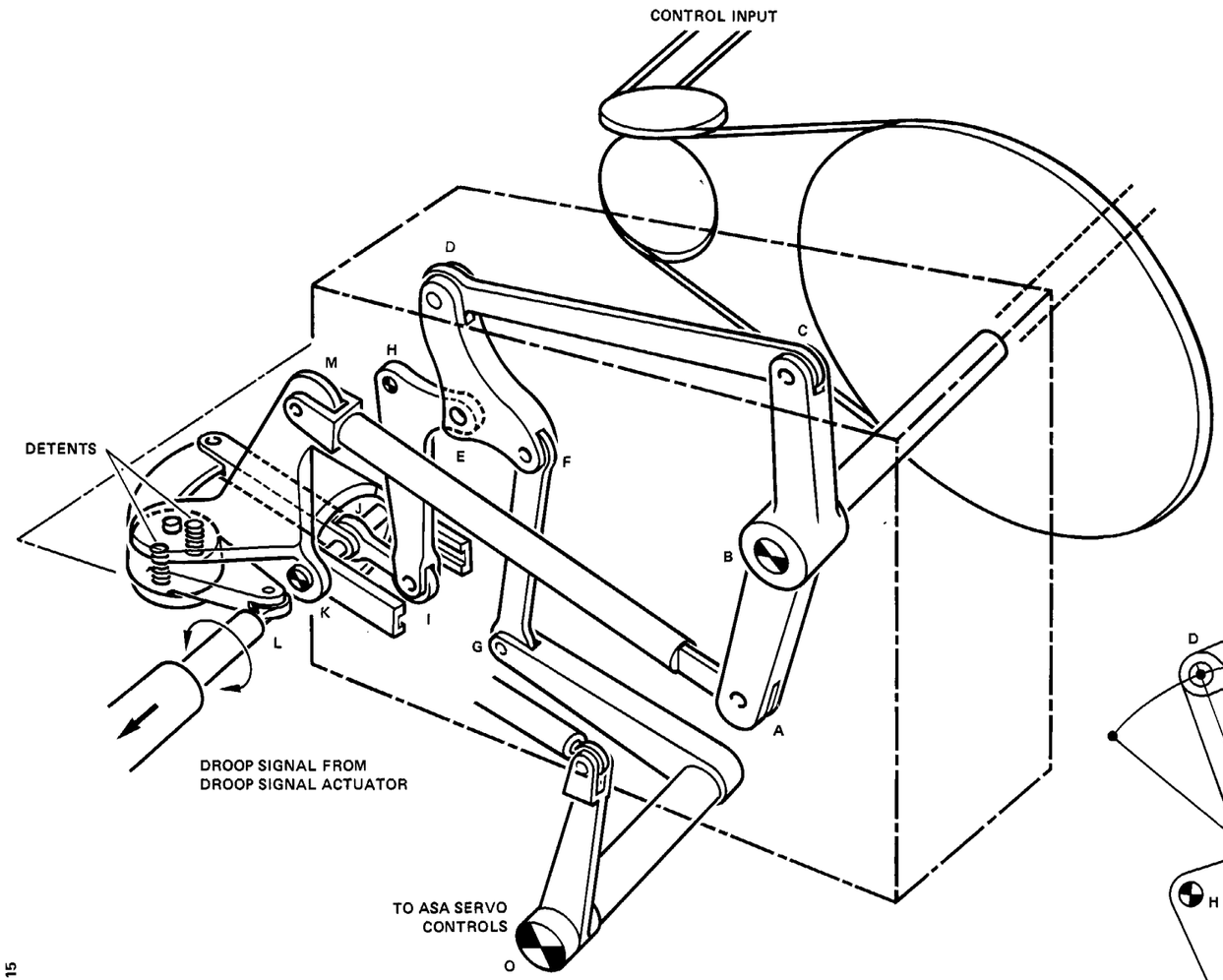
Fairleads are of the roller type, for low friction purposes.

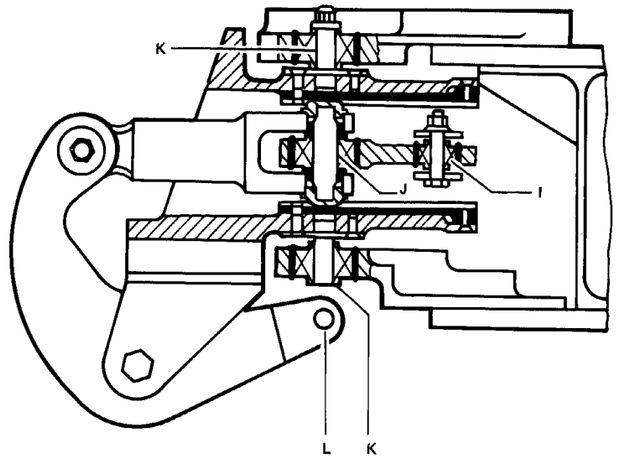
The fairlead supports allow passage of the cable end fittings.

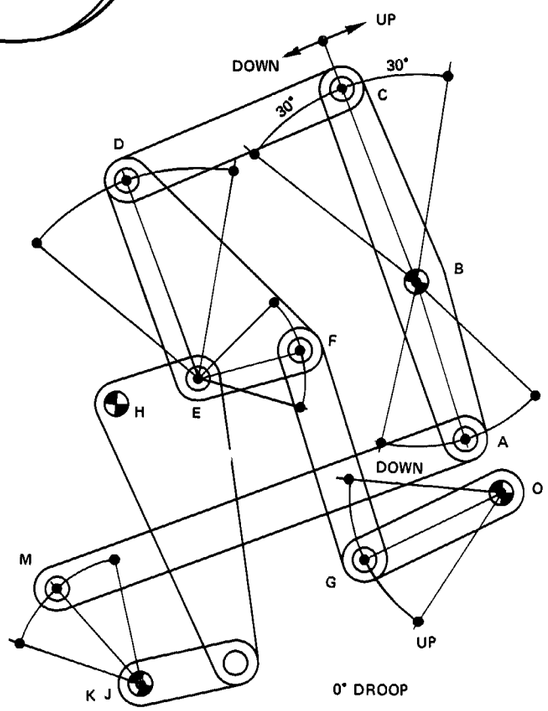
At bulkheads, cables are fed through pressure seals.

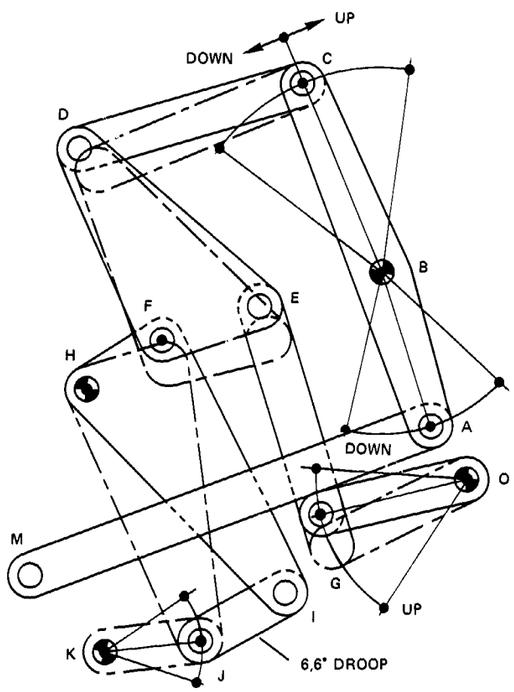
(6)Stops and rigging facilities

(a)Control wheel stops : control wheel maximum travel is limited in both



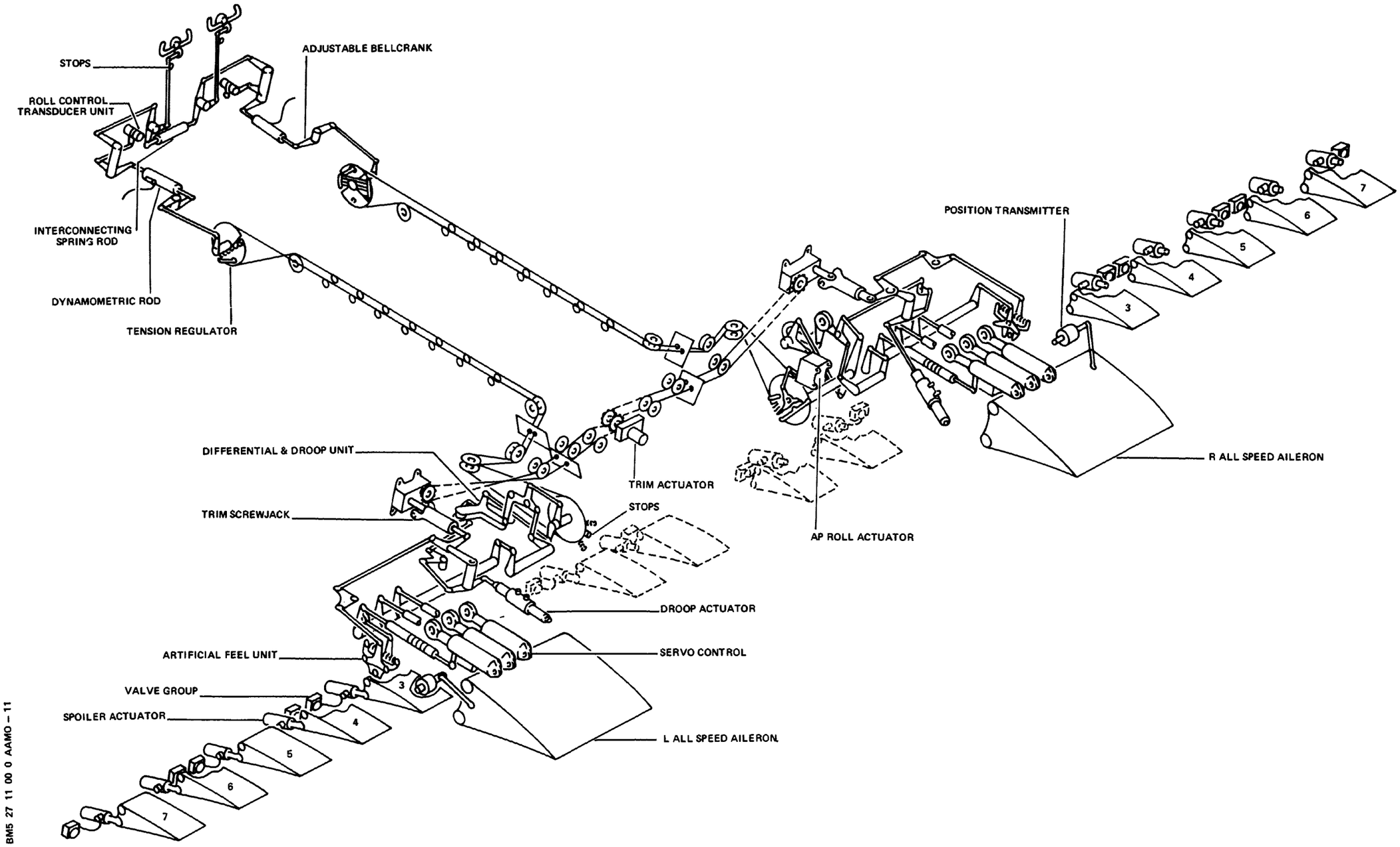






BM5 27 11 00 0 AFMO – 15

Differential and Droop Unit
Figure 003



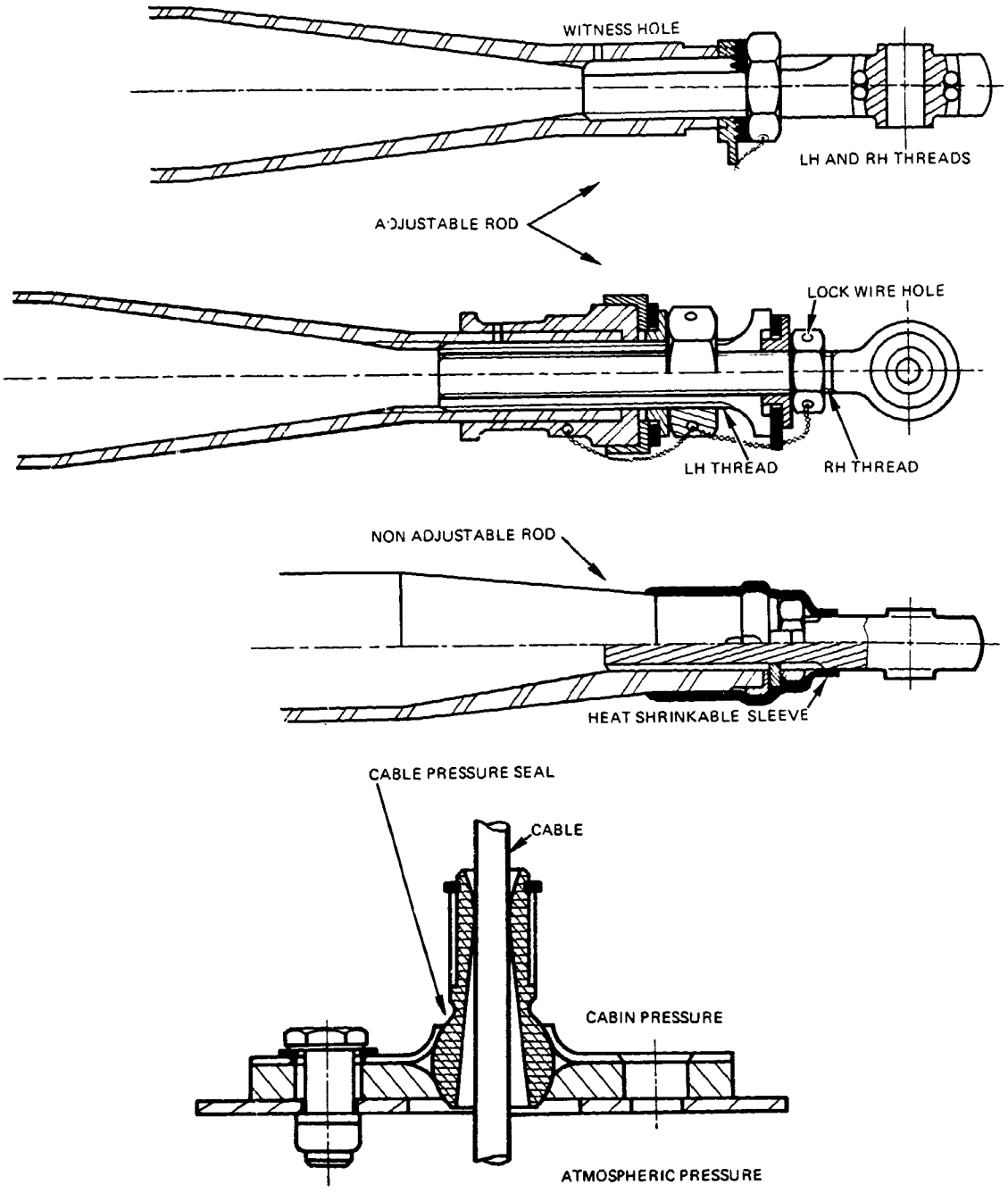
Mechanical Control (Aileron)
Figure 004

directions by non adjustable stops.
(b)All speed aileron operational stops : maximum input to the all speed aileron servo controls is limited by adjustable stops, located at the rear quadrant.
(c)In retracted position, the spoilers are held against their structural stops, one on each side of each spoiler ; the spoilers are faired with the wing contour by adjustment of actuator length with the actuator bottomed on its retraction stop ; normal operational extension stops are the control wheel stops.
(d)Aileron and spoiler stops : these stops are the stroke end stops (non adjustable) of the servo controls, never reached in normal operation.
(e)Aileron structural stops, when the servo controls are not installed : the ailerons rest on structural down stops, designed for that purpose, which are not able to withstand any load other than the weight of the aileron.
(f)Adjustable levers : the length of one lever between each control wheel and the corresponding tension regulator is adjustable in order to maintain maximum travel of the all speed ailerons within the design limits.
(g)Rigging pins : Rigging pin holes are provided at convenient places to facilitate rigging.

R
C. Leading Particulars
(1)Control wheel radius 137 mm (5.4 in.)
(2)ASA and spoiler deflection versus control wheel deflection
(a)No droop configuration
(Ref. Fig. 006)
(b)Droop configuration
(Ref. Fig. 007)
R NOTE : The aileron trailing edge might appear to be low (or asymmetrical
R compared to other side) when observed from the ground. This is
R expected behaviour when the hydraulics are switched off and the
R servo actuators can no longer hold the weight of the aileron
R surface. Observations from the ground should not be used as the
R reference for aileron zero position.
(3)Control wheel interconnecting spring rod characteristic (Ref. Fig. 009)
(4)Servo control actuating spring rod characteristic (Ref. Fig. 010)

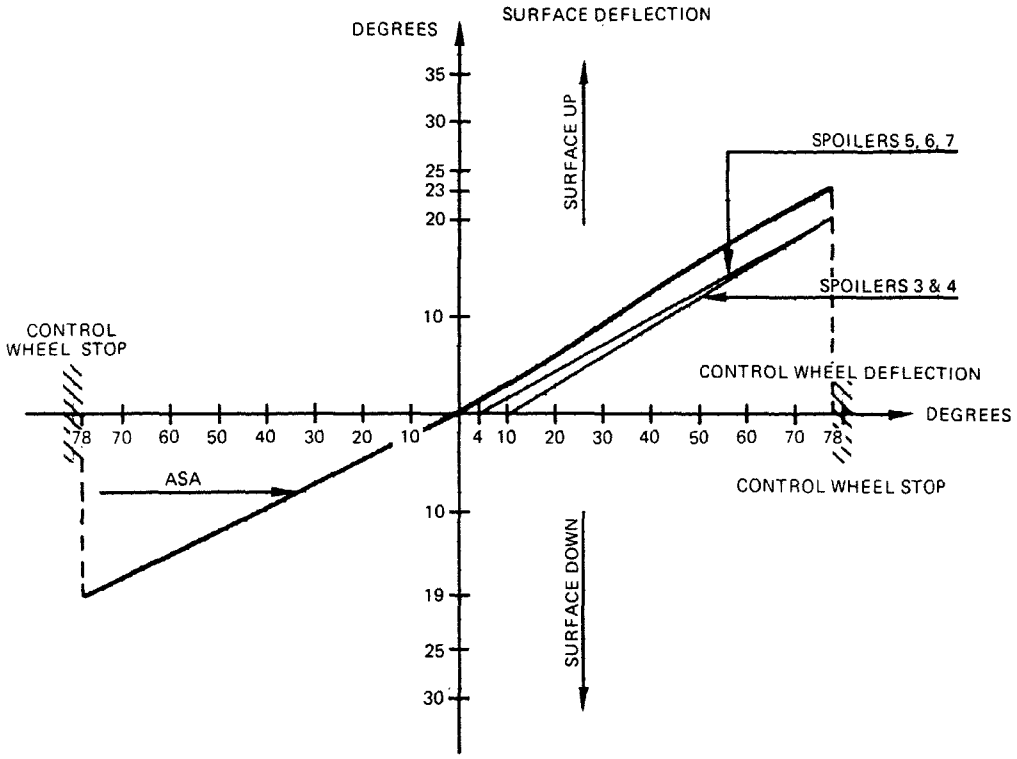
4. Electrical Control (Ref. 27-61)

A. General
The fourteen spoilers are electrically signalled.
Each spoiler is servoed by one servo control consisting of an actuator and a separate valve group (Ref. 27-64).
The spoilers are used for :
(1)Roll control (spoilers 3 through 7)
(2)Speed brake control (spoilers 1 through 4)
(3)Ground spoiler control (all spoilers, 1 through 7)
NOTE : Functions and components specific to roll, speed brake and ground spoiler control are described in 27-61.



BM5 27 11 00 0 AESO

Connecting Rods and Cable Pressure Seals
Figure 005



ASA AND SPOILER DEFLECTION VERSUS CONTROL WHEEL DEFLECTION

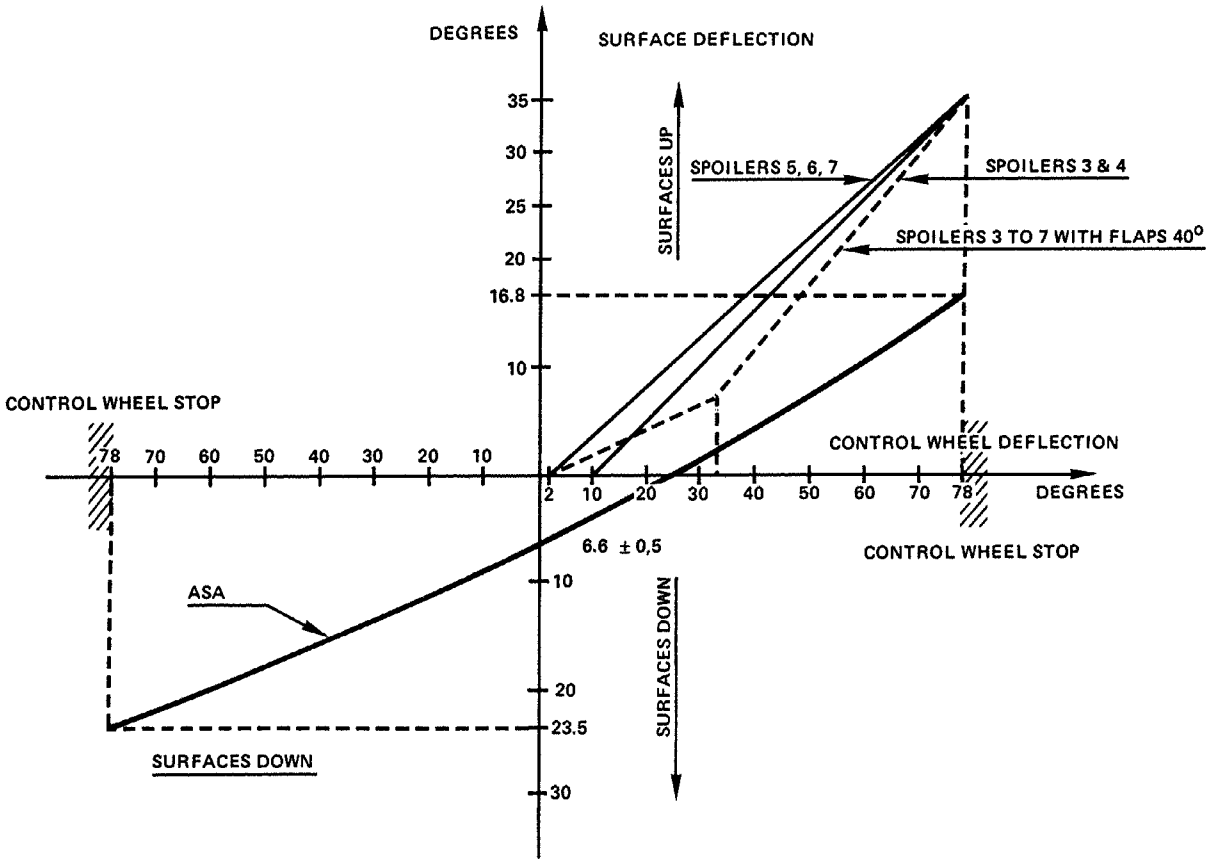
	ASA		SPOILERS 3,4,5	SPOILER 6	SPOILER 7
	UP	DOWN			
MAXIMUM OPERATIONAL DEFLECTION	$23°^{+0°}_{-1°}$	19°±1°	19°36'± 1°	19°15'± 1	18°45'± 1°
STOPS ON SERVO CONTROLS (MID VALUE)	25°				
SURFACE STRUCTURAL STOPS					
INTERFERENCE WITH STRUCTURE	⩾ 27°				

STOPS

BM5 27 11 00 0 ARM0 01

No Droop Configuration : ASA and spoiler Deflection Versus Control Wheel Deflection - Stops
Figure 006

R



ASA AND SPOILER DEFLECTION VERSUS CONTROL WHEEL DEFLECTION

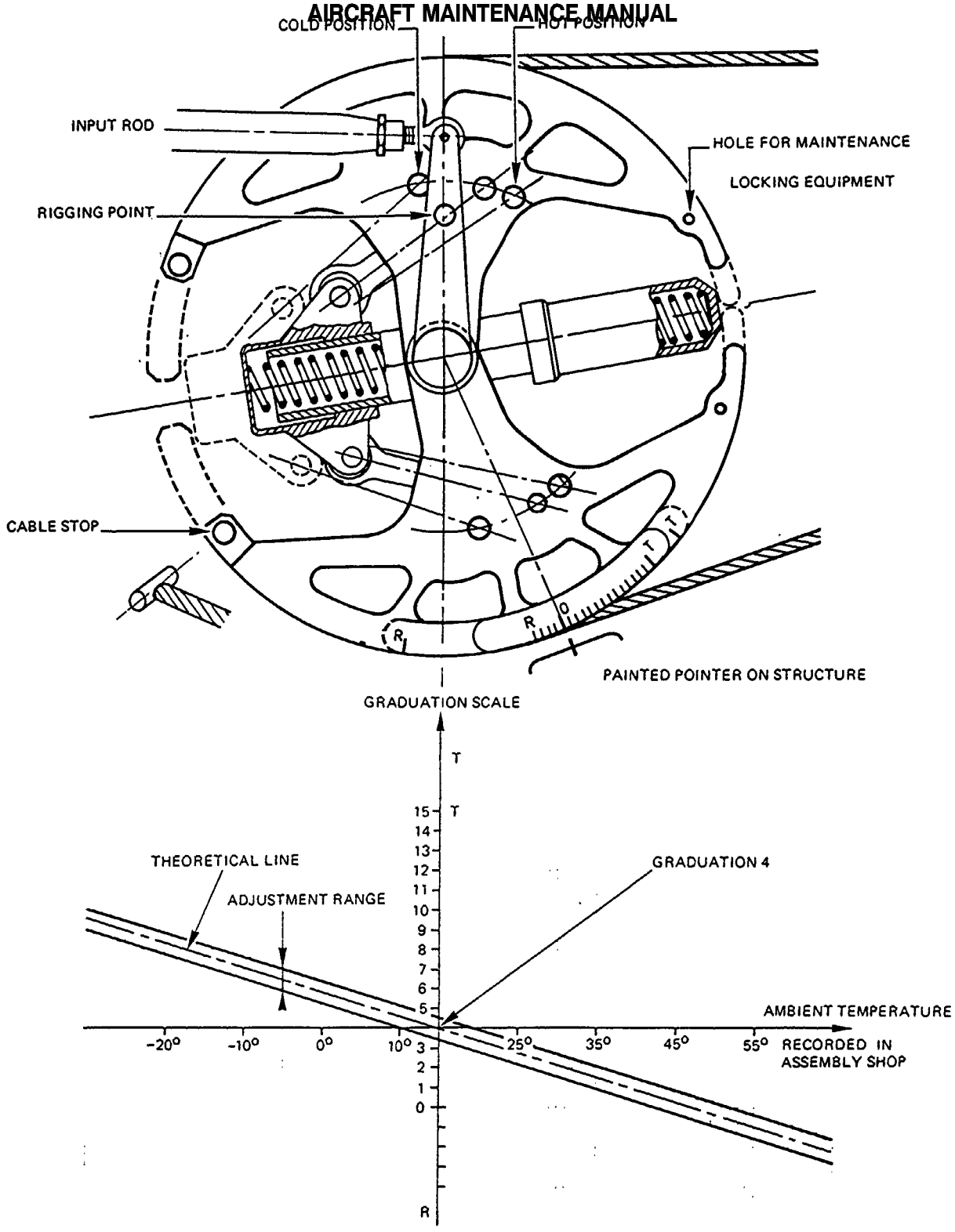
	ASA		SPOILERS 3,4,5	SPOILER 6	SPOILER 7
	UP	DOWN			
MAXIMUM OPERATIONAL DEFLECTION	16°48' ±1°30'	22°30' ±1°30'	34°30' ±1°	34° ±1°	33°30' ±1°
STOPS ON SERVO CONTROLS (MID VALUE)		25°36'			
SURFACE STRUCTURAL STOPS		>30°			
INTERFERENCE WITH STRUCTURE					

STOPS

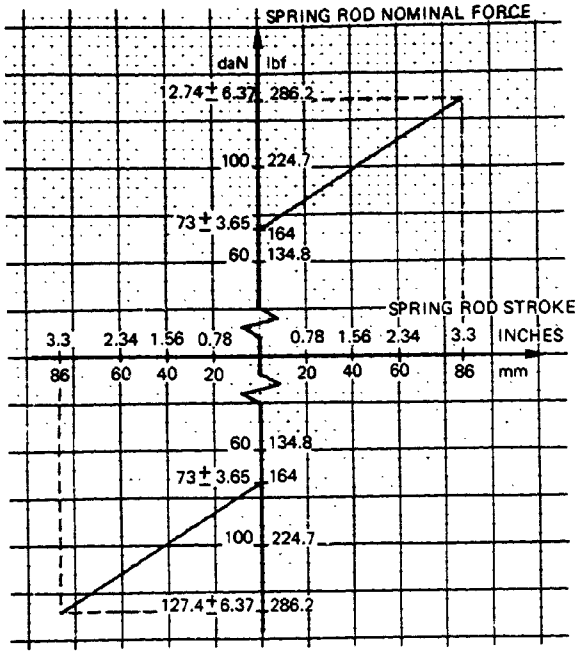
BM5 27 11 00 0 ATM0 01

Droop Configuration : ASA and Spoiler Deflection Versus Control Wheel Deflection - Stops
Figure 007

R



Cable Tension Regulator
Figure 008



MAXIMUM FRICTION FORCE	AT THRESHOLD	AT MAXIMUM FORCE
WHEN NEW		
INSTALLED ON AIRCRAFT		

DIAGRAM A INTERCONNECTING SPRING ROD CHARACTERISTIC AT ITS APPLICATION POINT

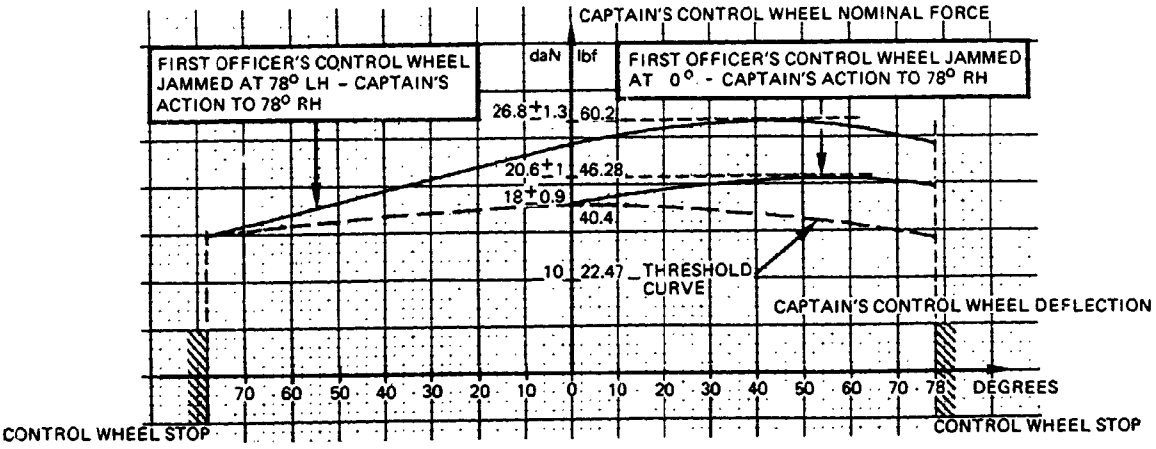
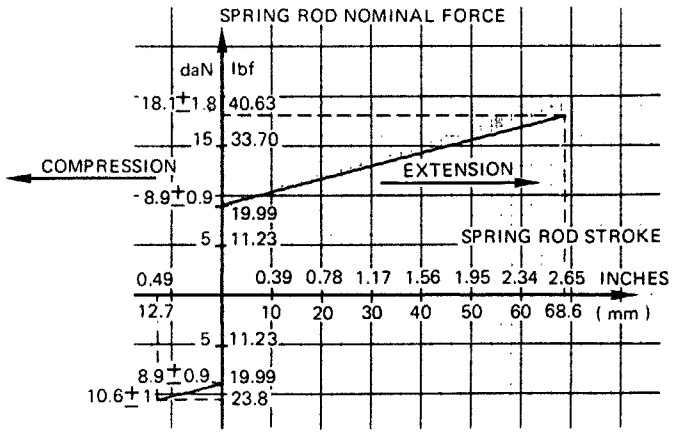

CAPTAIN'S CONTROL WHEEL NOMINAL FORCE
FIRST OFFICER'S CONTROL WHEEL JAMMED AT 78° LH - CAPTAIN'S ACTION TO 78° RH
daN
lbf
FIRST OFFICER'S CONTROL WHEEL JAMMED AT 0° - CAPTAIN'S ACTION TO 78° RH
26.8 ± 1.3
60.2
20.6 ± 1
46.28
18 ± 0.9
40.4
10
22.47
THRESHOLD CURVE
CAPTAIN'S CONTROL WHEEL DEFLECTION
70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 78
DEGREES
CONTROL WHEEL STOP
CONTROL WHEEL STOP

DIAGRAM B INTERCONNECTING SPRING ROD CHARACTERISTIC AT THE CAPTAIN'S CONTROL WHEEL

BM5 27 11 00 0 ANMO

Interconnecting Spring Rod Characteristic
Figure 009



MAXIMUM FRICTION FORCE	AT THRESHOLD	AT MAXIMUM FORCE
WHEN NEW		
INSTALLED ON AIRCRAFT		

DIAGRAM A SERVO CONTROL ACTUATING SPRING ROD CHARACTERISTIC AT ITS APPLICATION POINT

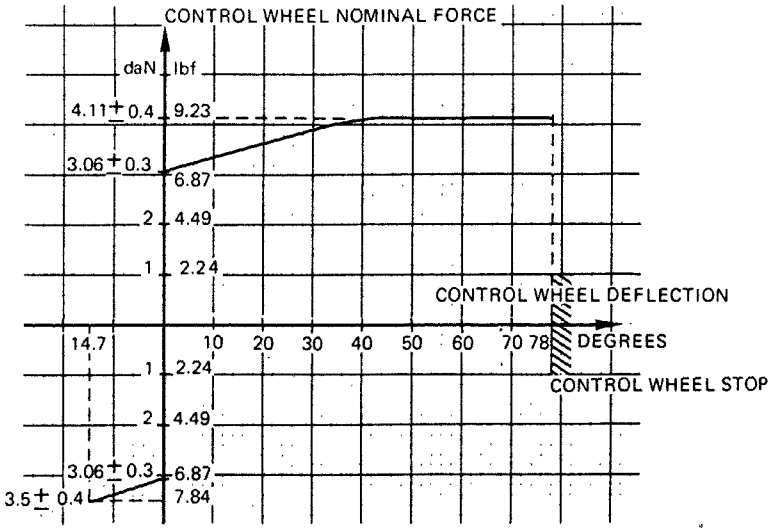


DIAGRAM B SERVO CONTROL ACTUATING SPRING ROD CHARACTERISTICS AT CONTROL WHEEL IN NO DROOP CONFIGURATION

BM5 27 11 00 0 APMO

Servo Control Actuating Spring Rod Characteristic
Figure 010

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT. MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Adjustment

R

A. Reason for the Job
(1)Adjustment of all speed aileron control cable tension.
(2)Adjustment of linkage between control wheel and cable tension regulator.
(3)Adjustment of droop function.
(4)Adjustment of all speed ailerons to neutral.
(5)Adjustment of trim control.
(6)Adjustment of auto pilot actuator.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27203500000	Measurement Base - Flight Control Surface Deflection
(2)	Clinometer
(3)98A27108025000	Rigging Pin - Droop Drive Layshaft
(4)98A27108014000	Rigging Pin - Cable Drum, Differential Droop Unit
(5)98A27207543000	Pin-Rigging
(6)98A27901007000	Pin-Rigging, Elevator Control
(7)98A27901000000	Pin-Rigging, Aileron Control Wheel
(8)72-5-644	Retaining Fork - Dynamometric Rod
(9)98A27901003000	Pin-Rigging, Aileron Control
10)98A27108022000	Neutral Setting Jig - All Speed Aileron
11)16987856	Rigging Pin - Transducer Unit
12)	Warning Notices
13)	Access Platforms 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
14)	Lockwire - Corrosion Resistant Steel, Dia. 0.8 mm (0.032 in.)
15)	Safety Barriers
16)	Safety Clips
17)98A27108024000	Rigging Pin - All Speed Aileron Trim Spindle
18)08-050	Loctite

ITEM	DESIGNATION
Referenced Procedures	
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 27-10-00, P. Block 501	Aileron
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-16, P. Block 401	

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)Connect hydraulic ground power cart and pressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU, make certain that B, G and Y pushbutton switches are pressed (in) and all legends are off.

(d)Make certain that Captain's and First Officer's aileron control wheels are at zero (trim at zero).

(e)Make certain that flap and slat control lever is in first notch (flaps and slats fully retracted). Display a warning notice prohibiting operation of flaps and slats.

(f)Make certain that SPEED BRAKE control lever is in RET position. Ground spoiler function not preselected.

(g)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/2 & 3	5CP	335/R63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/6 & 7	7CP	335/R62
133VU	EFCU/NORM/SUPPLY/SPLR 2 & 3	8CP	333/T62
133VU	EFCU/LAND RECOVERY/NORM SUPPLY/SPLR/ 6 & 7	9CP	333/T66
133VU	EFCU/NORM/SUPPLY/SPLR 6 & 7	10CP	332/U62
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/1 & 4	53CP	334/S63
133VU	LAND/RECOVERY/SUPPLY/SPLR/1 & 4 & 6 & 7	54CP	334/S67
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/5	55CP	334/S64
133VU	EFCU/NORM/SUPPLY/SPLR 5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM/SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	EFCU/LAND RECOVERY/SUPPLY/SPLR/1 & 4	72CP	333/T67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLAPS/SYS1/26VAC	1CV	335/R61
133VU	FLAPS/SYS2/26VAC	2CV	334/S62
133VU	SLATS/26VAC/SYS1	3CV	335/R65
133VU	SLATS/26VAC/SYS2	4CV	335/R64
133VU	SFCC/NORM/SUPPLY/FLAPS/SYS1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS2	6CV	331/V61
133VU	SFCC/NORM SUPPLY/SLATS/SYS1	7CV	333/T63
133VU	SFCC/NORM SUPPLY/SLATS/SYS2	8CV	333/T64
133VU	SFCC/LAND RECOVERY/SUPPLY/SLATS/SYS1	9CV	335/R66
133VU	SFCC/LAND RECOVERY/SUPPLY/FLAPS/SYS1	10CV	335/R67

(h)Install access platforms and safety barriers.
(j)Remove cover plates from Captain's and First Officer's aileron control wheels.

D. Adjustment

(1)Adjustment of all speed aileron control cable tension (Ref. 27-10-00, P. Block 501).

(2)Adjustment of linkage between control wheel and cable tension regulator
(Ref. Fig. 501)

R (a)Remove cap from each control wheel to gain access to rigging pin hole.

R (b)Immobilize Captain's control column at zero using rigging pin 98A27901007000.

R (c)Immobilize First Officer's control column at zero using rigging pin 98A27901007000.

R (d)Remove interconnecting rod (1) (Ref. 27-11-16, P. Block 401).

R (e)Immobilize Captain's aileron control wheel at zero using rigging pin 98A27901000000.

R (f)Immobilize First Officer's aileron control wheel at zero using rigging pin 98A27901000000.

R (g)Install interconnecting rod (1) (Ref. 27-11-16, P. Block 401) and check that pin on First Officers's control column can be freely installed and removed. If not, adjust length of interconnecting rod.

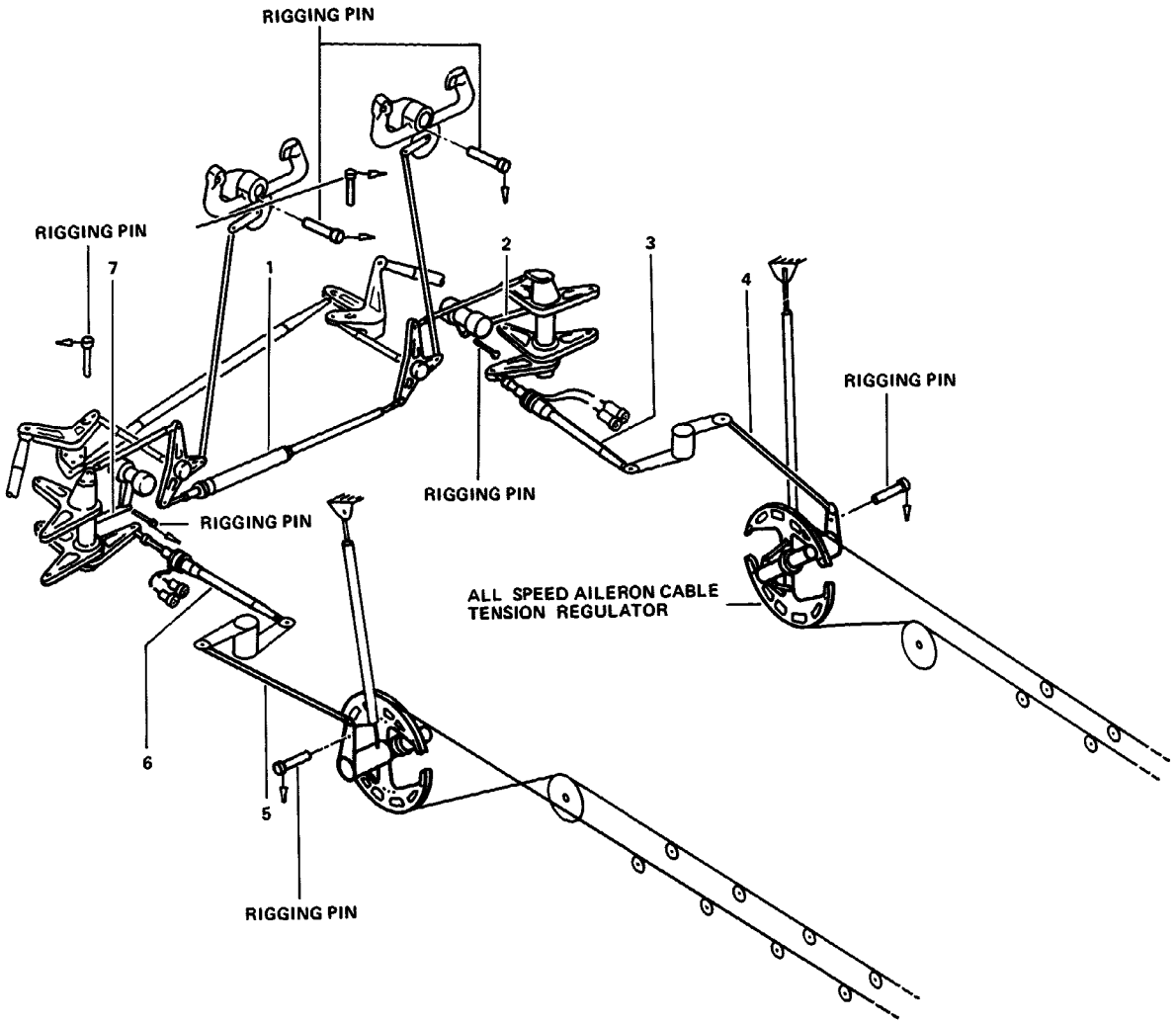
R (h)Immobilize roll control transducer units on Captain's and First Officer's channels with rigging pins 16987856.
Check that rigging pins can be freely installed and removed. If not, adjust length of rods (2) and (7) to obtain free insertion of rigging pins. Tighten lock nuts and wirelock.

R (j)Lock dynamometric rods (3) and (6) with retaining forks 72-5-644.

R (k)Immobilize cable tension regulator input levers with rigging pins 98A27901003000. Check that rigging pins can be freely installed and removed. If not, adjust length of rods (4) and (5) to obtain free insertion of rigging pins. Tighten lock nuts and wirelock.

R (l)Remove all rigging pins and retaining forks.

R (m)Install a new cap on each control wheel with Loctite
R (Material No.08-050).



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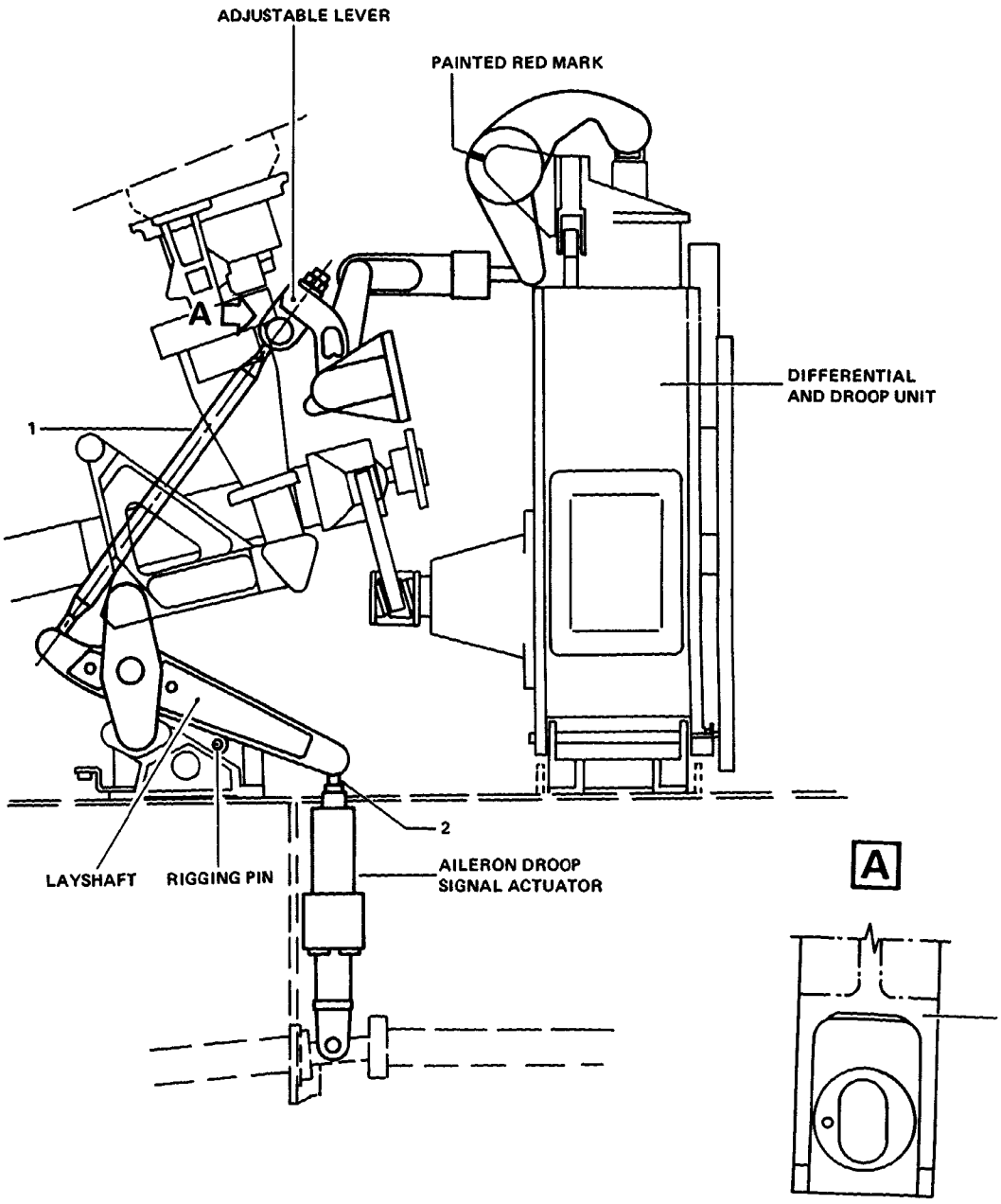
Linkage Between Control Wheel and Cable Tension Regulator
Figure 501

(3)Adjustment of droop control
(Ref. Fig. 502)
(a)Immobilize differential and droop unit with rigging pins 98A27108014000.
(b)Immobilize droop actuator input layshaft with rigging pin 98A27108025000. Check that rigging pin can be freely installed. If not, adjust length of actuator (2) acting on its adjustable end fitting to obtain free insertion of rigging pin. Tighten lock nut and wirelock.
(c)Check that painted marks are aligned, if not, adjust length of swivel link. (under no-droop conditions with layshaft and input drum rigget, it must be possible to remove and install freely bolt connecting swivel link and droop input lever). Tighten lock nut and wirelock.
(d)Remove rigging pins.
Check drooped condition :
- operate slats to provide droop input
- check that artificial feel unit stops are centered and in contact with guide rollers.
- if articicial feel unit stops are not as above, adjust to such condition by means of fork attachment on adjustable lever.



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Adjustment of Droop Control
Figure 502

(4)Adjustment of all speed ailerons to neutral
(Ref. Fig. 503, 504)

NOTE : The aileron trailing edge might appear to be low (or asymmetrical compared to other side) when observed from the ground. This is expected behaviour when the hydraulics are switched off and the servo actuators can no longer hold the weight of the aileron surface. Observations from the ground should not be used as the reference for aileron zero position.

NOTE : Before adjusting all speed ailerons to neutral, the hydraulic systems associated to the three servo controls must be bled, making certain that no rigging pin or equipment hamper operation of all speed ailerons. Move control wheel several times to the left and to the right.
It is imperative to bleed the three servo controls of each aileron.

(a)Open access doors 575AB, 675AB, 575CB, 675CB, 575BB and 675BB.
(b)Remove cover at the root of the ASA for access.
(c)Immobilize R and L cable quadrants (11) of differential and droop unit with rigging pins 98A27108014000.

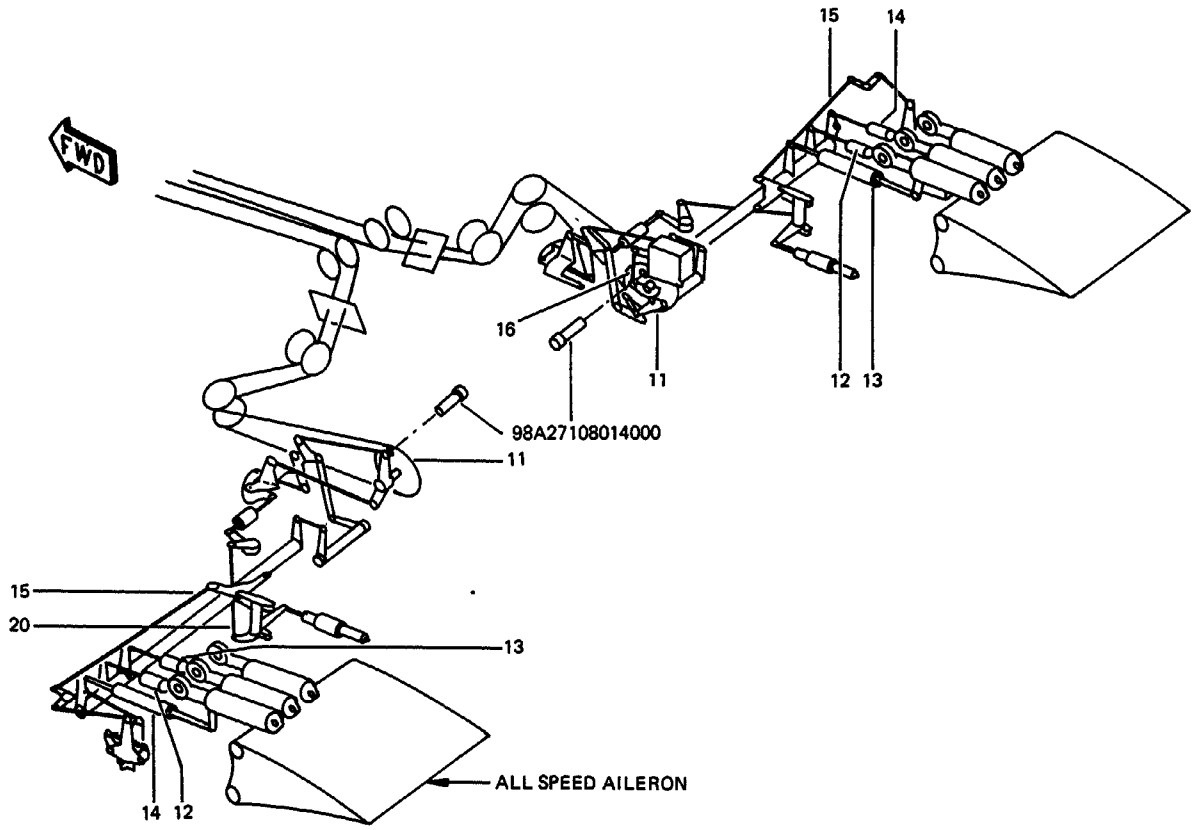
CAUTION : PROHIBIT OPERATION OF AILERON CONTROL WHEEL AND SHUTTING DOWN OF HYDRAULIC PRESSURE.

NOTE : The following operations apply to the R and L wings.

(d)Immobilize trim screw jack with rigging pins 98A27108024000 to nominal Zero position.
(e)Immobilize droop actuator input layshaft with rigging pin 98A27108025000. Check that rigging pins can be freely installed and removed. If not, perform adjustment of droop actuator.
(f)Make certain that painted matching marks on droop input unit are aligned. If not, perform adjustment of droop unit.
(g)Install all speed aileron neutral setting jig 98A27108022000 (Ref. Fig. 504). Use the post-Mod 5130 marking on the tool.
(h)On SERVO CTL section of panel 428VU, release SERVO CTL B and Y (JAM/OFF) pushbutton switches.
(j)Check that all speed aileron is at neutral using jig 98A27108022000 (Ref. Fig. 504). If not, adjust length of Green spring rod (12), first by lengthening it then by shortening it to raise aileron to desired position.

R NOTE : If structural repair has been performed on the bottom skin
R panel no. 2 (installation of repair plate), an offset allowance
R will have to be made for the repair plate thickness.

(k)Remove jig 98A27108022000.
(l)Install equipment 98A27203500000 perpendicularly to leading edge and in line with Green servo control axis.
(m)Install clinometer on equipment 98A27203500000 and record the value of angle which is to be used as reference for adjusting Blue and Yellow servo controls.
(n)On SERVO CTL section of panel 428VU, press SERVO CTL/B (JAM/OFF) pushbutton switch and release SERVO CTL/G (JAM/OFF) pushbutton switch.
(p)Check that measured angle and reference angle values are identical. If not, adjust length of Blue inner servo control spring rod (13) to obtain same angle value as the reference angle value. Check that no



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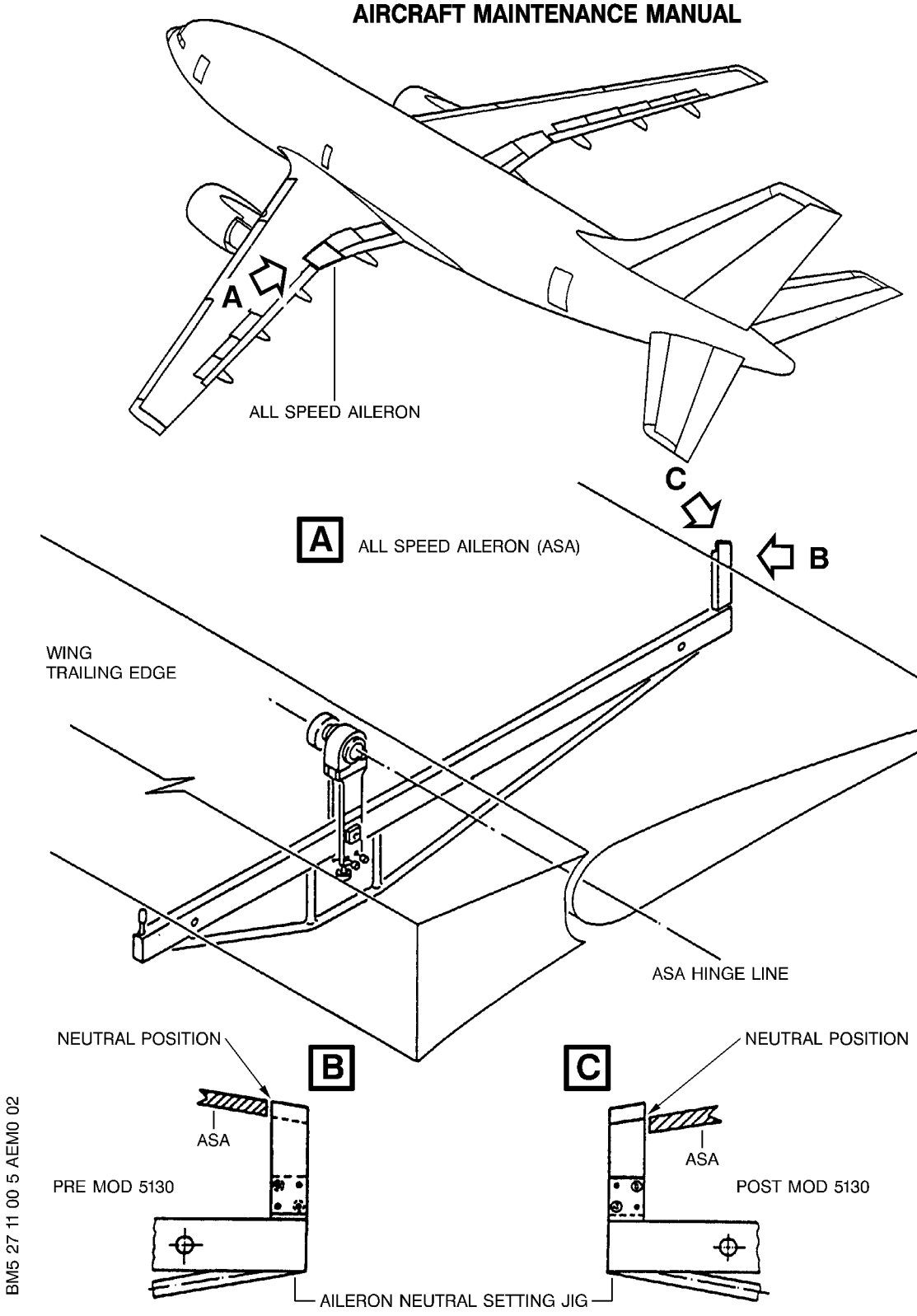
All Speed Aileron Linkage
Figure 503



Adjustment of All Speed Ailerons to Neutral
Figure 504

R

movement of aireron accurs on changeover from any system to the other, if necessary, adjust spring rods until no movement of aileron occurs on system changeover. Tighten lock nut. Do not safety at this stage.

(q) On SERVO CTL section of panel 428VU, press SERVO CTL/Y (JAM/OFF) pushbutton switch and release SERVO CTL/B (JAM/OFF) pushbutton switch.

(r) Check that measured angle and reference angle values are identical. If not, adjust length of Yellow servo control spring rod (14).Tighten lock nut. Do not safety at this stage.

(s) On SERVO CTL section of panel 428VU, press SERVO CTL G and B (JAM/OFF) pushbutton switches.

(t) Check that measured angle and reference angle values are identical. If not, repeat adjustment procedure of the three servo controls.

(u) Remove all rigging pins and equipment preventing free deflection of control surfaces.

(v) Move control wheel several times to the left and to the right.

(w) Immobilize cable quadrants of differential and droop unit with rigging pins.

(x) Check that measured angle and reference angle values are identical.

(y) Safety lock nuts of spring rods with lockwire.

(z) Remove tools and rigging pins.

R

(5)Adjustment of trim control
(a)Make certain that hydraulic ground power cart is connected to the aircraft (Ref. 24-41-00, P. Block 301, Ref. 29-10-00, P. Block 301).
(b)Make certain that slats and flaps are fully retracted (flap and slat control lever in first notch).
(c)Make certain that Captain's and First Officer's trim control wheels are at zero.
(d)Immobilize cable quadrants of differential and droop unit with rigging pins 98A27108014000.
(e)Immobilize trim screwjack with rigging pins 98A27108024000. Make certain that artificial feel unit is in its threshold position. If not, adjust length of control rod (15) at screwjack side to set artificial feel unit in threshold position and so that rigging pin can be freely installed. Tighten locknuts and safety with lockwire.
(f)Remove all rigging pins.

(6)Adjustment of autopilot actuator
(a)Make certain that hydraulic ground power cart is connected to the aircraft (Ref. 24-41-00, P. Block 301, Ref. 29-10-00, P. Block 301).
(b)Make certain that slat and flap control lever is in first notch (slats and flaps fully retracted).
(c)Make certain that Captain's and First Officer's aileron control wheels are at zero.
(d)Immobilize cable quadrants of differential and droop unit with rigging pins 98A27108014000.
(e)Immobilize autopilot actuator with rigging pin 98A27207543000. Check that rigging pin can be freely installed and removed. If not, adjust length of rod (16) to obtain free insertion of rigging pin. Tighten locknut and safety with lockwire.
(f)Remove all rigging pins.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove all warning notices.
(3)Install cover plates on Captain's and First Officer's aileron control wheels.
(4)Remove safety clips and tags and close circuit breakers 3CG, 5CP, 7CP, 8CP, 9CP, 10CP, 53CP, 54CP, 55CP, 70CP, 71CP, 72CP, 1CV, 2CV, 3CV, 4CV, 5CV, 6CV, 7CV, 8CV, 9CV and 10CV.
(5)Close access doors and panels.
(6)Depressurize hydraulic system and disconnect hydraulic ground power cart.
(7)De-energize the aircraft electrical network (Ref. 24-41-00. P. Block 301).
(8)Remove safety barriers and access platforms.

2. Operational Test

A. Reason for the Job
(1)Make certain that all speed ailerons and associated systems operate correctly.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

Make certain that electronics racks ventilation is correct.

(b)Pressurize hydraulic systems either :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c)Make certain that slat and flap control lever is in first notch.

(d)Make certain that SPEED BRAKE control lever is in RET position. Ground spoiler function not preselected.

(e)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/2 & 3	5CP	335/R63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/6 & 7	7CP	335/R62
133VU	EFCU/NORM/SUPPLY/SPLR 2 & 3	8CP	333/T62
133VU	EFCU/LAND RECOVERY/NORM SUPPLY/SPLR/ 6 & 7	9CP	333/T66
133VU	EFCU/NORM/SUPPLY/SPLR 6 & 7	10CP	332/U62
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/1 & 4	53CP	334/S63
133VU	LAND/RECOVERY/SUPPLY/SPLR/1 & 4 & 6 & 7	54CP	334/S67
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/5	55CP	334/S64
133VU	EFCU/NORM/SUPPLY/SPLR 5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM/SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	EFCU/LAND RECOVERY/SUPPLY/SPLR/1 & 4	72CP	333/T67

(f)Make certain that the travel ranges of the control surfaces are clear.

(g)On ECAM control panel 11VU
- press F/CTL pushbutton switch; FLT CTL page appears on right ECAM display unit.

(2)Roll test

ACTION	RESULT
1. On SERVO CTL section of panel 428VU - make certain that B, G and Y pushbutton switches are pressed (in).	- JAM and OFF legends are off
2. On SPLR & SPD BRK section of panel 428VU - make certain that 3 & 2, 4 & 1, 5, 6 and 7 push-button switches are pressed (in).	- FAULT and OFF/R legends are off
3. Fully turn Captain's or First Officer's aileron control wheel to the left	- L wing spoilers 3 to 7 extend - R wing spoilers 3 to 7 remain retracted - L all speed aileron deflects upwards - R all speed aileron deflects

	ACTION	RESULT
		downwards On right ECAM display unit : - left of SPLR, green arrows appear representing L wing spoilers 3 to 7
R R R R		- pointer moves to the upper tolerance band on L AIL scale - pointer moves to the lower tolerance band on R AIL scale.
	4. Fully turn Captain's or First Officer's aileron control wheel to the right	- R wing spoilers 3 to 7 extend - L wing spoilers 3 to 7 remain retracted. - R all speed aileron deflects upwards - L all speed aileron deflects downwards On right ECAM display unit : - right of SPLR, green arrows appear representing R wing spoilers 3 to 7
R R R R		- pointer moves to the lower tolerance band on L AIL scale - pointer moves to the upper tolerance band on R AIL scale.
	5. Return aileron control wheel to zero	- all control surfaces retract to the faired position - on right ECAM display unit below SPLR, only horizontal dashes remain visible
R		- on L and R AIL scales, pointers return to zero tolerance band.
	6. Move flap and slat control lever to second notch	- L and R all speed ailerons deflect downwards (New ASA zero with max. droop) - slats extend to 15° position - SLATS FLAP indicator moves to SLATS 15 position.
	7. Fully turn Captain's or First Officer's aileron control wheel to the left	- L wing spoilers 3 to 7 extend - R wing spoilers 3 to 7 remain retracted - L all speed aileron deflects upwards - R all speed aileron deflects downwards On right ECAM display unit :

	ACTION	RESULT
		- left of SPLR, green arrows appear representing L wing spoilers 3 to 7
R R R R		- pointer moves to the upper tolerance band on L AIL scale - pointer moves to the lower tolerance band on R AIL scale.
	8. Fully turn Captain's or First Officer's aileron control wheel to the right	- R wing spoilers 3 to 7 extend - L wing spoilers 3 to 7 remain retracted - R all speed aileron deflects upwards - L all speed aileron deflects downwards On right ECAM display unit : - right of SPLR, green arrows appear representing R wing spoilers 3 to 7
R R R R		- pointer moves to the lower tolerance band on L AIL scale - pointer moves to the upper tolerance band on R AIL scale.
	9. Return aileron control wheel to zero	- all control surfaces retract to the faired position - on right ECAM display unit below SPLR, only horizontal dashes remain visible - on L and R AIL scales, pointers return to zero tolerance band.
R		
	10. Move flap and slat control lever to first notch	- L and R all speed ailerons deflect upwards to the neutral position - slats retract to 0° position - SLAT/FLAP indicator moves to SLATS 0 position.

(3) Close-up
  (a) Depressurize hydraulic systems and disconnect hydraulic ground power cart.
  (b) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

3. System Test

A. Measuring all Speed Aileron Deflections
(1)Equipment and materials

ITEM	DESIGNATION
(a)98A27901000000	Pin-Rigging, Aileron Control Wheel
(b)98A27108014000	Rigging Pin - Cable Drum Differential Droop Unit
(c)98A27308005000	Protractor - Control Surface Deflection
or	
TR12-18	Rigmaster System
TR31	Rigmaster System - Protractor
or	
3028000	Clinometer
98A27203500000	Measurement Base - Flight Control Surface Deflection
(d)	Warning Notices
(e)	Access Platform 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
(f)	Safety Barriers
Referenced Procedures	
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 24-41-00, P. Block 301	AC External Power Control

(2)Procedure
(a)Job set-up
1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
2 Connect hydraulic ground power cart and pressurize the Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
3 Open access door 121BL.
4 Make certain that Captain's and First Officer's control wheels are at zero.
5 Make certain that slat and flap control lever is in first notch. Display a warning notice prohibiting operation of flaps and slats.
6 Make certain that SPEED BRAKE control lever is in RET position. Ground spoilers function not pre-selected.
7 On SERVO CTL section of panel 428VU,
- Make certain that B, G and Y pushbutton switches are pressed (in) and all legends are off.
8 Immobilize Captain's and First Officer's aileron control wheels with rigging pins 98A27901000000.
9 Immobilize cable quadrants of differential and droop unit with rigging pins 98A27108014000.
R 10 Install protractors 98A27308005000 or tools TR12-18 and TR31
R or clinometer 3028000 and flight control surface deflection
R measurement base 98A27203500000 on R and L all speed ailerons
R and set to zero.

11 Remove all rigging pins from Captain's and First Officer's control wheels and from R and L all speed aileron cable quadrants.

(3)Test
(a)Measurement of all speed aileron travel

ACTION	RESULT
1. Fully turn Captain's or First Officer's aileron control wheel to the left	L all speed aileron deflects upwards 23° + 0 - 1° R all speed aileron deflects downwards 19° ± 1°
NOTE : Manually assist control wheel to assure system is centered in trim detent.	
2. Return control wheel to zero and immobilize with rigging pin 98A27901000000	L and R all speed ailerons must return to zero ±20'
3. Remove rigging pin from control wheel	
4. Fully turn Captain's or First Officer's aileron control wheel to the right	R all speed aileron deflects upwards 23° + 0 - 1° L all speed aileron deflects downwards 19° ± 1°
NOTE : Manually assist control wheel to assure system is centered in trim detent.	
5. Return control wheel to zero and immobilize with rigging pin 98A27901000000	L and R all speed ailerons must return to zero ±20'
6. Remove rigging pins from control wheels	
7. Move slat and flap control lever to second notch and display a warning notice prohibiting operation of flaps and slats.	L and R all speed ailerons deflect downwards (New ASA zero with max. droop)
8. Fully turn Captain's or First Officer's control wheel to the left	L all speed aileron deflects upwards 16°48' ± 1°30' R all speed aileron deflects downwards 22°30' ±1°30'
NOTE : Manually assist control wheel to assure system is centered in trim detent.	

ACTION	RESULT
9. Return control wheel to zero and immobilize with rigging pin 98A27901000000	L and R all speed ailerons must return to zero ±20' (including droop deflection)
10. Remove rigging pins from control wheels	
11. Fully turn Captain's or First Officer's control wheel to the right	R all speed aileron deflects upwards 16°48' ±1°30' L all speed aileron deflects downwards 22°30' ±1°30'
NOTE : Manually assist control wheel to assure system is centered in trim detent.	
12. Return control wheel to zero and immobilize with rigging pin 98A27901000000	L and R all speed ailerons must return to zero ±20' (including droop deflection)
13. Remove rigging pins from control wheels	
14. Move slat and flap control lever to first notch	

(4)Close-up
(a)Remove protractors from L and R all speed ailerons.
(b)Remove all warning notices.
(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(d)Remove access platforms and safety barriers.
(e)Close access door 121BL.
(f)Depressurize hydraulic systems and disconnect hydraulic ground power cart.
(g)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

B. Measurement of Roll Load
(1)Equipment and materials

ITEM	DESIGNATION
(a)98A27903501001	Measuring Equipment - Pitch and Roll Operating Load
(b)98A27901007000	Rigging Pin - Elevator Control
(c)97A27902016000	Spring Scale Assy
Referenced Procedures - 24-41-00, P. Block 301	AC External Power Control

ITEM	DESIGNATION
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

(2)Procedure
(a)Job set-up
1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics racks ventilation is correct.
2 Pressurize Green hydraulic system using hydraulic ground power supply cart. (Ref. 29-10-00, P. Block 301).
3 Install tool 98A27903501001.
4 Immobilize control columns using rigging pins 98A27901007000 installed in the input levers of the control columns.
(3)Test

ACTION	RESULT
1. Using a spring scale installed on the measuring equipment 97A27902016000 operate control wheel to obtain maximum right turn deflection.	The maximum load for full deflection is 5.6 ± 0.6 daN. (12.6 ± 1.3 lbf.).
2. Perform the same operation for left turn	The maximum load for full deflection is 5.6 ± 0.6 daN. (12.6 ± 1.3 lbf.).

(4)Close-up
(a)Remove rigging pins from control column input levers.
(b)Remove tools.
(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(d)Depressurize Green hydraulic system and disconnect hydraulic ground power cart. (Ref. 29-10-00, P. Block 301).
(e)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

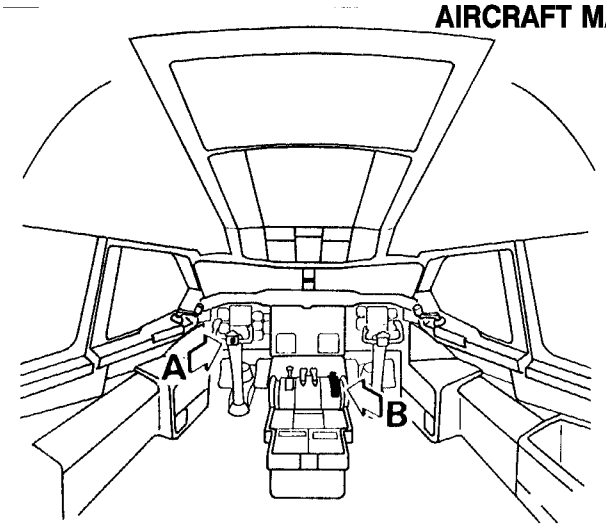
R A. Check Aileron Hinge Bearings for Excessive Play and General Condition
B. Check of the Inner Servo Controls and Hinge Bearings of the Inboard and Outboard Ailerons
C. Operational Check when the Different Hydraulic Systems are Pressurized
D. Operational Check of Control Wheel Interconnecting Spring Rod

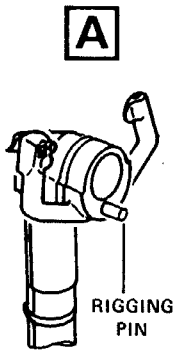
2. Equipment and Materials

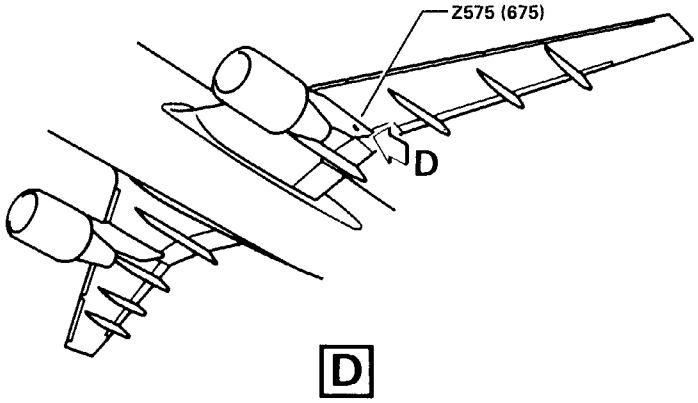
ITEM	DESIGNATION
A. 98A27901000000	Pin-Rigging, Aileron Control Wheel
B. 98A27503003000	Guard, Safety - Flap and Slat Control Lever
C. 98A27108014000	Rigging Pin - Input Drum Differential Droop Unit
D.	Access Platform
E. 08-050	Loctite
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-00, P. Block 501	Aileron Mechanical Control
- 27-11-28, P. Block 601	Aileron
- 27-14-12, P. Block 601	Aileron Servo-control
- 29-21-00, P. Block 301	Green Auxiliary Hydraulic Power
- 29-22-00, P. Block 301	Blue Auxiliary Hydraulic Power
- 29-23-00, P. Block 301	Yellow Auxiliary Hydraulic Power
- 57-51-34, P. Block 601	Trailing Edge - Attach Fittings

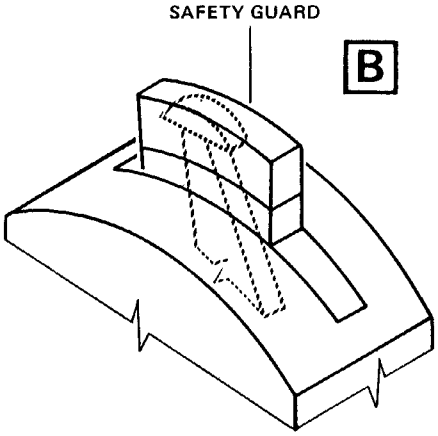
3. Procedure

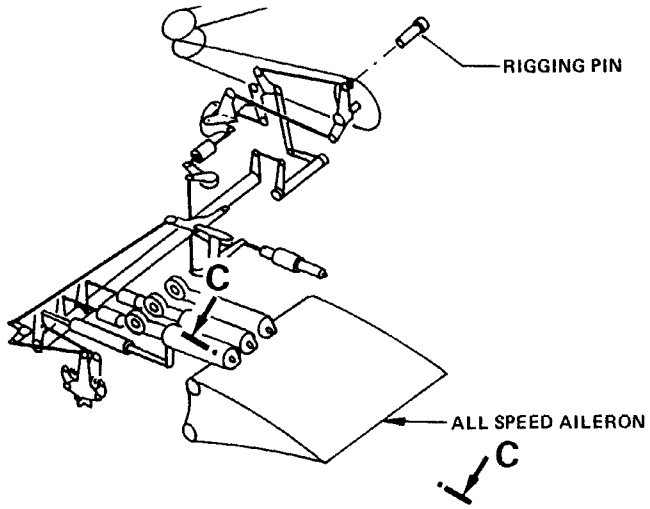
R A. Check Aileron hinge bearings for excessive play and general condition
(1)Job Set-Up
(Ref. Fig. 601)
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.







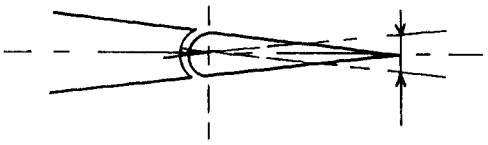




SECTION
C - C

TOTAL AUTHORIZED PLAY

MAXI IN SERVICE	5 mm (0.197 in.)
SCHEDULED MAINTENANCE	2.5 mm (0.098 in.)



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Component Location and Rigging Points
Figure 601

R

(b)Pressurize Green hydraulic system (Ref. 29-21-00, P. Block 301), Blue hydraulic system (Ref. 29-22-00, P. Block 301), Yellow hydraulic system (Ref. 29-23-00, P. Block 301).
(c)Position access platform.
(d)Open access door 121BL.
(e)Remove cap from each control wheel to gain access to rigging pin hole.
(f)Place aileron control wheels in neutral position and secure with aileron control wheel rigging pins 98A27901000000.
(g)Secure flap and slat control lever in RET position with flap and slat control lever safety guard 98A27503003000.
(h)Position access platform.
(j)Open access doors 575AB (left wing), 675AB (right wing), and insert input drum differential droop unit rigging pin 98A27108014000 in differential droop and feel mechanism cable quadrant.
NOTE : If rigging pins cannot be inserted, adjust aileron mechanical controls (Ref. 27-11-00, P. Block 501).
(k)Remove access panels 575CB, 575DB, 575BT (left wing), and 675CB, 675DB, 675BT (right wing).

B. Check of the Inner Servo Controls and Hinge Bearings of the Inboard and Outboard Ailerons
(1)Check authorized play at aileron trailing edges.
(2)Do a visual check of the servo control bearings.
(3)Do a visual check of the aileron hinge bearings.
(4)Make certain that the liners are not damaged.

C. Operational Check when the Different Hydraulic Systems are Pressurized
(1)Do this check with the Green hydraulic system pressurized.
(2)On trailing edge, opposite center servo control, apply a reasonable hand pressure upward in order to eliminate any play with no bending of the surface and note the position.
(3)On trailing edge, opposite center servo control, apply a reasonable hand pressure downward in order to eliminate any play with no bending of the surface and note the position.
(4)Using the trailing edge of the wing as reference, measure the play between the two opposite positions. If the play exceeds total authorized value (Ref. Fig. 601), proceed with inspection/check of the attach fittings (Ref. 27-11-28, P. Block 601), all-speed aileron servo-control (Ref. 27-14-12, P. Block 601) and aileron hinge attach fittings (Ref. 57-51-34, P. Block 601, Paragraph 4.).
(5)In flight compartment, on panel 428VU :
- release (out) the Green servo controls pushbutton switch and press (in) the Blue servo controls pushbutton switch.
(6)Do this check with the Blue hydraulic system pressurized.
(7)On trailing edge, opposite center servo control, apply a reasonable hand pressure upward in order to eliminate any play with no bending of the surface and note the position.
(8)On trailing edge, opposite center servo-control, apply a reasonable hand pressure downward in order to eliminate any play with no bending of the surface and note the position.
(9)Using the trailing edge of the wing as reference, measure the play

between the two opposite positions. If play exceeds total authorized value (Ref. Fig. 601), proceed with inspection/check of the attach fittings (Ref. 27-11-28, P. Block 601), all speed aileron servocontrol (Ref. 27-14-12, P. Block 601) and aileron hinge attach fittings (Ref. 57-51-34, P. Block 601, Paragraph 4.).

(10) In flight compartment, on panel 428VU :
- release (out) the Blue servo controls pushbutton switch and press (in) the Yellow servo controls pushbutton switch.

(11) Do this check with the Yellow hydraulic system pressurized.

(12) On trailing edge, opposite center servo control, apply a reasonable hand pressure upward in order to eliminate any play with no bending of the surface and note the position.

(13) On trailing edge, opposite center servo control apply a reasonable hand pressure downward in order to eliminate any play with no bending of the surface and note the position.

(14) Using the trailing edge of the wing as reference, measure the play between the two opposite positions. If play exceeds total authorized value (Ref. Fig. 601), proceed with inspection/check of the attach fittings (Ref. 27-11-28, P. Block 601), all speed aileron servocontrol (Ref. 27-14-12, P. Block 601) and aileron hinge attach fittings (Ref. 57-51-34, P. Block 601, Paragraph 4.).

D. Operational Check of Control Wheel Interconnecting Spring Rod

(1) First method :
- (a) Pressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).
- (b) Install rigging pin 98A27901000000 in captain or first officer control wheel.
- (c) Move the other control wheel in both directions and check on ECAM Page FLT aileron motion.

(2) Second method :
- (a) Pressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).
- (b) Manually maintain one control wheel.
- (c) Move the other one in both directions. Check surface motion on ECAM Page FLT.

E. Close-Up

(1) Remove rigging pins and depressurize Green hydraulic system power supply (Ref. 29-21-00, P. Block 301), Blue hydraulic power supply (Ref. 29-22-00, P. Block 301), Yellow hydraulic power supply (Ref. 29-23-00, P. Block 301).

(2) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3) Install a new cap on each control wheel with Loctite (Material No.08-050).

(4) Remove locking tool from flap and slat control lever.

(5) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(6) Close access doors and install access panels.

(7) Remove access platform.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

R 1. Reason for the Job
R Removal/Installation of control wheel for replacement of :
R - pitch trim control switch (7CC-8CC)
R - auto pilot disconnect button (31CA-32CA)
R - push to talk switch (13RN-14RN)
R - clock pushbutton (8FS-9FS).

R 2. Captain's (First Officer's) Control Wheel

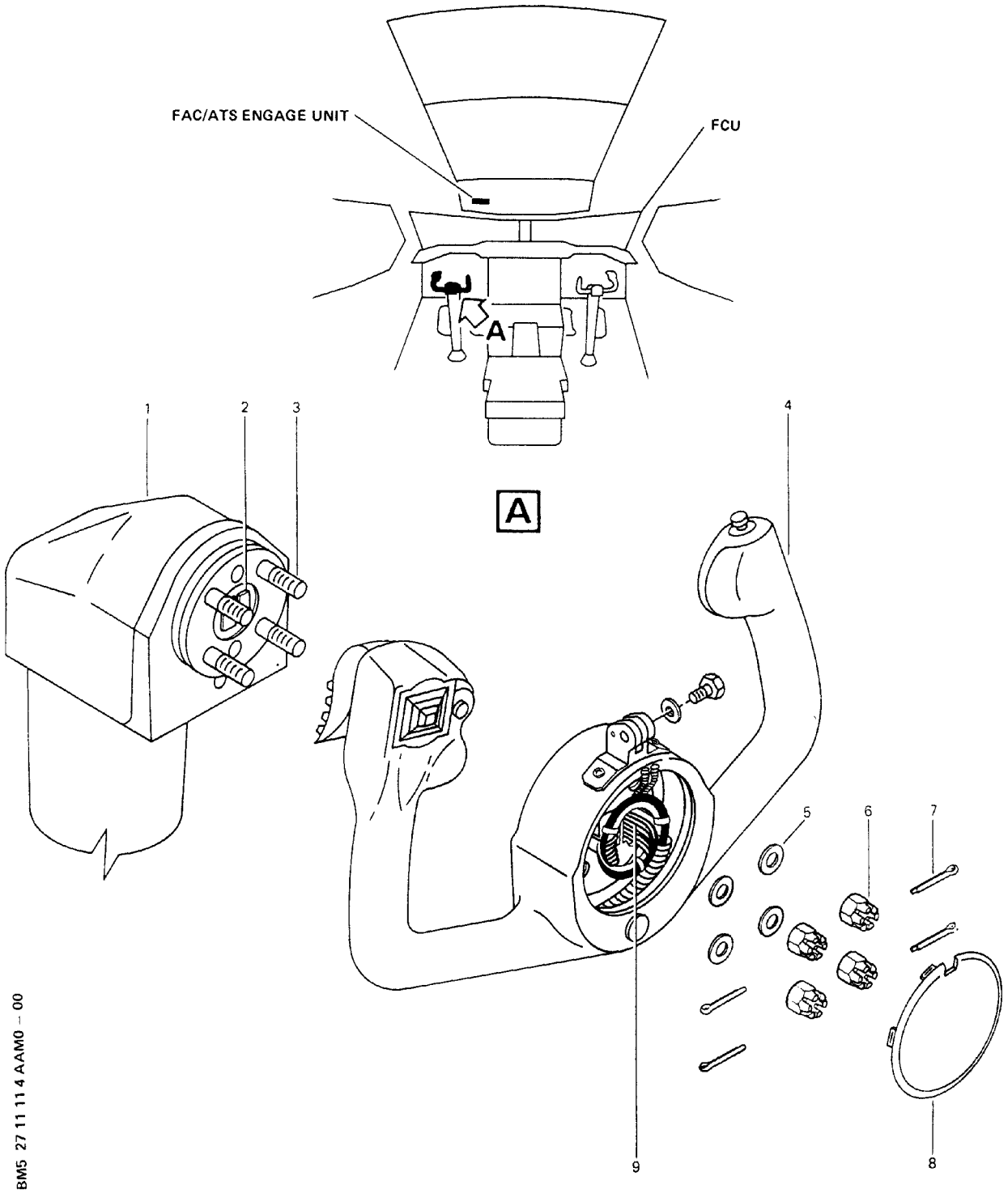
A. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
Referenced Procedures	
- 22-10-00, P. Block 501	Autopilot
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfert Unit)

B. Procedure
(Ref. Fig. 401)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1		Line 103
21VU	FAC2		Line 103
22VU	AUDIO SYS		Line 205
22VU	CLOCKS		Line 204

(2)Removal
(a)Remove map holder
(b)Remove cover plate (8)



Control Wheel
Figure 401

(c)Remove cotter pins (7), remove nuts (6) and washers (5)
(d)Remove control wheel (4) by pulling rearwards

(3)Installation
(a)Position control wheel (4) on the four studs (3) on control column head (1), and push home to connect control wheel electrical plug (9) fully in column head receptacle (2).
(b)Install washers (5) on studs (3). Install and fully tighten nuts (6), safety with cotter pins (7).
(c)Install cover plate (8) on control wheel (4)
(d)Install map holder
(e)Remove safety clips and tags, and close all circuit breakers opened in Job Set-Up.

(4)Tests
Initial conditions
- Correct electrical power supply
Forward Services Ventilation system in operation.
- Hydraulic systems pressurized

(a)Place all flight controls in neutral position
NOTE : The test described below is for pitch trim 1 channel. For pitch trim 2 channel test, which is identical, read number in parentheses.

ACTION	RESULT
1. On overhead panel, on FAC/ATS engage unit, place PITCH TRIM 1 (2) lever in up position.	Pitch trim wheel does not rotate
2. On Captain's (First Officer's) control wheel Move pitch trim control switch in nose down then nose up position (without reaching stops)	Pitch trim control wheel rotates in nose down direction, then in nose up direction.
3. On glareshield Engage AP1 (AP2) in CWS mode. (Ref. 22-10-00, P. Block 501).	Lever remains engaged
4. On Captain's (First Officer's) control wheel - press AP disconnect pushbutton switch Press a second time AP disconnect pushbutton switch	On glareshield - AP1 (AP2) lever returns to OFF position - AP OFF warnings appear and aural warning sounds. - Warnings disappear.
5. On overhead panel, on FAC/ATS engage unit, place PITCH TRIM 1 (2) lever in OFF position and clear warning	
6. Shut down pressurization of hydraulic systems.	

ACTION	RESULT
7. On Captain's (First Officer's) control wheel place **INTPH/RAD** switch in **INT** position.	
8. On Captain's (First Officer's) **AUDIO CTL** panel, select interphone function.	
9. Speak into Captain's (First Officer's) boomset microphone	Check that voice is received at First Officer's (Captain's) headset
10. On Captain's (First Officer's) control wheel - place **INTPH/RAD** switch in **RAD** position	
11. Speak into Captain's (First Officer's) boomset microphone	Check that voice is received at First Officer's (Captain's) headset.
12. On Captain's (First Officer's) control wheel - press clock pushbutton switch - press a second time clock pushbutton switch - press a third time clock pushbutton switch	On Captain's (First Officer's) instrument panel - Check that pointer and ET/chrono display start - Check that pointer and ET/chrono display stop - Check the chronometer is reseted.

(5) Close-up
  (a) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
  (b) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

INTERCONNECTING SPRING ROD - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A27901000000	Pin - Rigging, Aileron Control Wheel
B. 98A27901003000	Pin - Rigging, Aileron Control
C. 98A27901007000	Pin - Rigging, Elevator Control
D. 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
E.	Warning Notices Prohibiting Depressurization of Hydraulic System and Operation of Pitch and Roll Trim Control
F. Material No. 04-004	Common Greases (Ref. 20-31-00)
G.	Lockwire - Corrosion Resistant Steel dia. 0.8 mm (0.032 in.)
H.	Circuit Breaker Safety Clips
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

2. Procedure

A. Job set-Up

(1) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(2) Make certain that electronics racks ventilation is correct.

(3) Connect hydraulic ground power supply cart and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(4) Display a warning notice on hydraulic ground power cart prohibiting depressurization of Green hydraulic system.

(5) Make certain that Captain's and First Officer's aileron control wheels are at neutral.

(6) On panel 133VU :
Open, safety and tag FLT CTL/AIL/TRIM circuit breaker 3CG, position 331/V63.

(7)Immobilize Captain's and First Officer's aileron control wheels with rigging pins 98A27901000000.
(8)Open access door 121BL and install rigging pins 98A27901003000 on LH and RH cable tension regulators.
(9)Make certain that pitch trim control wheel is at neutral. Immobilize with equipment 97A27302009000.
(10)Immobilize Captain's and First Officer's control columns at neutral using rigging pins 98A27901007000.

B. Removal (Ref. Fig. 401)
NOTE : Identify spring rod (6) installation position.
(1)Disconnect interconnecting spring rod (6) at level of bellcrank assemblies (1) and (11) by removing cotter pins (10), nuts (9), washers (8) and bolts (3) equipped with bushes.
(2)Remove interconnecting spring rod (6)

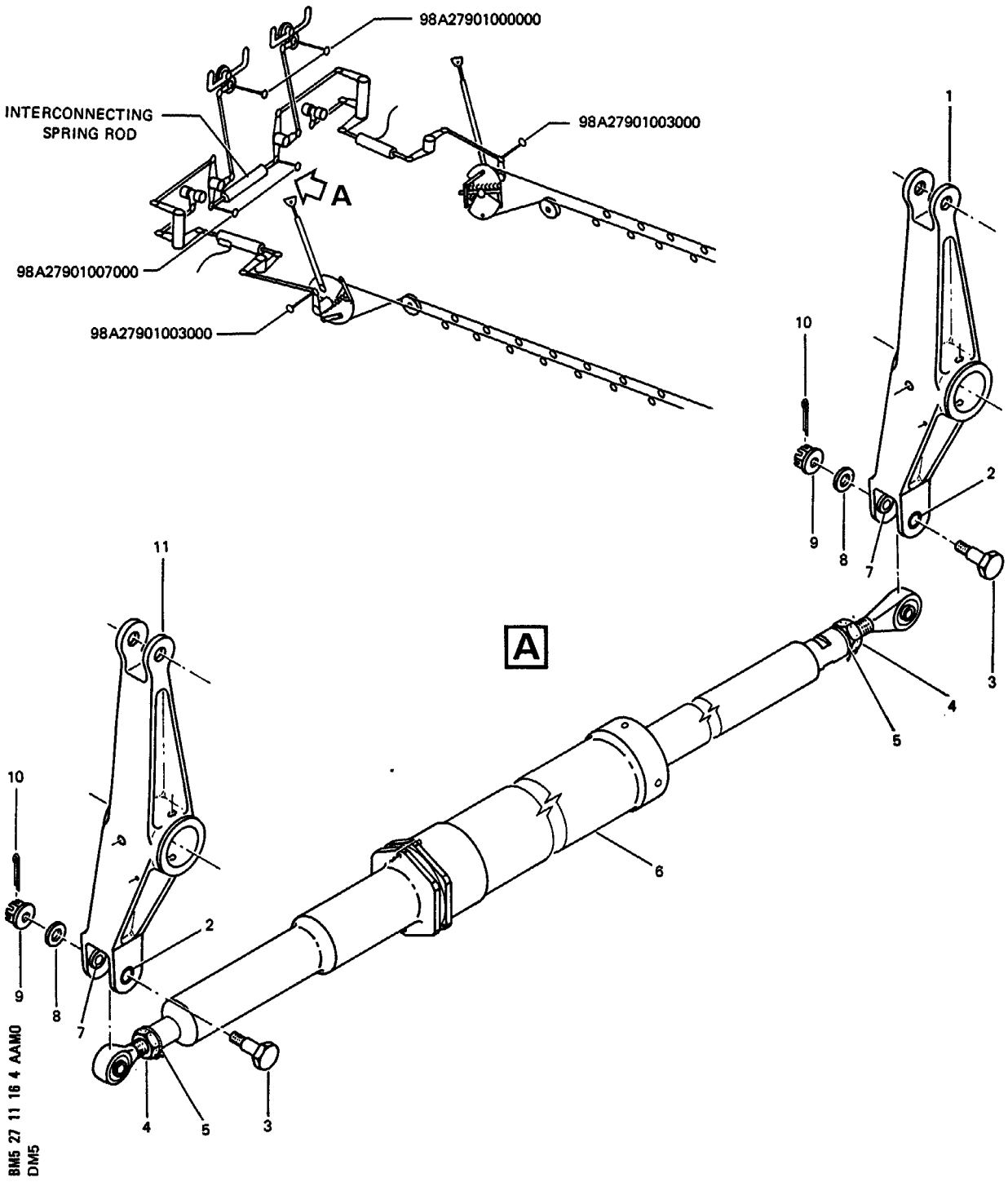
C. Installation
CAUTION : MAKE CERTAIN THAT SPRING ROD CORRECT INSTALLATION POSITION IS OBSERVED.
NOTE : Bolts are to be lubricated using material No.04-004.
(1)Position rod (6).
(2)Connect rod (6) to bellcranks (1) and (11) equipped with bushes (2) and (7) using shouldered bolts (3).
NOTE : In the event of installation difficulties on the aircraft, increase or decrease length of adjustable spherical rod end, respecting the tolerances of 1060 mm ± 6 mm (41.73 in. ± 0.24 in.).
(3)Make certain that rod is at neutral
If length adjustment is necessary, cut lockwire and loosen nuts (4)
Disengage lockwashers (5)
Move rod body so as to insert shouldered bolts (3)
Engage lockwashers (5), tighten nuts (4)
Safety with lockwire.
(4)Install washers (8).
(5)Tighten nuts (9) and install cotter pins (10).
(6)Remove all rigging pins and items of equipment from pitch trim wheels.
(7)Remove safety clip and tag and close circuit breaker 3CG.

D. Test
Initial conditions
- Electrical power supply correct
- Ventilation of electronics racks operating.
- Green hydraulic system pressurized.
- Circuit breakers closed, particularly those associated with flight controls.

ACTION	RESULT
1. On SERVO CTL section of panel 428VU - make certain that SERVO CTL/G/ (JAM/OFF) pushbutton switch is pressed in and that OFF legend is	

ACTION	RESULT
off.	
2. Fully move Captain's or First Officer's aileron control wheels to left	- Check that LH all speed aileron deflects upwards and RH all speed aileron deflects downwards
3. Fully move Captain's or First Officer's aileron control wheel to right	- Check that RH all speed aileron deflects upwards and LH all speed aileron deflects downwards
4. Place Captain's or First Officer's aileron control wheel in neutral	- Check that all speed ailerons are at neutral

E. Close-Up
(1) Depressurize Green hydraulic system and disconnect hydraulic ground power cart.
(2) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4) Close access door.



Interconnecting Spring Rod - Removal/Installation
Figure 401

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A. 98A27901000000	Pin - Rigging, Aileron Control Wheel
	B. 98A27901003000	Pin - Rigging, Aileron Control
	C. 98A27108014000	Rigging Pin - Cable Drum Differential Droop Unit
R	D. FE101901	Locking Equipment - Cable Tension Regulator
	E.	Lockwire-Corrosion Resistant Steel, dia. 0.8 mm (0.032 in.).
	F.	Circuit Breaker Safety Clips
	G.	Warning Notices Prohibiting Operation of Ailerons
	H.	Access Platforms, 2.65 to 4 m (9 ft. to 13 ft. 1 in.)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-10-00, P. Block 501	Aileron
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up

(Ref. Fig. 401)

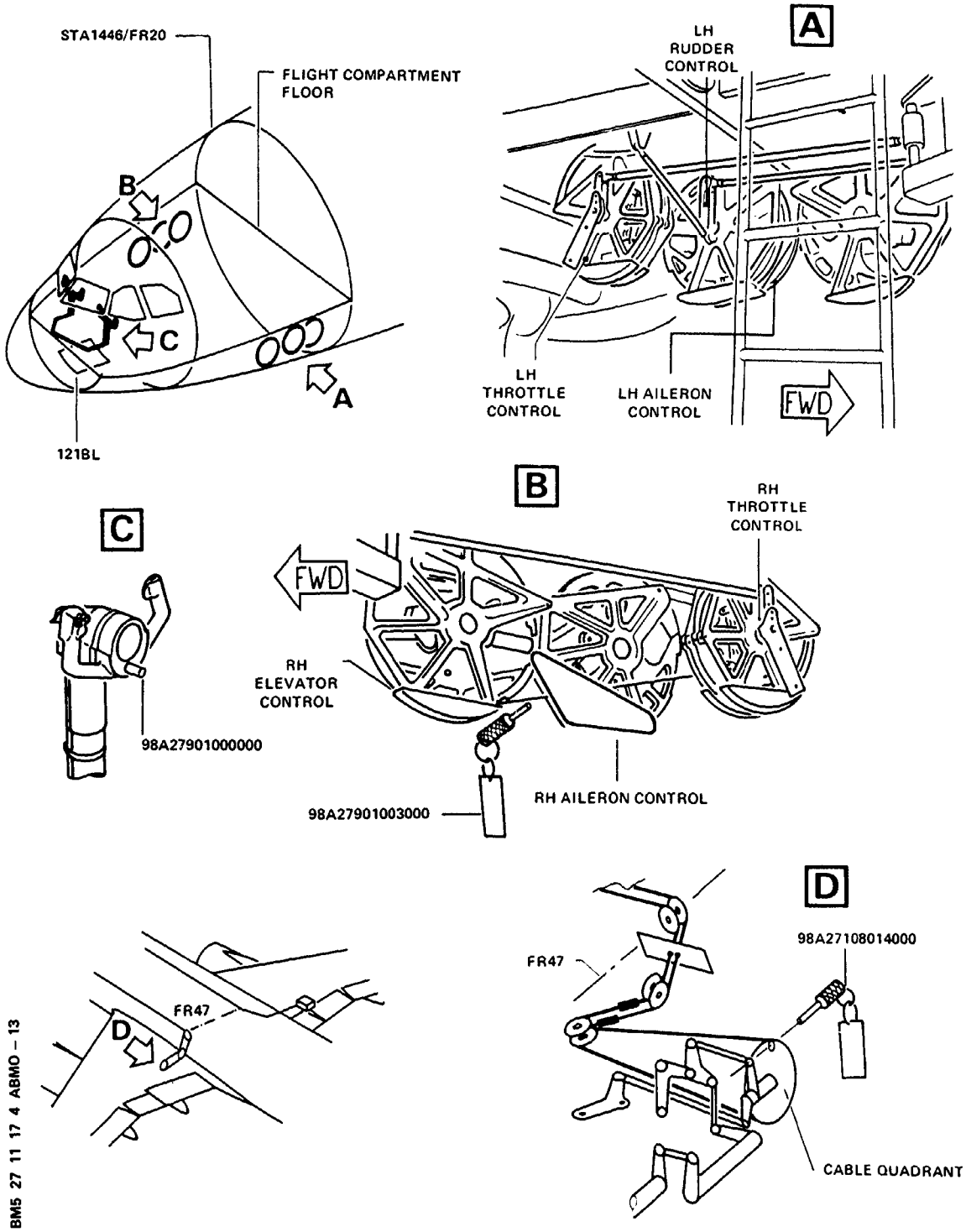
(1)Position access platform

(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(3)Pressurize Green hydraulic system using hydraulic ground power supply cart (Ref. 29-10-00, P. Block 301).

(4)On SERVO CTL section of panel 428VU,

- make certain that SERVO CTL/B, G and Y pushbutton switches are pressed (in) and legends off.

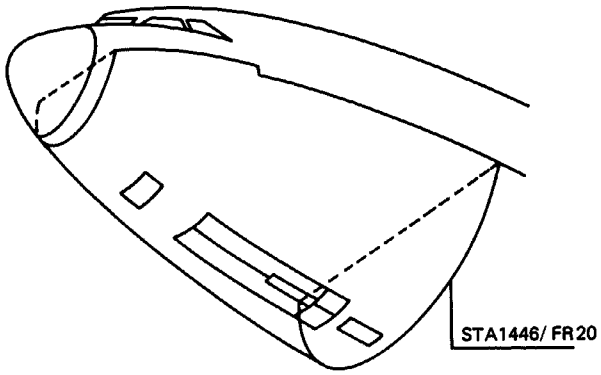


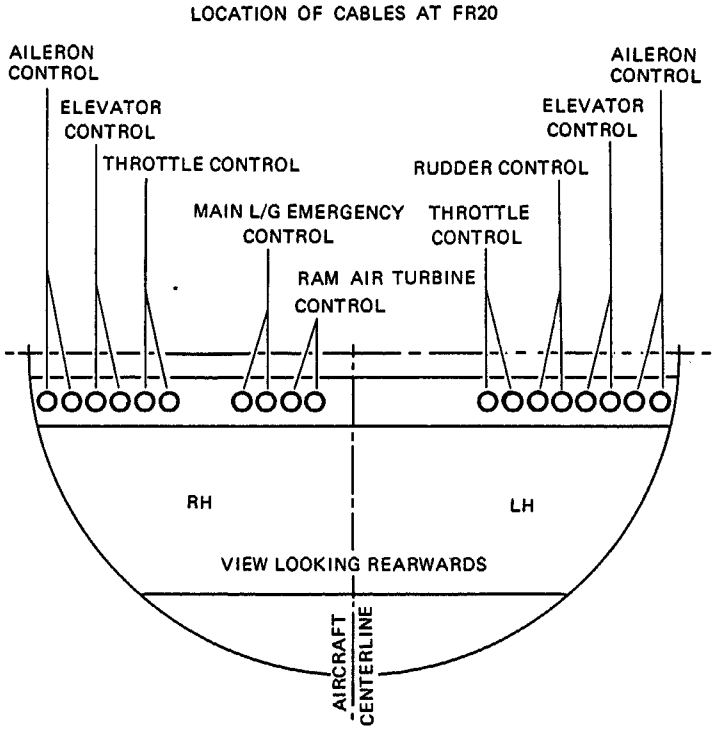
Component and Rigging Point Location
Figure 401

(5)Make certain that Captain's and First Officer's control wheels are in zero position (roll trim at zero).
(6)Check that flap and slat control lever is in the first notch position. (Slats and flaps fully retracted).
(7)Remove control wheel cover plate.
(8)Open, safety and tag circuit breaker 3CG on panel 133VU.
(9)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(10)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(11)On wing lower surface, open access door 575AB (or 675AB).
(12)Open door 121BL for access to avionics compartment and to tension regulator to be removed.
(13)Open left (right) main gear door for access to turnbuckles (Ref. 32-12-11, P. Block 301).
(14)Remove turnbuckle safety clips and progressively slacken cables until
R locking equipment FE101901 can be installed on the two tension regulator cable quadrants (Ref. Fig. 402).

B. Removal of Left Tension Regulator
(Ref. Fig. 403)
(1)Remove cotter pin from nut (38), remove nut (38) and washer (39). Hold brace rod (41) and remove bolt (40).
(2)Stow brace rod (41) on an adjacent part of the aircraft to prevent damage.
(3)Remove cotter pin from nut (42), remove nut (42) and washer (43). Hold input rod (37) and remove bolt (44).
(4)Stow input rod (37) on an adjacent part of the aircraft to prevent damage.
(5)Remove cotter pin from nut (5), remove nut (5), washer (4), bolt (1) and spacer (3) (Ref. Detail A).
(6)Cut and remove lockwire, remove bolt (9) and spacers (10) and (11) (Ref. Detail C).
(7)Remove cotter pin from nut (21), remove nut (21), washer (20), bolt (16), the two spacers (17) and (19) and upper cable guard (2) (Ref. Detail E).
(8)Remove cotter pins from nuts (28) and (30), remove nuts (28) and (30), washers (27) and (31), bolts (22) and (36) and spacers (23), (25), (33) and (35). Remove washers (26), (32) and cable protection plate (29).
(9)Remove lower cable guards (24) and (34).
(10)Remove cable ends from slots in cable quadrants. Hang cables on structure.
(11)At forward attachment point of regulator, remove cotter pin from nut (15), remove nut (15) and washer (14) (Ref. Detail D).
(12)At aft attachment point of regulator, remove cotter pin from nut (6), remove nut (6) and washer (7) (Ref. Detail B).
(13)Support regulator. Remove bolt (12), bolt (8) and bush (13).
(14)Remove regulator.

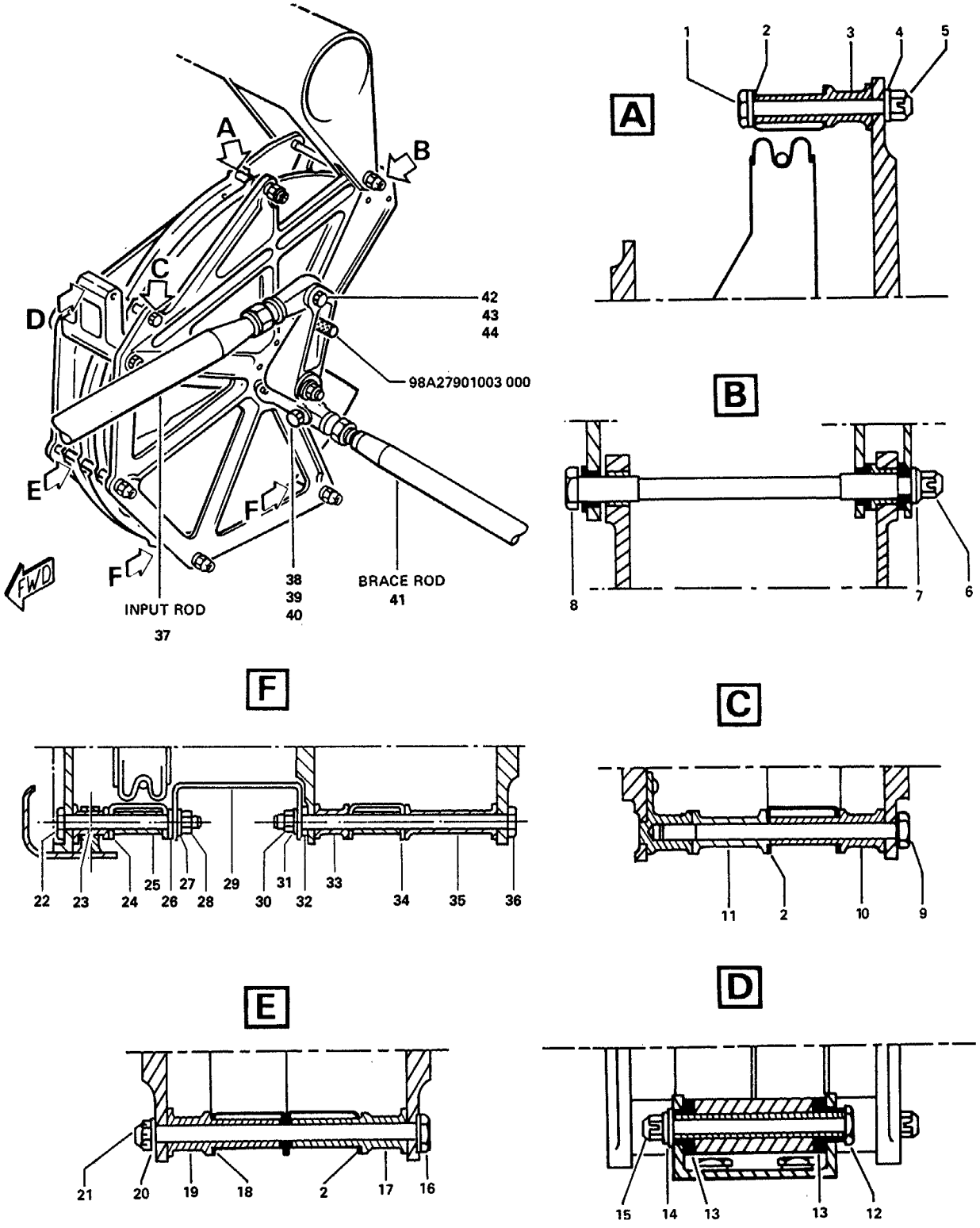
C. Removal of Right Cable Tension Regulator
(Ref. Fig. 404)
(1)Remove cotter pin from nut (30), remove nut (30) and washer (31). Hold brace rod (33) and remove bolt (32).





BM5 27 11 17 4 ADMO
DM5

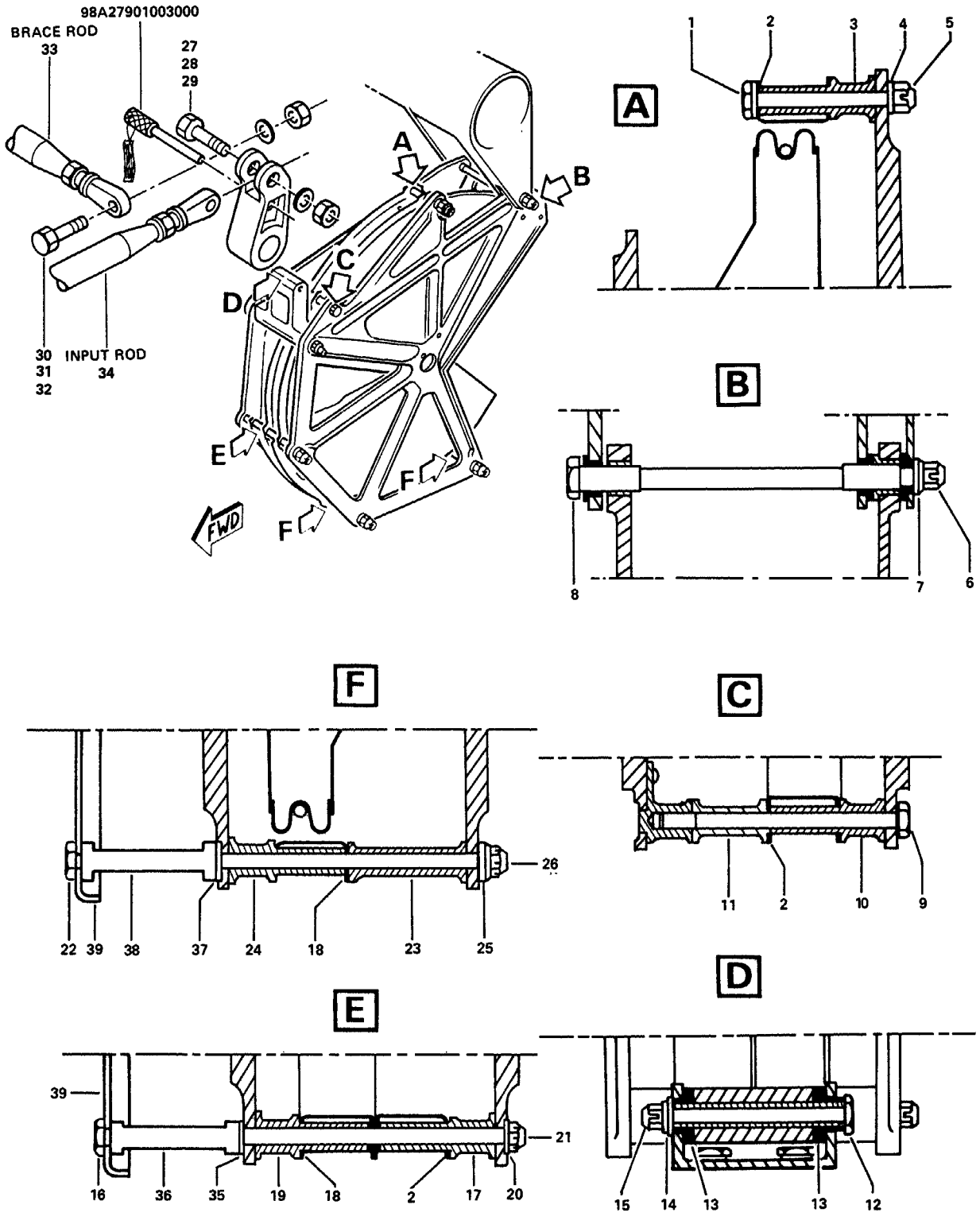
Location of Cables
Figure 402



Left Cable Tension Regulator
Figure 403

(2)Stow brace rod (33) on an adjacent part of the aircraft to prevent damage.
(3)Remove cotter pin from nut (27), remove nut (27) and washer (28). Hold input rod (34) and remove bolt (29).
(4)Stow input rod (34) on an adjacent part of the aircraft to prevent damage.
(5)Remove cotter pin from nut (5), remove nut (5), washer (4), bolt (1) and spacer (3) (Ref. Detail A).
(6)Cut and remove lockwire, remove bolt (9) and spacers (10) and (11) (Ref. Detail C).
(7)Remove cotter pin from nut (21), remove nut (21), washer (20), bolt (16), the three spacers (17), (19) and (36), washer (35) and upper cable guard (2) (Ref. Detail E).
(8)Remove cotter pins from nuts (26), remove nuts (26), washers (25), bolts (22), spacers (23), (24), (38) and washers (37).
(9)Remove cover (39) and lower cable guards (18) (Ref. Detail F).
(10)Remove cable ends from slots in cable quadrants. Hang cables on structure.
(11)At forward attachment point of regulator, remove cotter pin from nut (15), remove nut (15) and washer (14) (Ref. Detail D).
(12)At aft attachment point of regulator, remove cotter pin of nut (6), remove nut (6) and washer (7) (Ref. Detail B).
(13)Support regulator. Remove bolt (12), bolt (8) and bush (13).
(14)Remove regulator.

D. Preparation of Replacement Component
(1)Disassembly of regulator (Ref. Fig. 405)
(a)Remove cotter pin from nut (58), remove nut (58), washer (59) input lever (60) and shim washer (61).
(b)Cut and remove lockwire, remove the two bolts (52) and lock washer (53).
(c)Cut and remove lockwire from nuts (55), remove nuts (55), washers (56) and bolts (57).
(d)Remove cotter pin from nut (63), remove nut (63) and washers (64).
(e)Remove frame (62).
(f)Separate regulator (65) from frame (54).
(g)On frame (54) :
1 Hold suspension block (67)
2 Remove bolt (51) and washer (50).
3 Remove suspension block (67) fitted with spacer (66).
(2)Assembly of regulator
WARNING : REPLACEMENT REGULATOR MUST BE MANDATORILY FITTED WITH ITS CABLE QUADRANT LOCKING EQUIPMENT.
(a)Insert shorter hub of regulator into bearing of frame (54).
(b)Install lock washer (53).
(c)Secure lock washer (53) using the two bolts (52), tighten and wirelock bolts (52).
(d)Make certain that spacer (66) is inserted in suspension block (67). Install suspension block assembly on frame (54) using bolt (51) and washer (50).
(e)Install frame (62), centering it on regulator hub and on shoulder of



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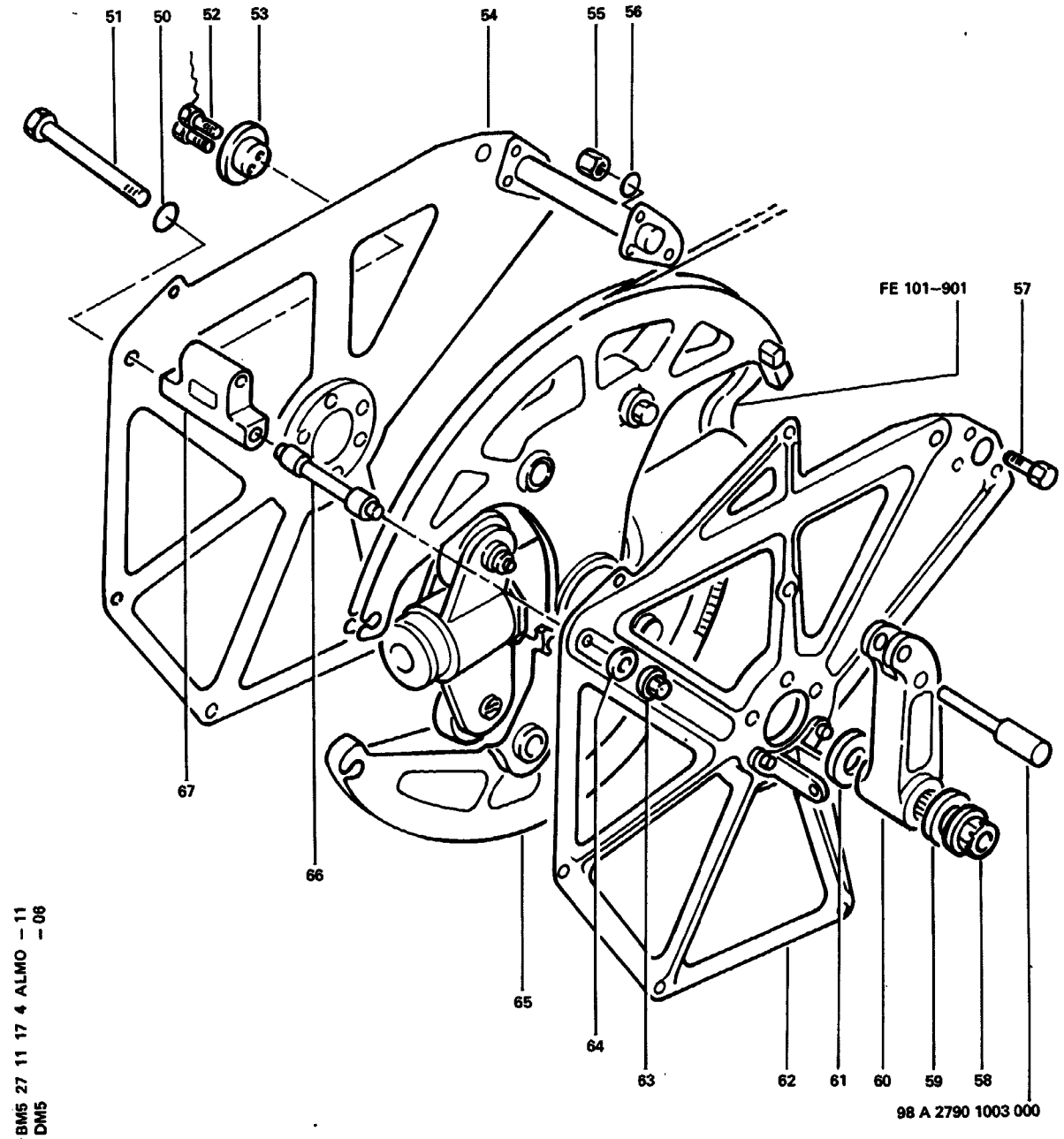
Right Cable Tension Regulator
Figure 404

spacer attached to frame (54).
(f)Install washer (64) on bolt (51). Install nut (63), tighten and safety with cotter pin.
(g)Install washers (56) and bolts (57). Install nuts (55), tighten and safety with cotter pins.
(h)Install shim washer (61) and input lever (60) on regulator hub.
NOTE : A double spline in regulator hub and a double groove on input lever provide foolproof mating of input lever with respect to regulator.
(j)Place regulator in correct installation attitude.
(k)Install washer (59).
(l)Install nut (58), tighten and safety with cotter pin.

E. Installation of Left Tension Regulator (Ref. Fig. 403)
(1)Position tension regulator assembly and secure using bolt (8), bush (13) and bolt (12).
(2)At aft attachment point of tension regulator, install washer (7) and nut (6) on bolt (8), tighten nut and safety with cotter pin (Ref. Detail B).
(3)At forward attachment point of tension regulator, install washer (14) on bolt (12), install nut (15), tighten and safety with cotter pin (Ref. Detail D).
(4)Insert end fitting of each cable in respective slot in cable quadrants.
(5)Position upper cable guard (2) and attach using bolt (1) spacer (3), and washer (4). Tighten nut (5) on bolt (1) and safety with cotter pin (Ref. Detail A).
(6)Attach upper cable guard (2), and spacers (11) and (10) with bolt (9), tighten bolt and wirelock (Ref. Detail C).
(7)Attach upper cable guard (2) and spacer (17) ; and lower cable guard (18) and spacer (19) with washer (20), bolt (16) and nut (21). Tighten nut and safety with cotter pin (Ref. Detail E).
(8)Install lower cable guards (24) and (34) and spacers (23), (25), (33) and (35).
Engage washers (26) and (32) on bolts (22) and (36). Install cable protection plate (29) then install washers (27) and (31). Tighten nuts (28) and (30) and safety with cotter pin (Ref. Detail F).
(9)Install input rod (37) on regulator input lever using bolt (44). Install washer (43) and nut (42). Tighten nut and safety with cotter pin.
(10)Install brace rod (41) on tension regulator using bolt (40). Install washer (39) and nut (38). Tighten nut and safety with cotter pin.
(11)Tighten cables to enable removal of locking tool FE101-901.

F. Installation of Right Tension Regulator
(Ref. Fig. 404)
(1)Position tension regulator assembly and secure using bolt (8), bush (13) and bolt (12).
(2)At aft attachment point of tension regulator, install washer (7) and nut (6) on bolt (8), tighten nut and safety with cotter pin (Ref. Detail B).
(3)At forward attachment point of tension regulator, install washer (14) on bolt (12), install nut (15), tighten and safety with cotter pin (Ref.



Tension Regulator
Figure 405

Detail D).
(4)Insert end fitting of each cable in respective slot in cable quadrants.
(5)Position upper cable guard (2) and attach using bolt (1) spacer (3), and washer (4). Tighten nut (5) on bolt (1) and safety with cotter pin (Ref. Detail A).
(6)Attach upper cable guard (2), and spacers (11) and (10) with bolt (9), tighten bolt and wirelock (Ref. Detail C).
(7)Position cover (39). Install spacer (36), washer (35), lower cable guard (18) and spacer (19), upper cable guard (2) and spacer (17). Engage washer (20) on bolt (16). Temporarily tighten nut (21) (Ref. Detail E).
(8)Finally install cover (39). Install spacers (38), washers (37), lower cable guards (18) with spacers (24) and (23). Engage washers (25) on bolts (22). Tighten nuts (26) and nut (21) and safety with cotter pins.
(9)Install input rod (34) on regulator input lever using bolt (29). Install washer (28). Tighten nut (27) and safety with cotter pin.
(10)Install brace rod (33) on tension regulator using bolt (32). Install washer (31) and nut (30). Safety nut with cotter pin.
R (11)Tighten cables to enable removal of locking tool FE101901.

G. Adjustment
Adjust cable tension (Ref. 27-10-00, P. Block 501).

H. Tests
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) Make certain that electronics racks ventilation is correct. Close circuit breaker 3CG.
(3)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Operate ailerons through five cycles.
(5)Install rigging pin 98A27901000000 in control wheel.
(6)Check that rigging pin 98A27901003000 can be freely installed in cable tension regulator.
(7)Check that rigging pin 98A27108014000 can be freely installed in ASA cable quadrant.
(8)Check that cable tension, as read on tension regulator compensation scale, has not changed.
(9)Re-adjust cable tension as required (Ref. 27-10-00, P. Block 501).

J. Close-Up
(1)Remove all rigging pins and install cover plate on control wheel.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Depressurize Green hydraulic system and disconnect hydraulic ground power unit.
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(5)Remove all warning notices.
(6)Close access doors.
(7)Remove access platform.

DYNAMOMETRIC ROD 61CA (62CA) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A27901000000	Pin - Rigging, Aileron Control Wheel
B. 98A27901003000	Pin - Rigging, Aileron Control
C. 72-5-644	Retaining Fork - Dynamometric Rod
D.	Access Platform, 2.5 to 3 m (8.20 to 9.80 ft.)
E.	Warning Notices Prohibiting Depressurization of Hydraulic System
F.	Circuit Breaker Safety Clips
G.	Electrical Connector Blanking Plugs/Caps
Referenced Procedures	
- 22-10-00, P. Block 501	Auto Pilot
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

2. Procedure

NOTE : Before removal of dynamometric rods, check that control cables are correctly rigged and that tension is within limits.

A. Job Set-up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/AP1-FD1/FCC1/26VAC	305CA1	102/H 2
21VU	AFS/AP2-FD2/FCC2/26VAC	305CA2	102/H 7

(2)Connect hydraulic ground power cart and presssurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
Display a warning notice prohibiting system depressurization.

(3)Check that Captain's and First Officer's aileron control wheels are at

zero (Trim at zero).
(4)On panel 133VU, open safety and tag FLT CTL/AIL/TRIM circuit breaker 3CG, position 331/V63.
(5)Immobilize the two aileron control wheels with rigging pins 98A27901000000.
(6)Open access door 121BL. Immobilize cable tension regulator input lever with rigging pin 98A27901003000.
(7)Install retaining fork 72-5-644 on dynamometric rod to be removed.

B. Removal (Ref. Fig. 401)
(1)Disconnect electrical connectors 1095VC-A and 1090VC-A (5) and (6) from LH rod 61CA (4). (Connectors 1097VC-A and 1092VC-A on RH rod 62CA).
(2)Protect connectors with blanking caps.
(3)Remove cotter pins, remove nuts (3) and (7).
(4)Retain washers (2) and (8).
(5)Remove bolts (1) and (9).
(6)Remove dynamometric rod (4).

C. Preparation of Replacement Component
(1)Make certain that the replacement dynamometric rod is fitted with its retaining fork.

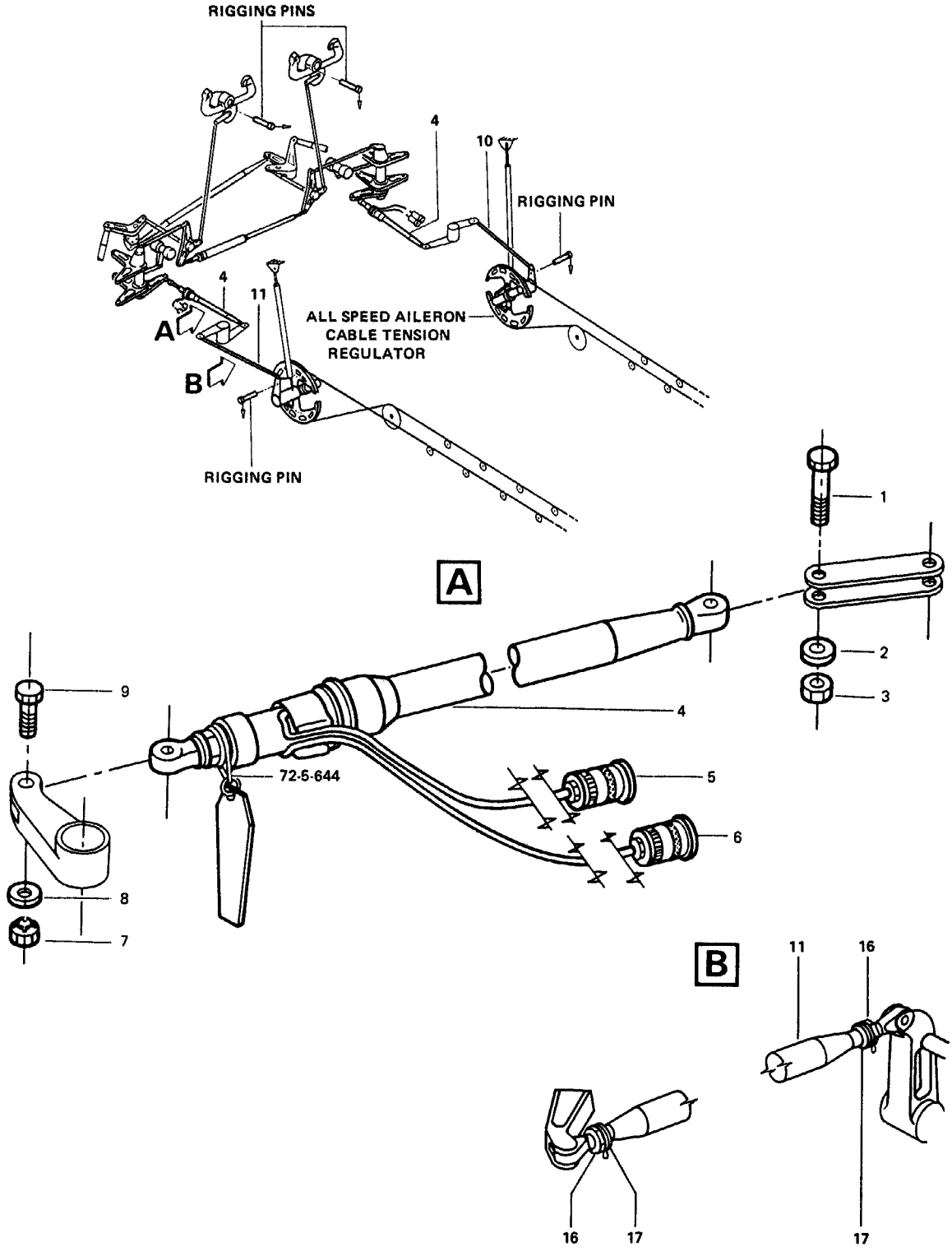
D. Installation
(1)Position dynamometric rod (4) and attach to bellcrank assemblies with bolts (1) and (9).
(2)If required, adjust lenght of rod (11) for left dynamometric rod or (10) for right dynamometric rod as follows :
- Cut and remove lockwire, loosen nuts (16) and free lockwashers (17). Act on adjustable rod (11).
- Engage lockwashers (17), tighten nuts (16) and wirelock.
(3)Install washers (2) and (8) on bolts (1) and (9).
(4)Install nuts (3) and (7) and safety with cotter pins.
(5)Remove protective caps from connectors (5) and (6).
(6)Connect electrical connectors 1090VC-A and 1095VC-A (5) and (6) on dynamometric rod 61CA (1092VC-A and 1097VC-A on dynamometric rod 62CA).
(7)Remove rigging pins and retaining fork from dynamometric rod.

E. Test

ACTION	RESULT
1. Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) Make certain that electronics racks ventilation is correct. racks operates.	
2. Remove safety clips and tags and close circuit breakers 305CA1, 305CA2 and 3CG.	
3. Place flight controls in zero position	

ACTION	RESULT
and check that flaps are retracted.	
4. On glareshield panel engage AP1 in CWS mode (Ref. 22-10-00, P. Block 501).	- Lever remains engaged.
5. Move aileron control wheel to the right then to the left.	- Check that ailerons deflect accordingly - AP1 engage lever remains engaged.
6. On Captain's (First Officer's) aileron control wheel, press AP disconnect pushbutton switch.	- AP1 engage lever falls back in OFF position - AP OFF warnings are activated.
7. Press again AP disconnect pushbutton switch	- warnings disappear.
8. Repeat steps 4 to 7 with AP2.	

F. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Depressurize hydraulic system and disconnect hydraulic ground power supply cart
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Remove warning notices
(5)Close access doors
(6)Remove access platform



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Dynamometric Rod
Figure 401

ASA - PULLEY BRACKET - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITIONS TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

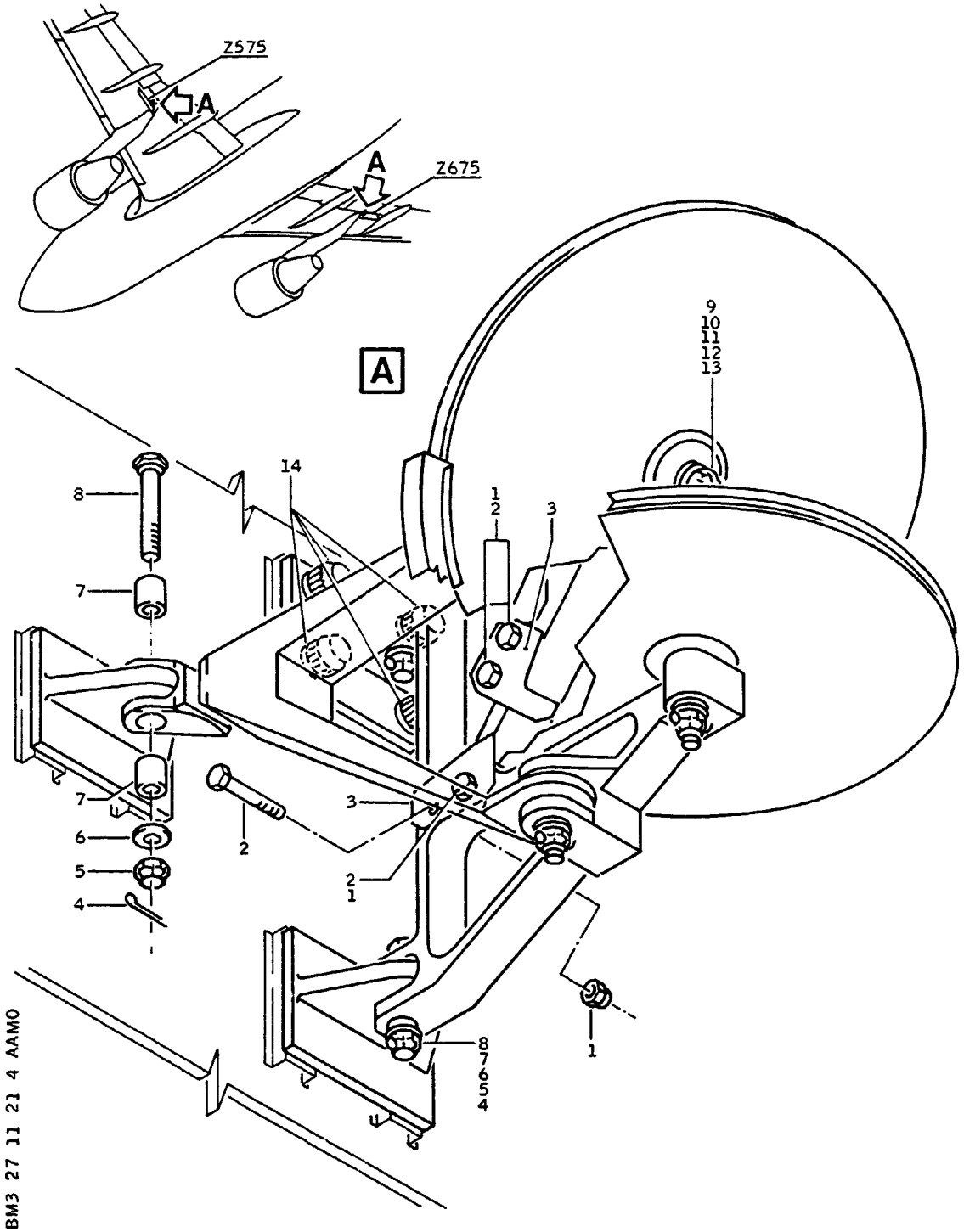
WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27108014000	Rigging Pin - Input Drum, Differential Droop Unit
C. 98A27901000000	Rigging Pin - Aileron Control Wheel
D. 98A27901003000	Rigging Pin - Aileron Control
E. FE101-901	Locking Equipment - Cable Tension Regulator
F.	Safety Barriers
G.	Cotter Pins
H.	Circuit Breaker Safety Clips and Tags
I. Material No. 05-005	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 20-29-11, P. Block 1	Cable Installation
- 24-41-00, P. Block 301	AC External Power Control
- 27-10-00, P. Block 501	Aileron
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Position safety barriers.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Pressurize GREEN, BLUE or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).
(5)Centralize aileron control wheel.
(6)Set aileron trim to zero.
(7)Install rigging pins PN 98A27901000000 in both control wheels.
(8)Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).



Aileron Pulley Assembly
Figure 401

(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(10)Position access platform.
(11)Depressurize hydraulic system pressurized in para. 2.A.(4) (Ref. 29-10-00, P. Block 301).
(12)Open access door 575AB, (675AB).
(13)Open access door 121BL.

B. Removal
(1)Remove nuts (1), bolts (2) and cable guides (3).
(2)Remove turnbuckle safety clips and slacken cables until cable tension regulator locking device can be installed.
(3)Install cable tension regulator locking equipment PN FE101-901.
(4)Slacken cables further and disengage from pulleys.
(5)Support cables on adjacent structure.
(6)Remove and discard cotter pins (4) from center and lower attachment points.
(7)Remove and discard cotter pin (9) and remove nut (10), washer (11), cover plate (12), bolt (13) and upper pulley wheel.
(8)Remove nut (5), washer (6), bolt (8) and bushes (7) from center attachment.
(9)Remove nut (5), washer (6), bolt (8) and bushes (7) from lower attachment.
(10)Support assembly and remove four nuts (14) securing upper attachment to rear spar.
(11)Remove pulley and bracket assembly from aircraft.
NOTE : To ensure correct installation, bag and label attaching parts noting their respective attachment points.

C. Installation
(1)Position pulley and bracket assembly and install four nuts (14) securing upper attachment.
(2)Install lower attachment bushes (7), bolt (8), washer (6) and nut (5).
(3)Adjust length of eye end at centre attachment so that when centre attachment is connected cable run is straight between pulley assembly and differential/droop unit cable drum.
(4)Install centre attachment bushes (7), bolt (8), washer (6) and nut (5).
(5)Safety bolt attachments with cotter pins (4) and apply corrosion preventive (Material No. 05-005) to threads.
(6)Install upper pulley wheel, secure with bolt (13), cover plate (12), washer (11) and nut (10).
(7)Safety with cotter pin (9).

(8)Engage cables on pulleys.
(9)Install cable guides (3), secure with bolts (2) nuts (1).
(10)Adjust cable guides (3) (Ref. 20-29-11, P. Block 1).
(11)Tighten cables sufficiently to allow removal of cable tension regulator locking device.
(12)Remove cable tension regulator locking device.
(13)Tension cables (Ref. 27-10-00, P. Block 501).
(14)Pressurize GREEN, BLUE or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).
(15)Remove safety clips and tags and close circuit breaker 1CB.
(16)Remove control wheel rigging pins.
(17)Operate ailerons over full range five times, check for smooth operation.
(18)Install control wheel rigging pins in both control wheels.
(19)Install cable tension regulator rigging pin PN 98A27901003000.
(20)Check that cable drum rigging pin PN 98A27108014000 can be inserted.
(21)If cable drum rigging pin cannot be inserted, proceed as follows:
(a)Adjust turnbuckles while maintaining correct tension.
(b)Remove rigging pins from cable tension regulator and control wheels.
(c)Repeat steps (17) thru (21).
(22)Install turnbuckle safety clips.
(23)Depressurize hydraulic system pressurized in para. 2.C.(13) above (Ref. 29-10-00, P. Block 301).
(24)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

D. Close-Up
(1)Remove safety clips and tags and close circuit breakers 10CV, 5CV, 6CV, 45CV and 3CG.
(2)Close access door 575AB (675AB).
(3)Close access door 121BL.
(4)Remove access platform.
(5)Remove safety barriers.

AILERON DIFFERENTIAL AND DROOP UNIT - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27108014000	Rigging Pin - Input Drum, Differential Droop Unit
C. 98A27108024000	Rigging Pin - ASA Trim Spindle
D. 98A27108025000	Rigging Pin - Droop Drive Layshaft
E. 98A27901000000	Rigging Pin - Aileron Control Wheel
F. 98A27901003000	Rigging Pin - Aileron Control
G. FE101-901	Locking Equipment - Cable Tension Regulator
H.	Clinometer
I.	Safety Barriers
J.	Cotter Pins
K.	Circuit Breaker Safety Clips and Tags
L.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
M.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
N. Material No. 04-004	Common Greases (Ref. 20-31-00)
O. Material No. 05-005	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 22-13-25, P. Block 401	Autopilot Roll Actuator
- 24-41-00, P. Block 301	AC External Power Control
- 27-10-00, P. Block 501	Aileron
- 27-11-21, P. Block 401	ASA Pulley Bracket
- 27-11-31, P. Block 401	Auto Pilot Detent
- 27-11-34, P. Block 401	Adjustable Lever
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

2. Procedure

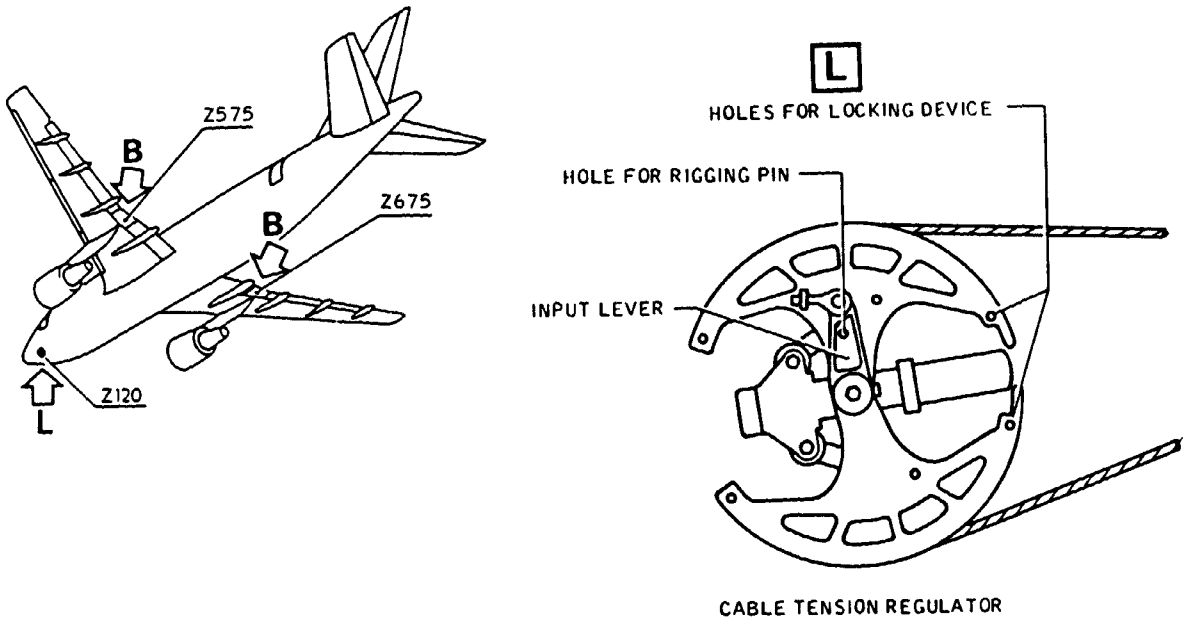
(Ref. Fig. 401)
(Ref. Fig. 402)
(Ref. Fig. 403)

A. Job Set-Up
(1)Position safety barriers.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Pressurize GREEN, BLUE, or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).
(5)Centralize aileron control wheel.
(6)Set aileron trim to zero.
(7)Install rigging pins PN 98A27901000000 in both control wheels.
(8)Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).
(9)Open, safety and tag the following circuit breakers:

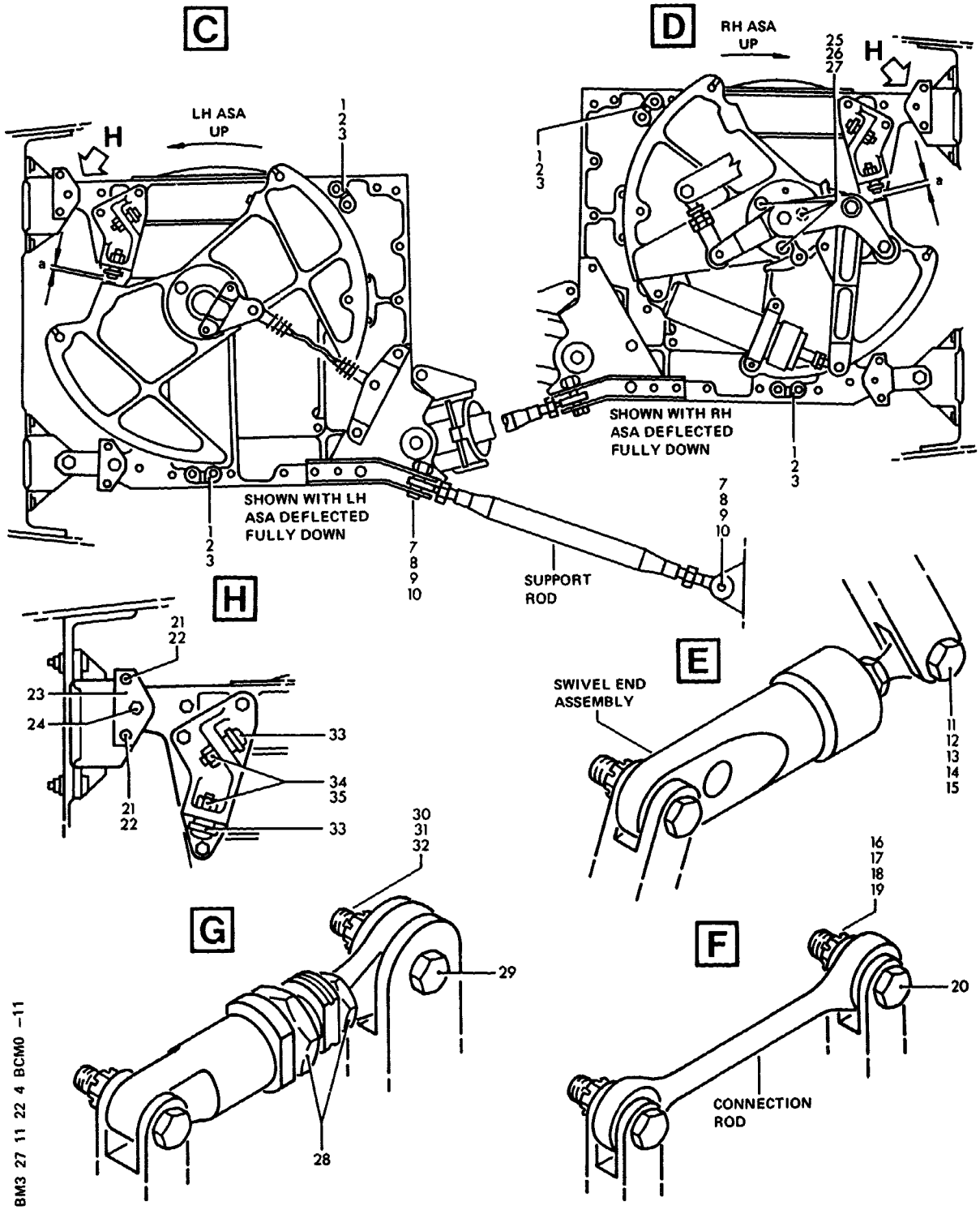
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(10)Position access platform.
(11)Place clinometer on aileron being worked on, and mark location for future reference.
(12)Set clinometer to 0°, and remove.
(13)Depressurize hydraulic system pressurized in para. 2.A.(4) (Ref. 29-10-00, P. Block 301) and ensure other two systems are not pressurized.
(14)Display a warning notice prohibiting pressurization of hydraulic systems.
(15)Open access doors 575AB, 575BB, 575CB (675AB, 675BB, 675CB).
(16)Open access door 121BL.

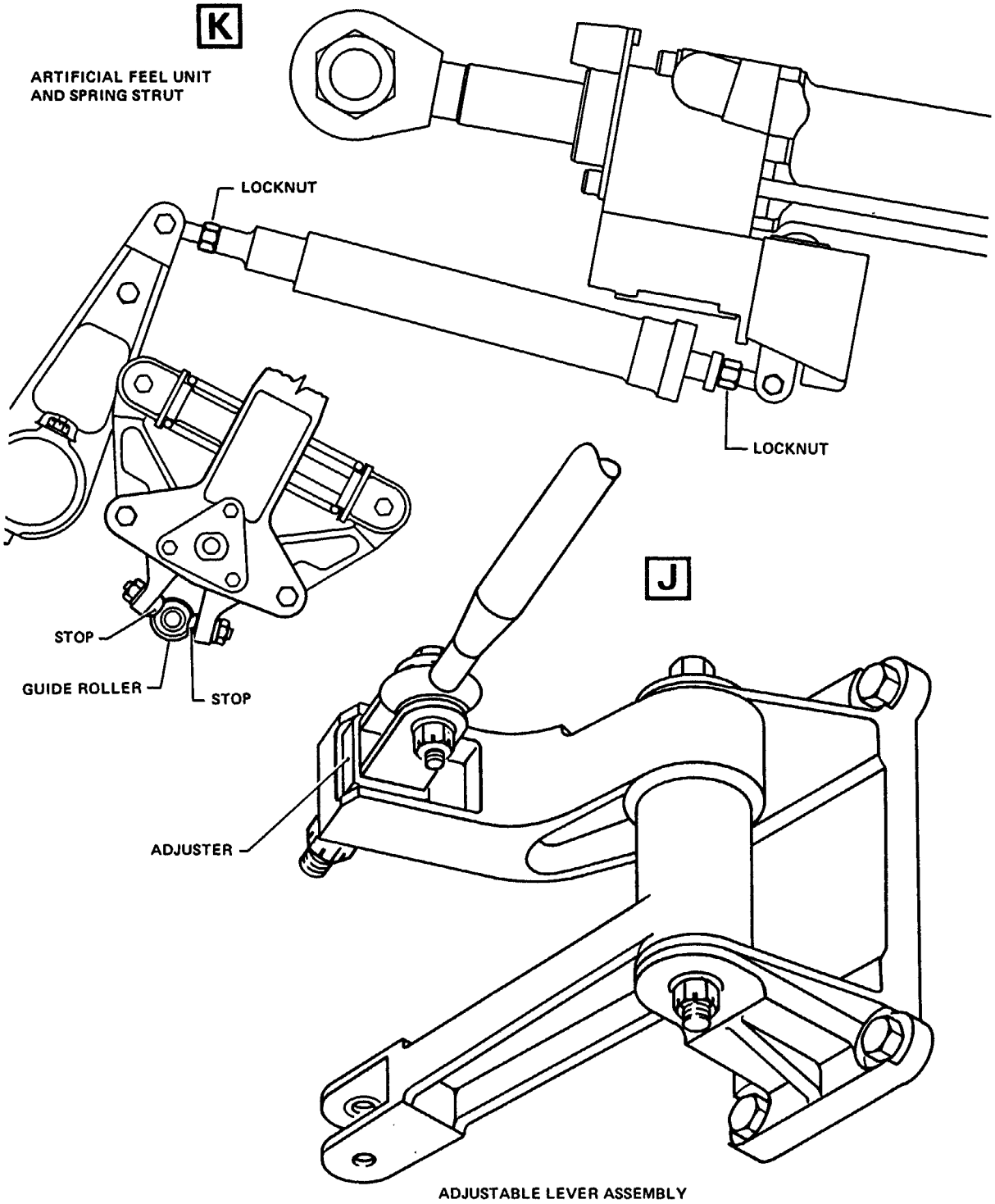
B. Removal
(1)On right wing only, carry out the following procedures:
(a)Removal of the autopilot roll actuator (Ref. 22-13-25, P. Block 401).
(b)Removal of autopilot detent unit (Ref. 27-11-31, P. Block 401).
(2)Install cable tension regulator rigging pin PN 98A27901003000.
(3)Remove safety clips and slacken turnbuckles until cable tension regulator locking device can be installed.
(4)Install cable tension regulator locking device PN FE101-901.
(5)Remove bolts (1), washers (2) and cable guides (3).
(6)Slacken turnbuckles further and disengage cables from cable drum.
(7)Support cables on adjacent structure.
(8)Remove cable pulley and bracket assembly (Ref. 27-11-21, P. Block 401).



Aileron Differential and Droop Unit
Figure 401



Aileron Differential and Droop Unit - Details
Figure 402



ADJUSTABLE LEVER ASSEMBLY

Aileron Differential and Droop Unit - Details
Figure 403

(9)Remove and discard cotter pins (7).
(10)Remove nuts (8), washers (9), bolts (10) and support rod.
(11)Install layshaft rigging pin PN 98A27108025000.
(12)Install trim screwjack rigging pin PN 98A27108024000.
(13)Remove and discard cotter pin (11).
(14)Remove nut (12), washers (13), bush (14), bolt (15) and disconnect swivel end assembly from droop input assembly.
(15)Remove and discard cotter pin (16).
(16)Remove nut (17), washer (18), bush (19) bolt (20) and disconnect connection rod.
(17)Remove bolts (21), washers (22) and secure pin retainers (23).

WARNING : DIFFERENTIAL AND DROOP UNIT WEIGHS 11 kg (25 lb.). DURING REMOVAL TAKE CARE TO AVOID INJURY OR DAMAGE.

(18)Support differential and droop unit and withdraw retaining pins (24).
(19)Remove differential and droop unit from aircraft.

C. Preparation for Installation
(1)Remove bolts (1), washers (2), and cable guides (3) from replacement differential and droop unit.
(2)Adjust quantity of shims on input drum stops to approximately the same amount as on removed unit, install washers (34), nuts (35) on stops (33) but do not fully tighten or safety at this stage.

D. Installation
(1)Position differential and droop unit and insert retaining pins (24).
(2)Install securing pin retaining plates (23), washers (22) and bolts (21).
(3)Apply corrosion preventive (Material No. 05-005) to bolts (21).
(4)Position support rod and make certain that attachment holes are aligned with holes in structure and housing.
(5)If attachment holes do not align proceed as follows:
(a)Cut and discard lockwire on locknuts.
(b)Slacken locknuts and adjust length of support rod.
(c)Tighten locknuts and make certain that rod ends are in safety.
(d)Safety with lockwire.
(6)Install support rod and secure with bolts (10), washers (9), nuts (8), safety with cotter pin (7) and apply corrosion preventive (Material No. 05-005) to end fittings.
(7)On right wing, proceed with installation of autopilot detent assembly (Ref. 27-11-31, P. Block 401).
(8)Install cable drum rigging pin.
(9)Make certain that holes in swivel end assembly and droop input assembly are aligned.
(10)If holes in swivel end assembly and droop input assembly are not aligned proceed as follows:
(a)Cut and discard lockwire on swivel end assembly locknut.
(b)Slacken locknut and adjust length of swivel end assembly to bring holes into alignment.
(c)Make certain swivel end is in safety and tighten locknut.
(d)Safety with lockwire.
(11)Connect swivel end assembly to droop input assembly, secure with bush (14), bolt (15), washer (13), nut (12).

(12)Safety with cotter pin (11) and apply corrosion preventive (Material No. 05-005).
(13)Install cable pulley and bracket assembly (Ref. 27-11-21, P. Block 401).
(14)Assemble connection rod to differential and droop unit output lever, secure with bush (19), nut (17), washer (18), bolt (20).
(15)Safety with cotter pin (16) and apply corrosion preventive (Material No. 05-005).
(16)Remove rigging pins from layshaft and trim screwjack.
(17)Make certain that artificial feel unit is centered with both stops in contact with guide roller.
(18)If artificial feel unit is not centered proceed as follows:
(a)Position clinometer on aileron in same location as 2.A.(11).
(b)Cut and discard lockwire on locknuts of all three spring struts.
(c)Slacken lock-nuts.
NOTE : To prevent "jack fighting" between servocontrols connected to the same aileron, all adjustments to spring struts must be made by lengthening spring strut (aileron deflects downward) and then shortening spring strut so that aileron moves upward to desired position.
(d)Remove safety clip and tag and close circuit breaker 1CB.
(e)Make certain that B, G and Y pushbutton switches on SERVO CTL section of overhead panel 428VU are pressed (OFF legends out).
(f)Remove warning notice prohibiting pressurization of hydraulic system and pressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301).
(g)Adjust center spring strut to position aileron at 0°.
(h)Tighten center spring strut locknuts, check that aileron has not moved from 0° position.
(i)On panel 428VU release G pushbutton switch (OFF legend comes on).
(j)Pressurize BLUE hydraulic system (Ref. 29-10-00, P. Block 301).
(k)Adjust inboard spring strut to position aileron at 0°.
(l)On panel 428VU press G pushbutton switch (OFF legend goes out) and release B pushbutton switch (OFF legend comes on) and check that no aileron movement occurs on system changeover.
(m)If aileron movement occurs on system changeover, on panel 428VU press B pushbutton switch (OFF legend goes out) and release G push-button switch (OFF legend comes on) and repeat steps (k) (l) and (m).
(n)Tighten locknuts on inboard spring strut, taking care not to disturb spring strut adjustment.
(o)On panel 428VU release G pushbutton switch (OFF legend comes on).
(p)Pressurize YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).
(q)Adjust outboard spring strut to position aileron at 0°.
(r)On panel 428VU press G pushbutton switch (OFF legend goes out) and release Y pushbutton switch (OFF legend comes on), check that no aileron movement occurs on system changeover.
(s)If aileron movement occurs on system changeover, on panel 428VU press Y pushbutton switch (OFF legend goes out), release G pushbutton switch (OFF legend comes on) and repeat steps (q) (r) (s).
(t)Tighten locknuts on outboard spring strut, taking care not to disturb spring strut adjustment.
(u)Depressurize GREEN BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).

(v)Safety locknuts on all three spring struts with lockwire.
(19)Remove safety clip and tag and close circuit breaker 1CB (unless already closed at (18)(d) above).
(20)Pressurize GREEN, BLUE and YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).
(21)Remove cable drum rigging pin and manually rotate cable drum to operate aileron fully up, check deflection is 23° +0° -1°.
(22)If aileron deflection does not agree with value at (21) proceed as follows:
(a)Increase or decrease shimming on cable drum stop as required.
(b)Repeat operations (21) and (22).
(23)Tighten cable drum stop locknut and safety with lockwire.
(24)Carry out operations (21) and (22), this time moving aileron fully down and obtaining a deflection of 20° ±0.5°.
(25)Open, safety and tag circuit breaker 1CB.
(26)Remove clinometer.
(27)Engage cables on cable drum.
(28)Install cable guides (3), secure with washer (2) and bolts (1).
(29)Lubricate cable drum assembly with grease (Material No. 04-004).
(30)Tighten cable turnbuckles until cable tension regulator locking device can be removed.
(31)Remove locking device.
(32)Tension cables (Ref. 27-10-00, P. Block 501).
(33)Remove rigging pins from cable tension regulator, cable drum, and control wheels.
(34)Remove safety clip and tag and close circuit breaker 1CB.
(35)Operate control wheel over full range five times, and install control wheel rigging pins in both control wheels.
(36)Install cable tensioner rigging pins.
(37)Make certain that cable drum rigging pin can be inserted.
(38)If cable drum rigging pin cannot be inserted, adjust aileron cable turnbuckles while maintaining correct tension then repeat operations (30) thru (35).
(39)Remove rigging pins from cable drum, tension regulator and control wheels.
(40)Operate aileron to give a full "up" deflection of aileron on side being worked on, check that gap "a" (between down stop and cable drum) on differential and droop unit on other wing is between 0.5 and 3.0 mm (0.02 and 0.12 in.).
(41)Reverse control wheel selection to give full "down" deflection of aileron on side being worked on, check that gap "a" is between 0.5 and 3.0 mm (0.02 and 0.12 in.).
(42)Using clinometer, check that "down" deflection of aileron on side being worked on is 19° ±1°.
(43)Centralize aileron control wheel.
(44)Remove safety clip and tag and close circuit breaker 45CV.
(45)Select slats 15° flaps 0° on flap/slat lever.(Ref. 27-80-00, P. Block 301).
(46)Make certain that artificial feel unit is centered with both stops in contact with guide roller.
(47)If artificial feel unit is not centered, carry out adjustment

procedure (Ref. 27-11-34, P. Block 401).
(48)Retract slats (Ref. 27-80-00, P. Block 301).
(49)Depressurize GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(50)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(51)On right wing proceed with installation of roll autopilot actuator (Ref. 22-13-25, P. Block 401).
(52)On right wing, carry out following procedure:
(a)Install cable drum rigging pin.
(b)Install servomotor rigging pin.
(c)Check alignment of holes in connecting rod and autopilot detent assembly input lever.
(d)If holes are not aligned, cut and discard lockwire, slacken locknuts (28), and adjust length of connecting rod. Make certain rod ends are in safety, tighten locknuts (28) and safety with lockwire.
(e)Attach connecting rod to autopilot detent input lever with bolt (29), washer (30), nut (31).
(f)Safety with cotter pin (32) and apply corrosion preventive (Material No. 05-005).
(53)Remove autopilot servomotor rigging pin.
(54)Remove cable drum rigging pin.

E. Close-Up
(1)Shut down and remove the hydraulic ground power supply.
(2)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00; P. Block 301).
(3)Remove safety clips and tags and close circuit breakers 3CG, 5CV, 6CV and 10CV.
(4)Close access door 121BL.
(5)Close access doors 575AB, 575BB, 575CB (675AB, 675BB, 675CB).
(6)Remove access platform.
(7)Remove safety barriers.

ALL SPEED AILERON SERVOCONTROL ACTUATING SPRING ROD - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27901000000	Rigging Pin - Aileron Control Wheel
C.	Clinometer
D.	Safety Barriers
E.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
F.	Circuit Breaker Safety Clips and Tags
G.	Cotter Pins
H.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
I. Material No. 05-005	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Position safety barriers.

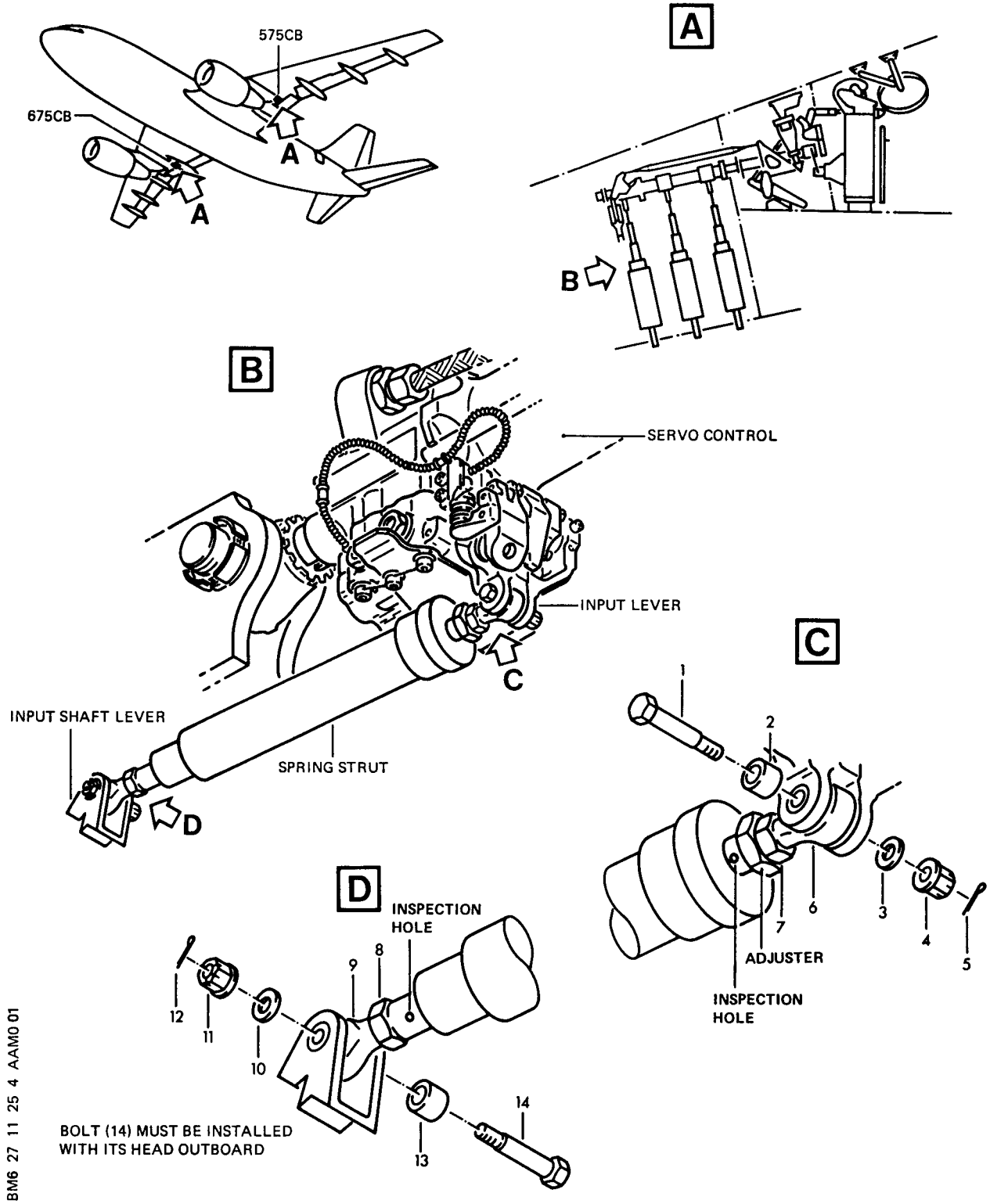
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Make certain that electronics racks ventilation is correct.

(4)Pressurize GREEN, BLUE or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).

(5)Centralize aileron control wheel.

(6)Set aileron trim to zero.



ASA Servocontrol Actuating Spring Rod
Figure 401

R

(7)Install rigging pins PN 98A27901000000 in both control wheels.
(8)Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(10)Position access platform.
(11)Depressurize hydraulic system in para. 2.A.(4) (Ref. 29-10-00, P. Block 301) and ensure other two systems are not pressurized.
(12)Display warning notice prohibiting pressurization of hydraulic systems.
(13)Open access doors 575BT, 575BB, 575CB (675BT, 675BB, 675CB).

B. Removal
(1)Remove and discard cotter pin (5); remove nut (4), washer (3), bolt (1)
R and bush (2). Disconnect spring rod from the input lever of the servo control.
R (2)Remove and discard cotter pin (12); support spring rod; remove nut (11) washer (10), bolt (14) and bush (13).
R (3)Remove spring rod.

C. Installation
R (1)Manually check spring rod by extending and compressing the spring rod.
R Make certain that the spring rod "breaks out" in both directions and return to the neutral condition.
R (2)Position spring rod (barrel end forward) on input shaft lever, install bolt (14), bush (13), washer (10) and nut (11); safety with cotter pin (12).
NOTE: Bolt (14) must be installed with its head outboard.
R (3)Position free end of spring rod on servo control input lever, install bolt (1), bush (2), washer (3) and nut (4); safety with cotter pin (5).

D. Adjustment
NOTE : If all three spring rods have been replaced, proceed with mechanical controls, setting of ailerons to neutral (Ref. 27-11-00, P. Block 501).
NOTE : In the following procedure it is assumed that a BLUE system spring rod has been replaced. Variations for GREEN or YELLOW system spring rods are indicated.
(1)Remove safety clip and tag and close circuit breaker 1CB.
R (2)On SERVO CTL section of overhead panel 428VU, release B pushbutton
R switch (OFF legend comes on) to isolate BLUE system servocontrol (G or Y pushbutton switch to correspond with system being

worked on).

R NOTE : The remaining two pushbutton switches must be pressed.

(3)Remove warning notice prohibiting pressurization of hydraulic systems.
(4)Pressurize GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
R (5)Place clinometer on aileron surface.
R (6)Set clinometer to 0°.
(7)On SERVO CTL section of overhead panel 428VU, press B pushbutton switch (OFF legend goes off) (G or Y pushbutton switches to match system being worked on).
R (8)On SERVO CTL section of overhead panel 428VU, release G and Y push-button switches (OFF legends come on) (for YELLOW system B and G pushbutton switches, for GREEN system B and Y pushbutton switches).
R (9)Check clinometer on aileron that no aileron movement has occurred
R on system changeover.
(10)If movement has occurred, proceed as follows:

R NOTE : If a large amount of travel is to be adjusted, loosen
R locknuts (7) and (8).

R (a)Cut and discard lockwire on locknut (7).
R (b)Slacken locknut (7).
(c)Turn adjuster to lengthen spring rod (aileron moves down) and then shorten spring rod to raise aileron to 0° position.
NOTE : Every adjustment of spring rod length must be carried out by first lengthening and then shortening rod to attain desired aileron position. This eliminates any possibility of "jack fighting" between servocontrols.
(d)On SERVO CTL section of overhead panel 428VU, press G and Y pushbutton switches (OFF legends go off) (B and Y for GREEN system, G and B for YELLOW system).
R (e)On SERVO CTL section of overhead panel 428VU, release B pushbutton
R switch (OFF legend comes on) (G or Y pushbutton switch to match
R system being worked on).
(f)Make certain that aileron has not moved from 0° position on system changeover.
R (g)Repeat steps D.(6) thru D.(10)(f) until no movement occurs on system changeover.
R (h)To check that eye bolts (6) and (9) are in safety, insert a piece
R of wire in the inspection holes and make sure that you can feel shafts
R of eye bolts.
R (j)Remove piece of wire.
R (k)Tighten locknut (7) and safety with lockwire.
(11)Remove clinometer.
R (12)On SERVO CTL section of panel 428VU, press all pushbutton switches
R (OFF legends go off).
(13)Remove rigging pins from both control wheels.
WARNING : BEFORE OPERATING AILERONS, MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACES IS CLEAR.

(14)Operate ailerons over full range of movement, check that operation is satisfactory.
(15)Return ailerons to neutral position.
(16)Depressurize BLUE, GREEN, YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(17)Apply corrosion preventive (Material No. 05-005) to all exposed threads, bolts and adjusters.

E. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access doors 575BT, 575BB and 575CB (675BT , 675BB and 675CB).
(3)Remove access platform.
(4)Remove safety clips and tags and close circuit breakers 5CV, 6CV, 10CV, 45CV, 3CG.
(5)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(6)Remove safety barriers.

ALL SPEED AILERON SERVO CONTROL VALVE SHAFT - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SURFACES THEY OPERATE.

WARNING : MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.

1. Equipment and Materials

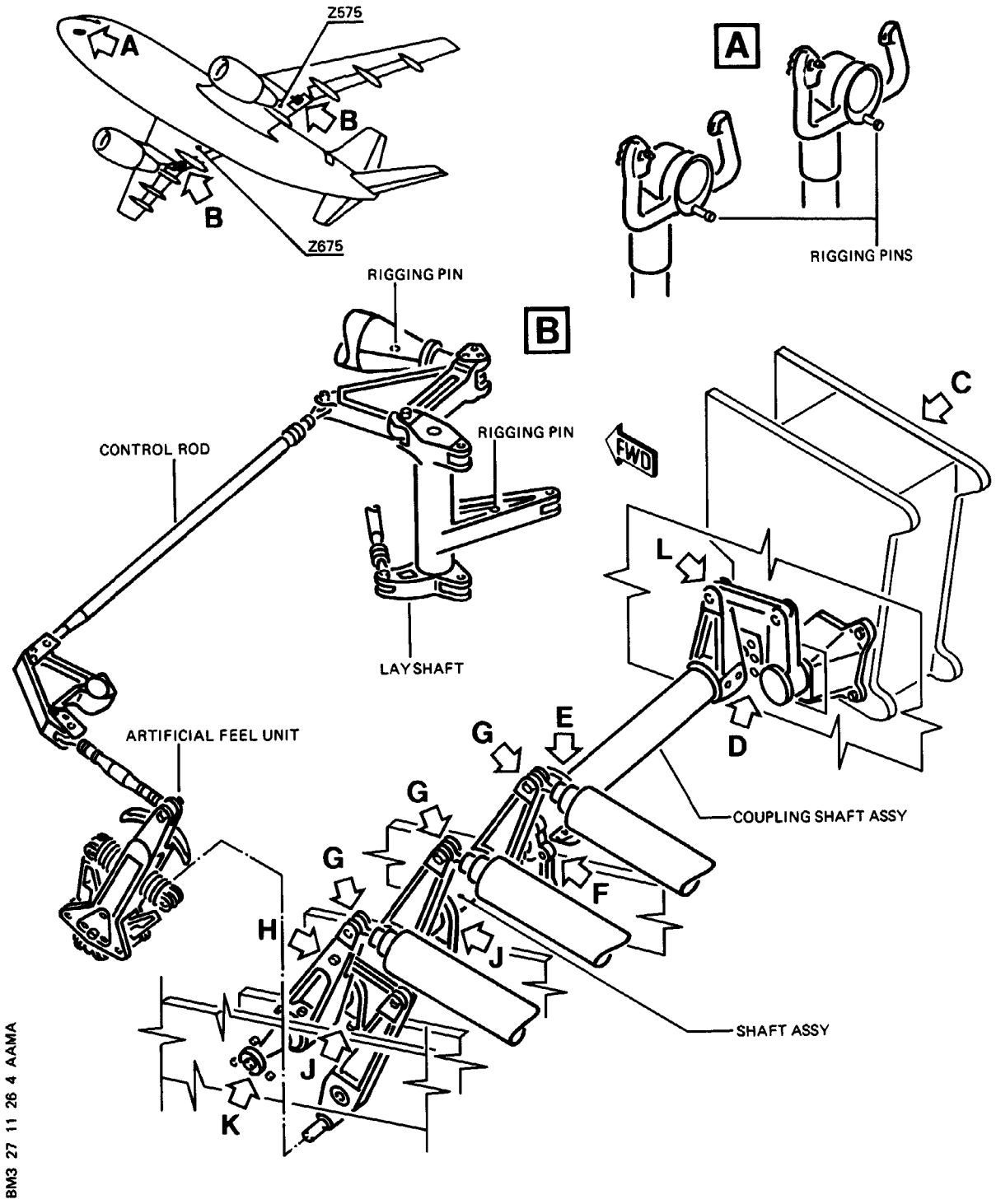
	ITEM	DESIGNATION
R	A.	Access Platform, 3.5 m (11 ft.)
R	B. 98A27108014000	Rigging Pin - Input Drum, Differential Droop Unit
R	C. 98A27108022000	Neutral Setting Jig - All Speed Aileron
R	D. 98A27108024000	Rigging Pin - ASA Trim Spindle
R	E. 98A27108025000	Rigging Pin - Droop Drive Layshaft
R	F. 98A27901000000	Rigging Pin - Aileron Control Wheel
R	G.	Clinometer
R	H.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
R	J.	Cotter Pins
R	K.	Safety Barriers
R	L.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
R	M.	Circuit Breaker Safety Clips and Tags

R Referenced Procedures

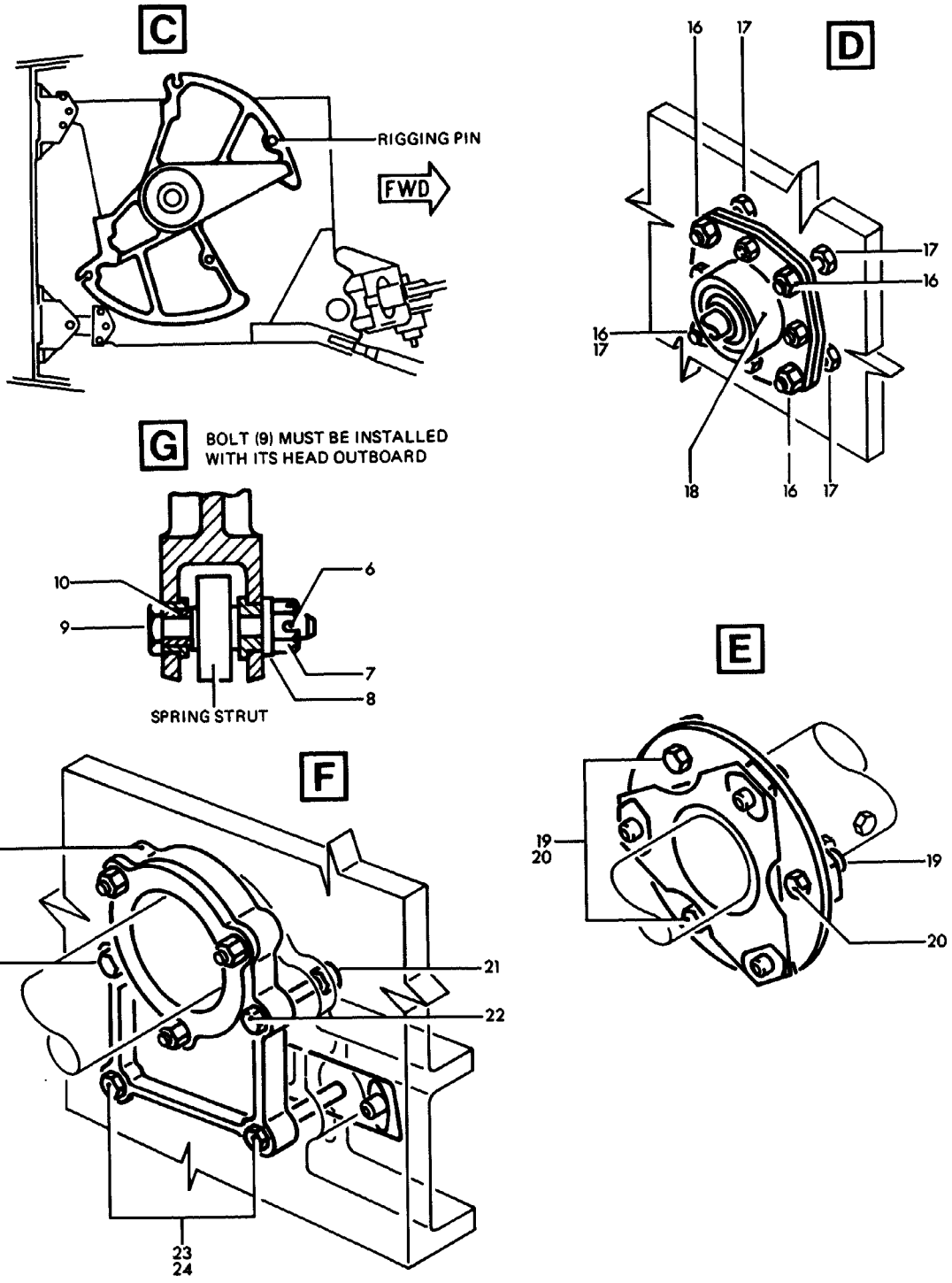
R	- 24-41-00, P. Block 301	AC External Power Control
R	- 27-11-25, P. Block 401	All Speed Aileron Servo Control Actuating Spring Rod
R	- 27-13-13, P. Block 401	Artificial Feel Unit
R	- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
R	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

(Ref. Fig. 401) (Sheet 1/3)
(Ref. Fig. 401) (Sheet 2/3)
(Ref. Fig. 401) (Sheet 3/3)

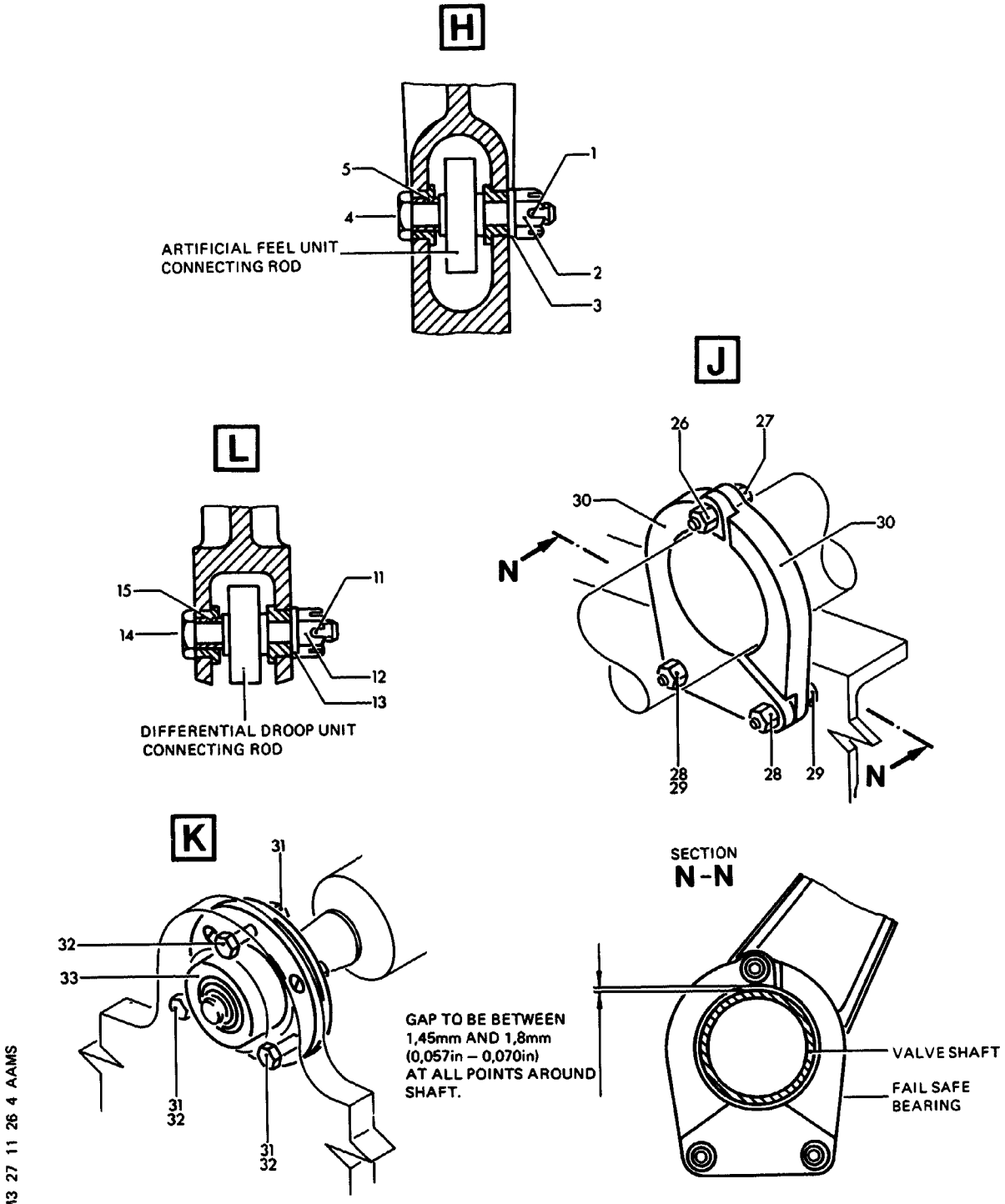
2. Procedure



Valve Shaft Installation (Sheet 1/3)
Figure 401



Valve Shaft Installation (Sheet 2/3)
Figure 401



Valve Shaft Installation (Sheet 3/3)
Figure 401

A. Job Set-Up
(1)Position safety barriers.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Pressurize GREEN, BLUE, or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).
(5)Centralize aileron control wheel.
(6)Set aileron trim to zero.
(7)Install rigging pins PN 98A27901000000 in both control wheels.
(8)Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(10)Position access platform.
(11)Depressurize hydraulic system pressurized in para. 2.A.(4) (Ref. 29-10-00, P. Block 301) and ensure other two systems are not pressurized.
(12)Display warning notice prohibiting pressurization of hydraulic systems.
(13)Open access doors 575BT, 575BB, 575CB (675BT, 675BB, 675CB).
(14)Insert rigging pin PN 98A27108014000 in differential and droop unit.
(15)Insert rigging pin PN 98A27108025000 in layshaft assembly.
(16)Insert rigging pin PN 98A27108024000 in trim screwjack.

B. Removal
(1)Remove and discard cotter pin (1); remove nut (2), washer (3), bolt (4) and bush (5). Disconnect artificial feel unit connecting rod from shaft assembly.
(2)At outboard spring strut, remove and discard cotter pin (6), remove nut (7), washer (8), bolt (9) and bush (10). Disconnect outboard spring strut from shaft assembly.
(3)Repeat step (2) for inboard spring strut.
(4)Repeat step (2) for center spring strut.
(5)Remove and discard cotter pin (11); remove nut (12), washer (13), bolt (14) and bush (15). Disconnect differential and droop unit connecting rod.
(6)Support outboard end of coupling shaft assembly, remove nuts (19) and bolts (20).
(7)Push coupling shaft assembly inboard towards ball bearing assembly (18), incline coupling shaft downwards and withdraw from ball bearing assembly (18).

(8)Remove coupling shaft assembly.
(9)Remove nuts (26) and bolts (27).
(10)Remove nuts (28), bolts (29) and fail-safe bearings (30). Retain mating halves of fail-safe bearings (30) with lockwire.
(11)Remove nuts (21) and bolts (22), support inboard end of shaft assembly, remove nuts (23) and bolts (24).
(12)Push shaft assembly outboard towards ball bearing assembly (33), incline shaft assembly downwards and withdraw from ball bearing assembly (33).
(13)Remove shaft assembly complete with steady bearing (25).
(14)Remove nuts (31), bolts (32) and ball bearing assembly (33).
(15)Remove nuts (16), bolts (17) and ball bearing assembly (18).

C. Installation
(1)Position ball bearing assembly (18) on RIB7A, install bolts (17) and nuts (16).
(2)Position ball bearing assembly (33), install bolts (32) and nuts (31).
(3)Position shaft assembly.
(4)Press outboard end of shaft assembly into ball bearing assembly (33).
(5)Support inboard end of shaft assembly, position steady bearing (25), install bolts (24) and nuts (23). Do not fully tighten at this stage.
(6)Install bolts (22) and nuts (21) and tighten.
(7)Tighten bolts (24) and nuts (23).
(8)Cut and remove lockwire from one fail-safe bearing (30). Position fail-safe bearing (30) on shaft assembly; install bolt (27) and nut (26). Do not fully tighten at this stage.
(9)Position fail-safe bearing (30), install nuts (28) and bolts (29). Do not fully tighten at this stage.
(10)Cut and remove lockwire from other fail-safe bearing (30). Position fail-safe bearing (30) on shaft assembly, install bolt (27) and nut (26). Do not fully tighten at this stage.
(11)Position fail-safe bearing (30), install nuts (28) and bolts (29). Do not fully tighten at this stage.
(12)Position coupling shaft assembly with inboard end adjacent to RIB7A.
(13)Press inboard end of coupling shaft assembly into ball bearing assembly (18).
(14)Support outboard end of coupling shaft assembly against inboard end of shaft assembly, install bolts (20) and nuts (19).
(15)At both fail-safe bearings, check clearance between valve shaft and fail-safe bearing is between 1.45 and 1.8 mm (0.057 and 0.070 in.) around entire circumference of shaft.
(16)Fully tighten nuts (26),(28) and bolts (27),(29) taking care not to disturb adjustment of clearance.
(17)Install neutral setting jig PN 98A27108022000 and make certain that aileron surface is in the neutral position.
(18)Position clinometer on aileron surface and zero clinometer.
(19)Mark position of clinometer on aileron surface to facilitate repositioning and remove clinometer.
(20)Remove neutral setting jig.
(21)Position free end of differential droop unit connecting rod on coupling shaft assembly, install bolt (14), bush (15), washer (13) and nut (12);

safety with cotter pin (11).
(22)Position free end of center spring strut on shaft assembly lever. Check that bolt holes in spring strut rod end align with bolt holes in shaft assembly lever fork end. If bolt holes are not in alignment, adjust length of center spring strut (Ref. 27-11-25, P. Block 401).
(23)Install bolt (9), bush (10), washer (8) and nut (7), safety with cotter pin (6).
NOTE : Bolt (9) must be installed with its head outboard at all locations.
(24)Repeat steps (22) and (23) for inboard spring strut.
(25)Repeat steps (22) and (23) for outboard spring strut.
(26)Position free end of artificial feel unit connecting rod on shaft assembly lever, install bolt (4), bush (5,) washer (3) and nut (2); safety with cotter pin (1).
(27)Check that artificial feel unit has not moved from neutral position. If artificial feel unit has moved from neutral position, adjust length of control rod (Ref. 27-13-13, P. Block 401).

D. Adjustment/Test
(1)Remove rigging pin from trim screwjack.
(2)Remove rigging pin from differential and droop unit.
(3)Remove rigging pin from layshaft assembly.
(4)Remove warning notice prohibiting pressurization of the hydraulic systems.
WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
(5)Pressurize the BLUE, GREEN and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(6)Remove safety clips and tags and close circuit breakers 1CB, 2CB and 3CG.
(7)On SERVO CTL section of panel 428VU, make certain that pushbutton switch G is pressed and the GREEN servo control system is pressurized (OFF legends out). Press and release pushbutton switches Y and B (OFF legends come on).
(8)Place clinometer on aileron surface in position previously marked.
(9)Check that aileron surface has not moved from neutral position.
(10)If aileron surface has moved from neutral position, adjust length of center spring strut (Ref. 27-11-25, P. Block 401).
(11)On SERVO CTL section of panel 428VU:
(a)Press pushbutton switch B to pressurize BLUE servo control system (OFF legends go off).
(b)Press and release pushbutton switch G to de-pressurize GREEN servo control system (OFF legend comes on).
(12)Check that aileron surface has not moved from neutral position.
(13)If aileron surface has moved from neutral position, adjust length of inboard spring strut (Ref. 27-11-25, P. Block 401).
(14)On SERVO CTL section of panel 428VU:
(a)Press pushbutton switch Y to pressurize YELLOW servo control system (OFF legends go off).
(b)Press and release pushbutton switch B to de-pressurize BLUE servo control system (OFF legend comes on).

(15)Check that aileron has not moved from neutral position.
(16)If aileron has moved from neutral position, adjust length of outboard spring strut (Ref. 27-11-25, P. Block 401).
WARNING : MAKE CERTAIN THAT TRAVEL RANGE OF AILERONS AND SPOILERS IS CLEAR.
(17)Remove clinometer.
(18)On SERVO CTL section of panel 428VU, press pushbutton switches B and G to pressurize BLUE and GREEN servo control systems (OFF legends go off).
(19)Remove rigging pins from aileron control wheels.
(20)Turn aileron control wheel over full range, checking that relevant aileron moves in the correct sense and returns to the neutral position.

E. Close-Up
(1)Depressurize BLUE, GREEN and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(2)Remove safety clips and tags and close circuit breakers 10CV, 5CV, 6CV, and 45CV.
(3)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(4)Make certain that work area is clean and clear of tools and miscellaneous items of equipment and close access doors 575BT, 575BB, 575CB (675BT, 675BB, 675CB).
(5)Remove safety barriers.
(6)Remove access platform.

WARNING : LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROL SURFACES - MAKE CERTAIN TRAVEL RANGE IS CLEAR.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Equipment and Materials

	ITEM	DESIGNATION
R	A.	Access Platform 2.0 m to 6.0 m (6 ft. 7 ins.
R		to 19 ft. 8 ins)
	B. 98A27108029000	Hoisting Sling - All Speed Aileron
	C.	Crane
	D. 98A27108015800	Holding Tool - All Speed Aileron Actuator Bolts
	E. SL90.303 - 1.1250	Wrench Notched
	F. SL90.374 - 1.2500	Wrench Notched
	G. SL90.309 - 1.1250	Installation Tool
	H. SL90.313 - 1.2500	Installation Tool
	J. SL90.310 - 1.1250	Extraction Tool
	K. SL90.314 - 1.2500	Extraction Tool
	L. 98A27108030000	Guide Bullet - All Speed Aileron Hinge Line Bolts
	M.	Torque Wrench 130 to 170 lbf.ft (18 to 23 m.daN)
	N.	Torque Wrench 90 to 120 lbf.ft (13 to 17 m.daN)
	P. 98A27108022000	Neutral Setting Jig - All Speed Aileron
	Q. 98A27901000000	Rigging Pin - Aileron Control Wheel
	R.	Warning Notice - Prohibiting Operation of Flight Controls
	S.	Circuit Breaker Safety Clips and Tags
	T.	Trestle
	U.	Clinometer
	V. Material No. 04-004	Common Greases (Ref. 20-31-00)
	W. Material No. 05-005	Special Materials (Ref. 20-31-00)
	X. Material No. 09-001	Sealants (Ref. 20-31-00)
	Referenced Procedures	
	- 20-21-16, P. Block 1	Sta-Lok Nuts and Lockwashers
	- 20-28-11, P. Block 1	Electrical Bonding
	- 24-41-00, P. Block 301	AC External Power Control
R	- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
	- 27-15-00, P. Block 501	Control Surface Position Indicating (Aileron)

ITEM	DESIGNATION
- 27-15-15, P. Block 401	Transmitter - ASA Position
- 27-50-00, P. Block 301	Flaps
- 29-10-00, P. Block 301	Main Hydraulic Power
- 57-51-12, P. Block 401	Trailing Edge - Skins and Plating

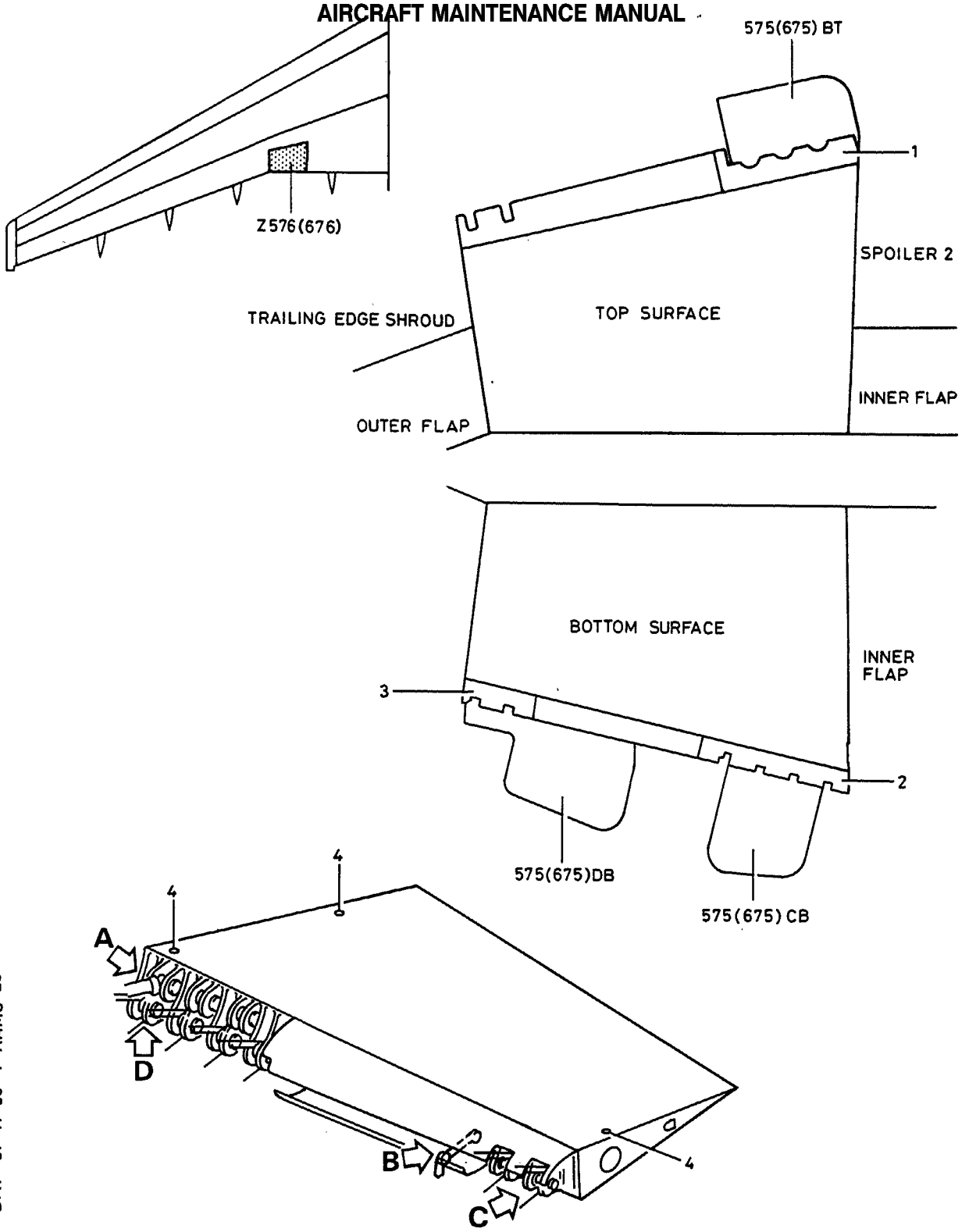
2. Procedure

A. Job Set-Up
(1)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(2)Depressurize all hydraulic systems (Ref. 29-10-00, P. Block 301).
(3)Open, safety, and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/AIL TRIM	3CG	331/V63
133VU	FLT CTL/FLAPS/SYS 1/26 VAC	1CV	335/R61
133VU	FLT CTL/FLAPS/SYS 2/26 VAC	2CV	334/S62
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/FLAPS/ SYS 1	10CV	335/R67
133VU	FLT CTL/FLAPS/WTB	11CV	336/Q66
133VU	FLT CTL/FLAPS/WTB 2	12CV	336/Q67

(4)In flight compartment, display a warning notice prohibiting operation of flight controls.
(5)Position access platform.
(6)Open access doors 575(675) CB, DB and BT.

B. Removal
(Ref. Fig. 401)
(Ref. Fig. 402)
(1)Remove aileron hinge panels (1), (2) and (3).
(2)Remove nuts (10) and (21), washers (22) and bolts (12) and (23). Disconnect bonding leads (11), (24) and (29).
(3)Reverse lifting eyes (4), attach hoisting sling PN98A27108029000 and support aileron with crane.
(4)Using tools PN98A27108015800 SL90.303 - 1.1250 and SL90.310 -1.1250. remove lockwashers (7) and nuts (8) (Ref. 20-21-16, P. Block 1).
(5)Remove bolts (9) and disconnect servo controls (5). Lower servo control carefully onto support brackets.
(6)Remove cotter-pin (15), nut (14) and washer (13A). Disconnect position transmitter link rod (13) from mounting bracket (Ref. 27-15-15, P. Block 401).
(7)Remove nuts (20) and bolts (16). Withdraw locking plates (27) from inboard hinges, and locking plates (17) from outboard hinges.
(8)Using tools SL90.374 - 1.2500 and SL90.314 - 1.2500, remove lockwashers (26) and nuts (25) (Ref. 20-21-16, P. Block 1).
(9)Withdraw inboard hinge bolts (28) and outboard hinge bolts (18). Lift aileron (Wt. approx. 126 lbs. (57 Kg)) clear of wing and place on



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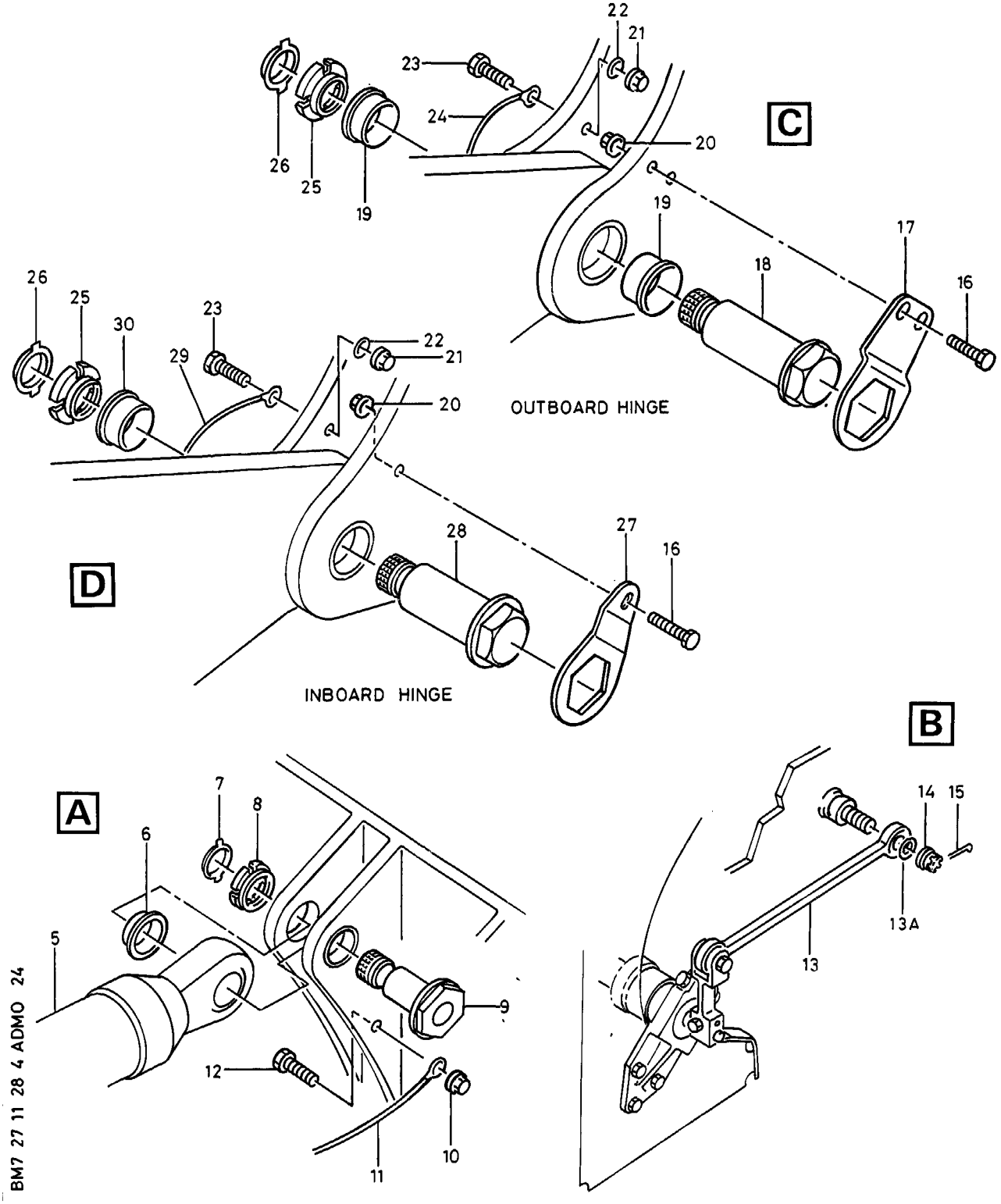
Aileron - Removal/Installation
Figure 401



Attachment Points
Figure 402

trestle. Remove sling and reverse lifting eyes.

(10)If another aileron is to be installed, remove bushes (30), (19) and (6).

C. Preparation of Replacement Component (Ref. Fig. 401, 402)

(1)Remove aileron hinge panels (1), (2) and (3).

(2)Install bushes (30) on each inner hinge bracket, bushes (19) on each outboard hinge bracket, and bushes (6) on each servocontrol attachment bracket. Install with grease (Material No. 04-004).

(3)Reverse lifting eyes (4) and attach sling.

D. Installation (Ref. Fig. 403)

(1)Examine square section seals on ends of ailerons for condition; renew as necessary.

(2)Apply grease (Material No. 04-004) to shanks and under heads of bolts (9), (18) and (28).

(3)Lift aileron (Wt. approx. 126 lb. (57 Kg)) using crane, and position on hinge brackets. Install inboard hinge bolts (28) and outboard hinge bolts (18) using guide bullet PN98A27108030000.

(4)Make certain that brush seals on fixed shrouds are just touching aileron over their full length. If necessary adjust seals (Ref. 57-51-12, P. Block 401).

(5)Apply grease (Material No. 04-004) to underside of nuts (25) and lockwashers (26).

(6)Position heads of bolts (18) and (28) to accept locking plates (17) and (27). Using tool SL90.374 - 1.2500, install nuts (25) (Ref. 20-21-16, P. Block 1), then TORQUE to between 135 and 162 lbf.ft (18.30 and 21.96 m.daN).

(7)Using tool SL90.313 - 1.2500 install lockwashers (26) (Ref. 20-21-16, P. Block 1).

(8)Apply grease (Material No. 04-004) to heads of bolts (28), install locking plates (27) and secure with bolts (16) and nuts (20).

(9)Apply grease (Material No. 04-004) to heads of bolts (18), install locking plates (17) and secure with bolts (16) and nuts (20).

(10)Apply grease (Material No. 04-004) to shanks of bolts (9). Align servo controls (5) with attachment brackets. Install bolts (9), with heads outboard.

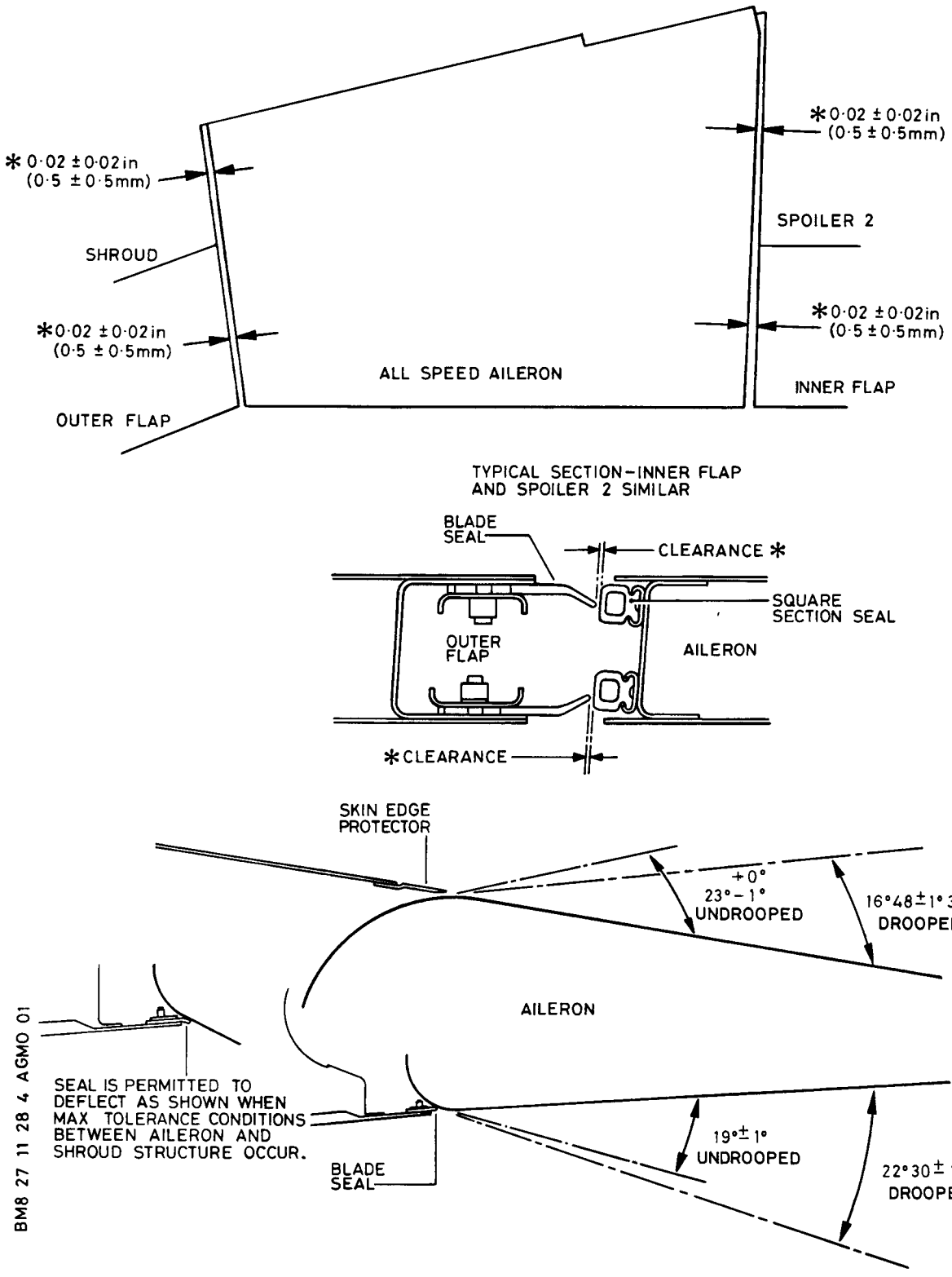
(11)Apply grease (Material No. 04-004) to threads of bolts (9) and contact face of nuts (8).

(12)Using tools PN98A27108015800 and SL90.303 - 1.1250, install nuts (8) (Ref. 20-21-16, P. Block 1). TORQUE to between 98.8 and 111.4 lbf.ft (13.4 and 15.1 m.daN).

(13)Install lockwashers (7) (Ref. 20-21-16, P. Block 1) using tools PN98A27108015800 and SL90.309 - 1.1250.

(14)Coat nuts (8), lockwashers (7) and heads of bolts (9) with corrosion preventive lacquer (Material No. 05-005).

(15)Connect position transmitter link rod (13) to mounting bracket (Ref. 27-15-15, P. Block 401). Install washer (13A) and nut (14) and safety with cotter pin (15).



Clearances and Range of Movement
Figure 403

R

R CAUTION: TO PREVENT CHAFING AND SERVERING OF BONDING LEADS ON ADJACENT
R STRUCTURES, MAKE SURE THAT THE BONDING LEADS ARE INSTALLED IN
R THE CORRECT MANNER AND POSITION (Ref. 20-28-11, P. Block 1).

(16)Connect bonding leads (11), (24) and (29) with bolts (12) and (23), washers (22), and nuts (10) and (21) (Ref. 20-28-11, P. Block 1). Seal
R the bonding connection with sealant (Material No. 09-001).
R (17)Remove hoisting sling PN98A27108029000 and reverse the lifting eyes (4).

E. Preparation for Test

R WARNING: FLIGHT CONTROL SURFACES - MAKE CERTAIN THAT TRAVEL RANGES ARE
R CLEAR.

R (1)Energize the aircraft electrical network and make sure the electronics
R racks are ventilated (Ref. 24-41-00, P. Block 301).
(2)Pressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(3)On panel 133VU, remove safety clips and tags and close circuit breakers 3CG(331/V63),1CV(335/R61),2CV(334/S62),5CV(332/U61),6CV(331/V61) 10CV(335/R67), 11CV (336/Q66) and 12CV (336/Q67).
R (4)Fully retract the flaps and slats (Ref. 27-50-00, P. Block 301).
R (5)Make sure that the two pilots aileron control-wheels are at zero and
R insert the rigging pin PN98A27901000000.
R (6)On panel 428VU, make sure that the SERVO CTL B, G and Y P/BSW's are
R pressed (in), and that the OFF, JAM and LO PR legends are off.
R (7)Install the aileron neutral-setting jig PN98A27108022000.

F. Adjustment (Ref. Fig. 403)

NOTE : Make certain aileron neutral setting jig PN98A27108022000 is set to the "after mod.5130" position as marked.

(1)With aileron in neutral position, check clearances are within limits shown on the figure. If necessary, adjust seals to obtain correct clearances.
(2)On panel 428VU, release SERVO CTL B and SERVO CTL Y pushbutton switches.
(3)Make certain that aileron is in neutral position (0°). If necessary, extend center servo control spring rod to lower aileron below 0 deg., then shorten spring rod to bring aileron to neutral. Tighten locknuts.
(4)On panel 428VU, press SERVO CTL Y pushbutton switch and immediately release SERVO CTL G pushbutton switch. Make certain that aileron does not move during system changeover. If movement occurs, extend outer servo control spring rod to lower aileron below 0 deg. position, then shorten spring rod to bring aileron back to 0 deg. Tighten locknuts.
(5)On panel 428VU, press SERVO CTL G pushbutton switch and immediately release SERVO CTL Y pushbutton switch. Make certain that aileron does not move during system changeover. If movement occurs, repeat steps (4) and (5).
(6)On panel 428VU, press SERVO CTL B pushbutton switch and immediately release SERVO CTL G pushbutton switch. Make certain that aileron does not move during system changeover. If movement occurs, extend

inner servo control spring rod to lower aileron below 0 deg., then shorten to bring aileron back to 0 deg. Tighten locknuts.

(7) On panel 428VU, press SERVO CTL G pushbutton switch and immediately release SERVO CTL B pushbutton switch. Make certain that aileron does not move during system changeover. If movement occurs, repeat steps (6) and (7).

(8) On panel 428VU, press SERVO CTL B and Y pushbutton switches. Make certain that aileron 0 deg. position is maintained. If aileron is out of position, repeat adjustment of spring rods (steps 2 thru 8). When spring rod adjustment is satisfactory, safety with lockwire.

(9) Activate ECAM display units:

(a) On flight compartment center pedestal press in SGU 1 and 2 pushbutton switches.

(b) Turn left and right DISPLAY rotary switches clockwise to switch on display and adjust brightness to required level.

(c) Press F/CTL pushbutton switch.

(10) On right ECAM display, make certain that associated aileron position indicator shows 0 deg. If necessary, adjust position transmitter to obtain correct indication (Ref. 27-15-00, P. Block 501).

(11) Remove aileron neutral setting jig.

G. Test (Ref. Fig. 403)

R (1) Put the clinometer in position on the aileron upper surface, and note the surface angle with the aileron in the neutral position. Mark the position of the clinometer for use in subsequent measurements.

R (2) Remove the warning notice from the flight compartment.

R WARNING: FLIGHT CONTROL SURFACES - MAKE SURE THAT THE TRAVEL RANGES ARE CLEAR.

R (3) Remove the rigging pin PN98A27901000000 and operate the aileron control wheel through the full travel range. Make sure that movement of the aileron and the position indicator both agree.

R CAUTION: TO PREVENT CHAFING AND SEVERING OF BONDING LEADS ON ADJACENT STRUCTURES, MAKE SURE THAT THE BONDING LEADS ARE INSTALLED IN THE CORRECT MANNER AND POSITION (Ref. 20-28-11 P. BLOCK 1).

R (4) At the aileron, make sure that the range of movement is within the limits given on the figure (undrooped). Examine for freedom of movement and make sure that bonding leads do not catch or strain (Ref. 27-11-00, P. Block 501).

R (5) Fully extend the flaps and slats, (Ref. 27-50-00, P. Block 301).

R (6) Operate the aileron control wheel through the full travel range. Make sure that movement of the aileron and the position indicator agree.

R (7) At the aileron, make sure that the range of movement is within the limits given on the figure (drooped). Examine for freedom of movement and make sure that bonding leads do not catch or strain (Ref. 27-11-00, P. Block 501).

R (8) Install the aileron hinge panels (1), (2) and (3) and the access doors

R 575 (675) CB, DB and BT. Make sure that all brush seals just touch the
R aileron through the full travel range.
R (9)Fully retract the flaps and slats, (Ref. 27-50-00, P. Block 301).
R (10)On the center pedestal ECAM control panel, release the F/CTL P/BSW.
R (11)Turn the ECAM left and right DISPLAY rotary switches to OFF.
R (12)Release the SGU 1 and 2 P/BSW's.

H. Close-Up
R (1)De-pressurize the hydraulic systems (Ref. 29-10-00, P. Block 301).
R (2)De-energize the aircraft electrical network (Ref. 24-41-00,
R P. Block 301).
R (3)Make sure that the work area is clean and clear of tools and
miscellaneous items of equipment.
R (4)Remove the access platform.

1. Reason for the Job

A. Check of fits and clearances
With removal - Table of Fits and Clearances
(Ref. Fig. 601)

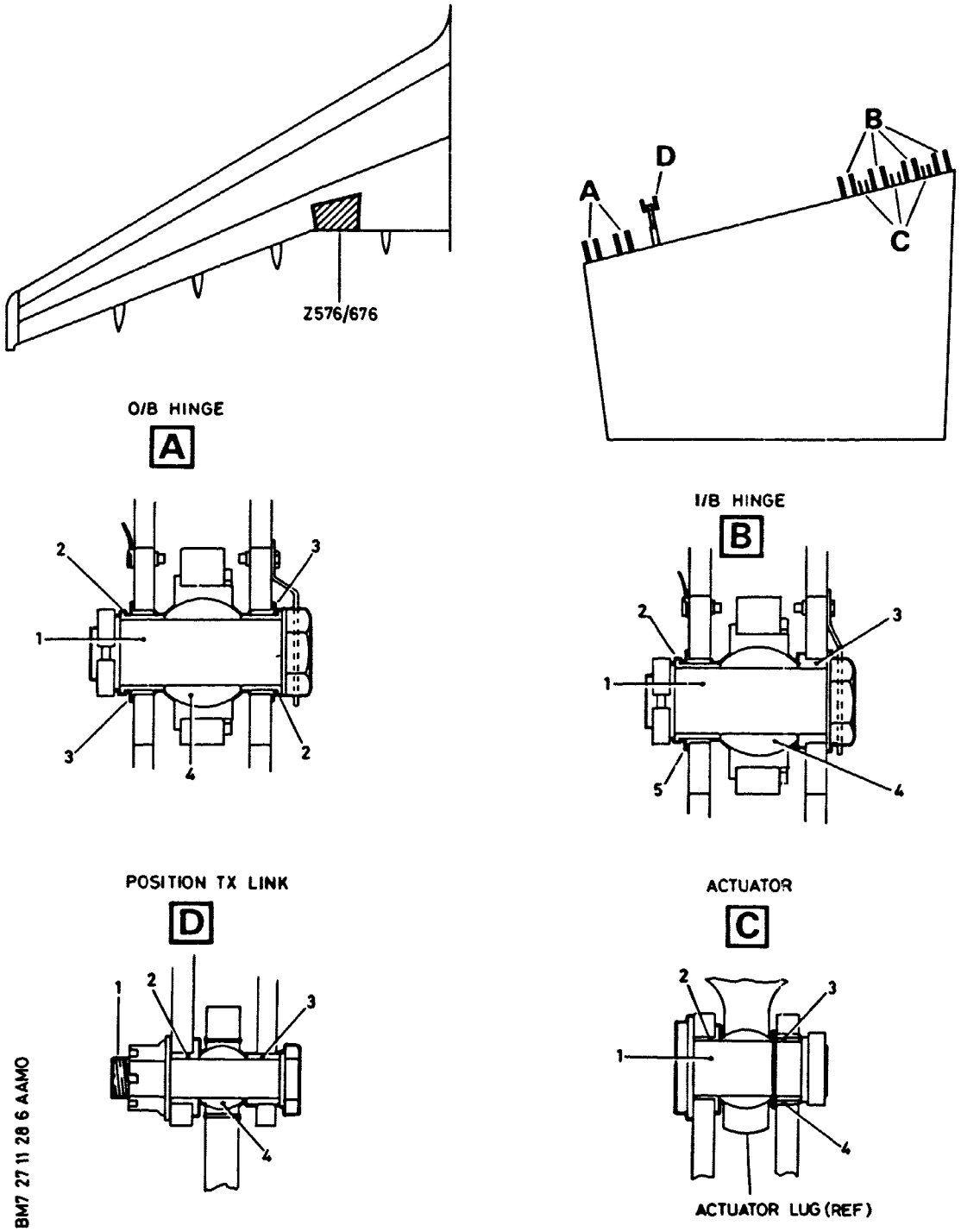
NOTE : Limits annotated with an asterisk *, only apply while there is a thickness of chrome plating remaining on the bearing surfaces.

R

Detail and Item No.	Original Mfg Limits				In Service Wear Limits		
	Dimension inches (Millimeters)		Assy. Clearance Inch.(Milli.)		Dimension Limits Inch.(Milli.)		Max. Allow clear in. (mm)
	Min.	Max.	Min.	Max.	Min.	Max.	
A							
OD1	1.4985 (38.062)	1.4991 (38.077)			1.4975 (38.037)		
			0.0004 (0.010)	0.0020 (0.051)	*		0.0040 (0.102)
ID2	1.4995 (38.087)	1.5005 (38.113)				1.5015 (38.138)	
OD1	1.4985 (38.062)	1.4991 (38.077)			1.4975 (38.037)		
			0.0004 (0.010)	0.0015 (0.038)	*		0.0035 (0.089)
ID4	1.4995 (38.087)	1.5000 (38.100)				1.5010 (38.125)	
OD2	1.6865 (42.837)	1.6871 (42.852)			1.6855 (42.812)		
			0.0008 (0.020)	0.0020 (0.051)			0.0040 (0.102)
ID3	1.6879 (42.873)	1.6885 (42.888)				1.6895 (42.913)	
B							
OD1	1.4985 (8.062)	1.4991 (38.077)			1.4975 (38.037)		
			0.0004 (0.010)	0.0020 (0.051)	*		0.0040 (0.102)
ID2	1.4995 (38.087)	1.5005 (38.113)				1.5010 (38.125)	
OD1	1.4985 (38.062)	1.4991 (38.077)			1.4975 (38.037)		
			0.0005 (0.013)	0.0014 (0.036)	*		0.0035 (0.089)
ID3	1.4996	1.4999				1.5010	

R

Detail and Item No.	Original Mfg Limits				In Service Wear Limits		
	Dimension inches (Millimeters)		Assy. Clearance Inch.(Milli.)		Dimension Limits Inch.(Milli.)		Max. Allow clear
	Min.	Max.	Min.	Max.	Min.	Max.	in. (mm)
	(38.090)	(38.097)				(38.125)	



Aileron Fits and Clearances
Figure 601

Detail and Item No.	Original Mfg Limits				In Service Wear Limits		
	Dimension inches (Millimeters)		Assy. Clearance Inch.(Milli.)		Dimension Limits Inch.(Milli.)		Max. Allow clear in. (mm)
	Min.	Max.	Min.	Max.	Min.	Max.	
OD1	1.4985 (38.062)	1.4991 (38.077)			1.4975 (38.037)		
			0.0004 (0.010)	0.0015 (0.038)	*		0.0035 (0.089)
ID4	1.4995 (38.087)	1.5000 (38.100)				1.5010 (38.125)	
OD2	1.6865 (42.8371)	1.6871 (42.8521)			1.6855 (42.812)		
			0.0008 (0.020)	0.0020 (0.051)			0.0040 (0.102)
ID5	1.6879 (42.873)	1.6885 (42.888)				1.6895 (42.913)	
C							
OD1	1.2488 (31.720)	1.2493 (31.732)			1.2480 (31.670)		
			0.0003 (0.008)	0.0011 (0.028)			0.0025 (0.064)
ID2	1.2496 (31.740)	1.2499 (31.747)				1.2505 (31.763)	
OD1	1.2488 (31.720)	1.2493 (31.732)			1.2480 (31.670)		
			0.0007 (0.018)	0.0022 (0.055)			0.0040 (0.102)
ID3	1.2500 (31.750)	1.2510 (31.775)				1.2520 (31.801)	
OD3	1.4374	1.4384			1.4365		

Detail and Item No.	Original Mfg Limits				In Service Wear Limits		
	Dimension inches (Millimeters)		Assy. Clearance Inch.(Milli.)		Dimension Limits Inch.(Milli.)		Max. Allow clear
	Min.	Max.	Min.	Max.	Min.	Max.	in. (mm)
	(36.510)	(36.535)			(36.487)		
			0.0005 (0.013)	0.0008 (0.020)			0.0020 (0.051)
ID4	1.4376 (36.515)	1.4379 (36.523)				1.4385 (36.538)	
D							
OD1	0.1885 (4.788)	0.1895 (4.813)			0.1875 (4.763)		
			0.0003 (0.008)	0.0020 (0.051)			0.0040 (0.102)
ID2 3	0.1898 (4.821)	0.1905 (4.839)				0.1915 (4.864)	

Detail and Item No.	Original Mfg Limits				In Service Wear Limits		
	Dimension inches (Millimeters)		Assy. Clearance Inch.(Milli.)		Dimension Limits Inch.(Milli.)		Max. Allow clear
	Min.	Max.	Min.	Max.	Min.	Max.	in. (mm)
OD1	0.1885 (4.788)	0.1895 (4.813)			0.1875 (4.763)		
			0.0000 (0.000)	0.0015 (0.038)			0.0030 (0.076)
ID4	0.1895 (4.813)	0.1900 (4.826)				0.1905 (4.839)	

AUTOPILOT DETENT UNIT - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED. BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

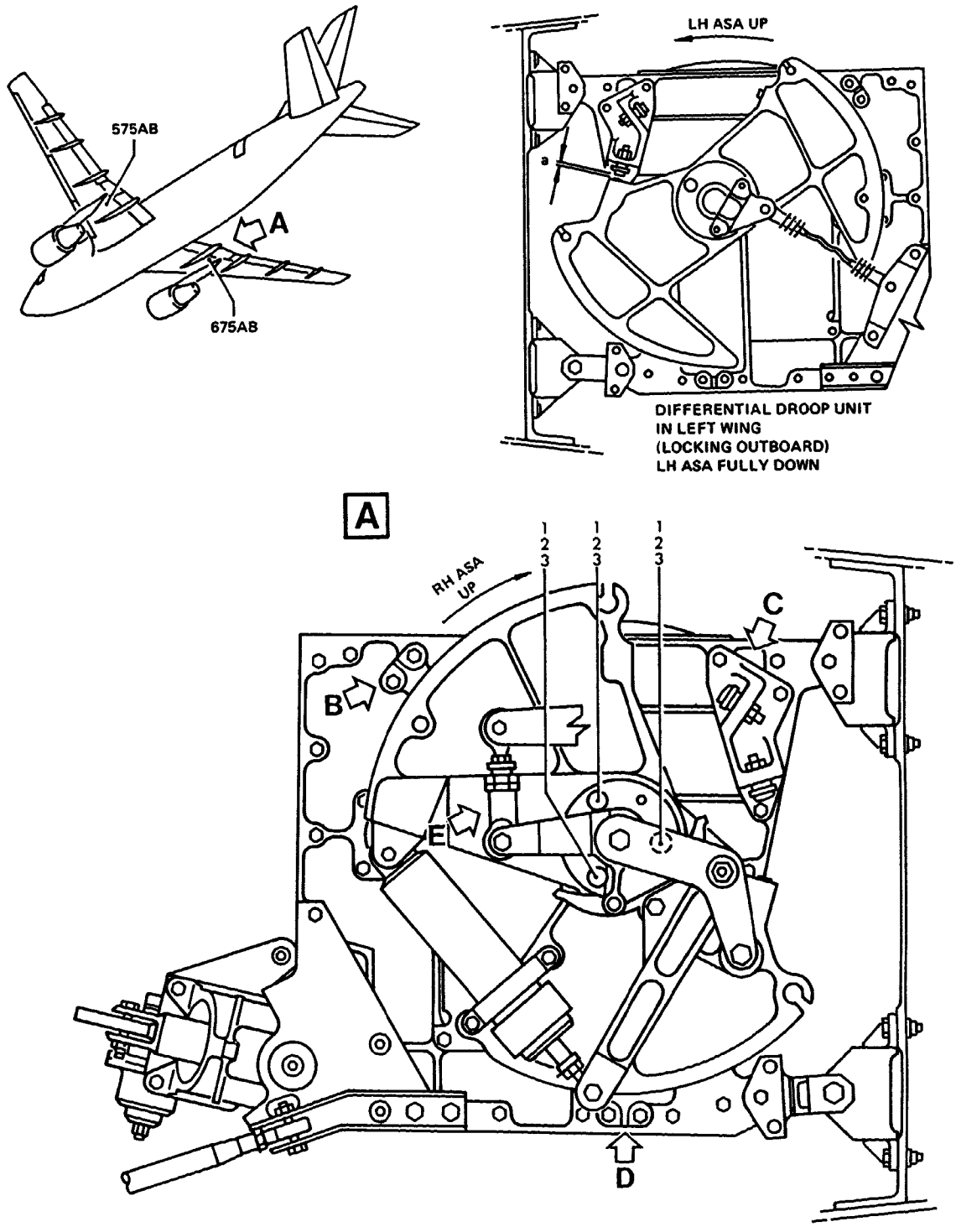
CAUTION : ANY COMPONENT REPLACEMENT ON THE AUTOPILOT DETENT UNIT REQUIRES SETTING UP OF BREAKOUT FORCES WHICH CAN ONLY BE CARRIED OUT IN AN OVERHAUL FACILITY.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27108014000	Rigging Pin - Input Drum, Differential Droop Unit
C. 98A27901000000	Rigging Pin - Aileron Control Wheel
D. 98A27901003000	Rigging Pin - Aileron Control
E. FE101-901	Locking Equipment - Cable Tension Regulator
F. 98A27207543000	Rigging Pin
G.	Clinometer
H.	Circuit Breaker Safety Clips and Tags
I.	Safety Barriers
J.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
K.	Cotter Pins
L.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
M. Material No. 04-004	Common Greases (Ref. 20-31-00)
N. Material No. 05-005	Special Materials (Ref. 20-31-00)
O. Material No. 09-003	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 22-13-25, P. Block 401	Autopilot Roll Actuator
- 24-41-00, P. Block 301	AC External Power Control
- 27-10-00, P. Block 501	Aileron
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

2. Procedure

(Ref. Fig. 401)



Roll Autopilot Detent Unit
Figure 401

(Ref. Fig. 402)

A. Job Set-Up

(1)Position safety barriers.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Pressurize GREEN, BLUE, or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).
(5)Centralize aileron control wheel.
(6)Set aileron trim to zero.
(7)Install rigging pins PN 98A27901000000 in both control wheels.
(8)Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL ! THS/HYD/SEL	1CB	332/U63

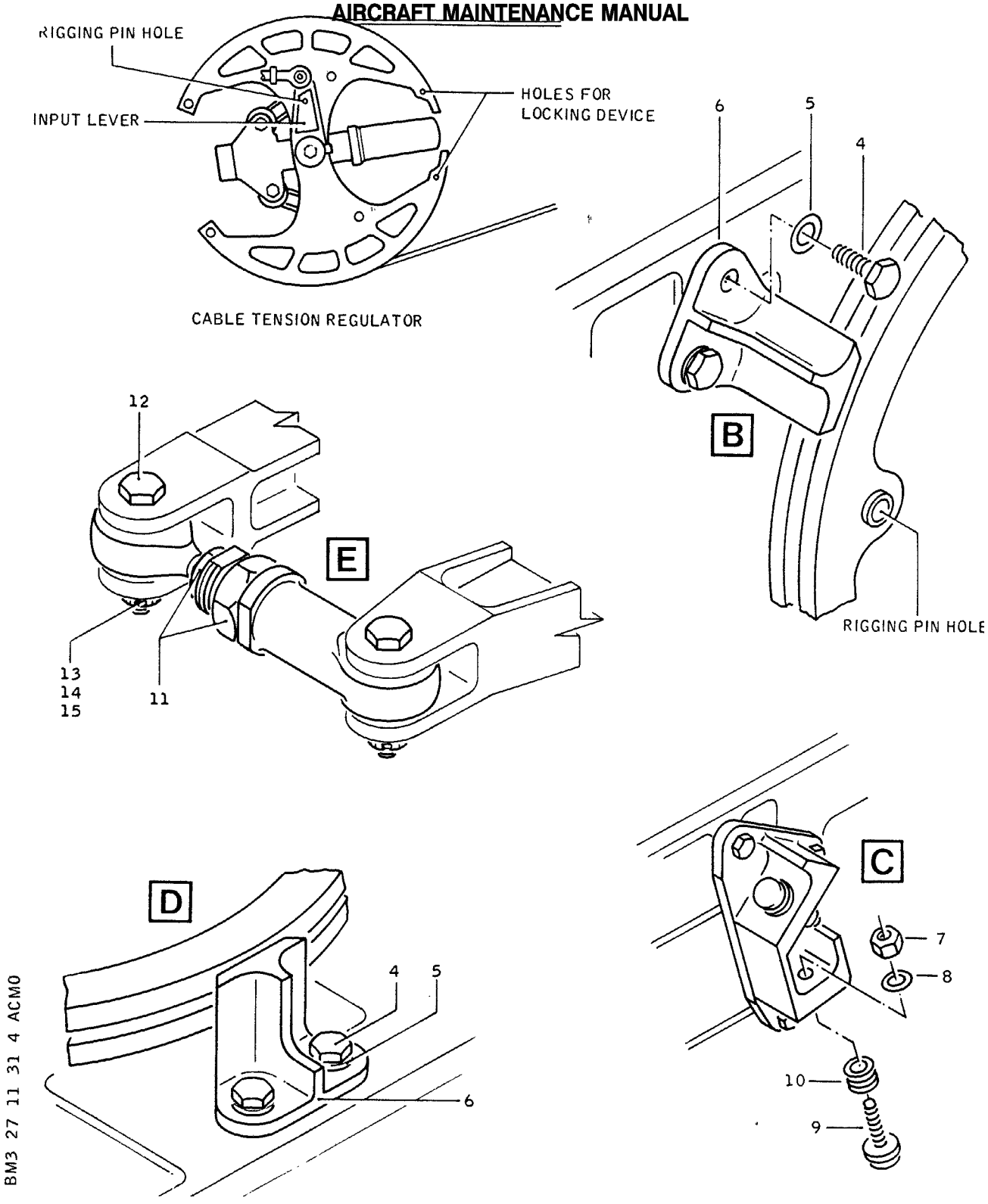
(10)Position access platform.
(11)Depressurize hydraulic system pressurized in para. 2.A.(4) and ensure other two systems are not pressurized (Ref. 29-10-00, P. Block 301).
(12)Display warning notice prohibiting pressurization of hydraulic systems.
(13)Open access door 675AB.
(14)Open access door 121BL.
(15)Install rigging pin PN 98A27901003000 in cable tension regulator.
(16)Remove autopilot roll actuator (Ref. 22-13-25, P. Block 401).
(17)Install rigging pin PN 98A27108014000 in cable drum.

B. Removal

(1)Remove safety clips and slacken turnbuckles until cable tension regulator locking device PN FE101-901 can be installed.
(2)Install cable tension regulator locking device.
(3)Remove bolts (4) washers (5) and cable guides (6).
(4)Slacken turnbuckles and disengage cables from drum.
(5)Support cables on adjacent structure.
(6)Remove and discard cotter pins (1), and remove nuts (2) and washers (3) securing detent assembly.
(7)Remove rigging pin from cable drum.
(8)Remove detent assembly from aircraft.

C. Installation

(1)Position detent assembly and secure with washers (3) and nuts (2).
(2)Safety with cotter pins (1).
(3)Engage cables in cable drum.



Roll Autopilot Detent Unit
Figure 402

(4)Lubricate all moving parts with grease (Material No. 04-004).
(5)Install cable guides (6) securing with washers (5) and bolts (4).
(6)Install rigging pin PN 98A27108014000 in cable drum.
(7)Tighten aileron cables until locking device can be removed from tension regulator.
(8)Tension cables (Ref. 27-10-00, P. Block 501).
(9)Remove rigging pins from cable drum and tension regulator.
(10)Remove warning notice prohibiting pressurization of hydraulic systems and pressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301).
(11)Remove tags and safety clips and close circuit breakers 1CB and 2CB.
(12)Remove rigging pin from aileron control wheel.
(13)Operate ailerons over full range five times.
(14)Centralize aileron control wheel and install rigging pin in control wheel.
(15)Depressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301).
(16)Install rigging pin PN 98A27901003000 in cable tension regulator.
(17)Check that rigging pin PN 98A27108014000 can be inserted in cable drum.
(18)If cable drum rigging pin cannot be inserted, adjust aileron cables while maintaining correct tension, remove rigging pins from cable drum and tension regulator, then repeat operations (10) thru (18).
(19)Make certain that turnbuckles are in safety and install safety clips.
(20)Remove rigging pins from cable drum, tension regulator and aileron control wheel.
(21)Install clinometer on aileron.
NOTE : Clinometer must be aligned at 90° to aileron hinge line.
(22)Pressurize GREEN, BLUE YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(23)Operate aileron control wheel to give full 'up' deflection of right aileron.
(24)Check that deflection of aileron is 23° +0° -1°.
(25)If above deflection is not obtained, proceed as follows;
(a)Centralize aileron control wheel and install rigging pin.
(b)On 'up' stop, cut and discard lockwire, remove nut (7) washer (8).
(c)Remove stop (9) and add or subtract shims (10) as necessary.
(d)Install stop (9) washer (8) nut (7).
(e)Remove rigging pin from aileron control wheel.
(f)Repeat operations C.(23) thru C.(25) until correct aileron deflection is obtained.
(g)Tighten nut (7) and safety with lockwire.
(26)With right aileron held at full 'up' deflection, check that gap "a" (between 'down' stop and cable drum) on left wing differential/droop unit is between 0.5 and 3.0 mm (0.02 and 0.12 in.).
(27)Operate aileron control wheel to give full 'down' deflection of right aileron and check "up" stop on left wing differential and droop unit is in contact.
(28)Check that deflection is 19° ±1° and that gap "a" on right differential/droop unit is between 0.5 and 3.0 mm (0.02 and 0.12 in.).
(29)If gap is incorrect, carry out operations (25)(a) thru (25)(e) on right wing differential and droop unit "down" stop until correct gap is obtained, then tighten nut (7) and safety with lockwire.
(30)Depressurize GREEN, BLUE, YELLOW hydraulic systems (Ref. 29-10-00,

P. Block 301).
(31)Remove clinometer.
(32)Install autopilot roll actuator (Ref. 22-13-25, P. Block 401).
(33)Install autopilot roll actuator rigging pin PN 98A27207543000.
(34)Install cable drum rigging pin.
(35)Slacken locknuts (11) and adjust length of connecting rod between autopilot roll actuator and detent assembly until hole in eye end is aligned with hole in detent input lever.
(36)Tighten locknuts (11) and safety with lockwire.
(37)Secure connecting rod to detent input lever using bolt (12) washer (13) nut (14) and safety with cotter pin (15).
(38)Apply corrosion preventive (Material No. 05-005) to nut (13) and bolt (14).
(39)Remove rigging pins from cable drum and autopilot roll actuator.

D. Close-Up
(1)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(2)Shut down and remove hydraulic ground power supply.
(3)Close access doors 675AB, 121BL.
(4)Remove safety clips and tags and close circuit breakers 10CV, 5CV, 6CV, 45CV and 3CG.
(5)Remove access platform.
(6)Remove safety barriers.

LAYSHAFT - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

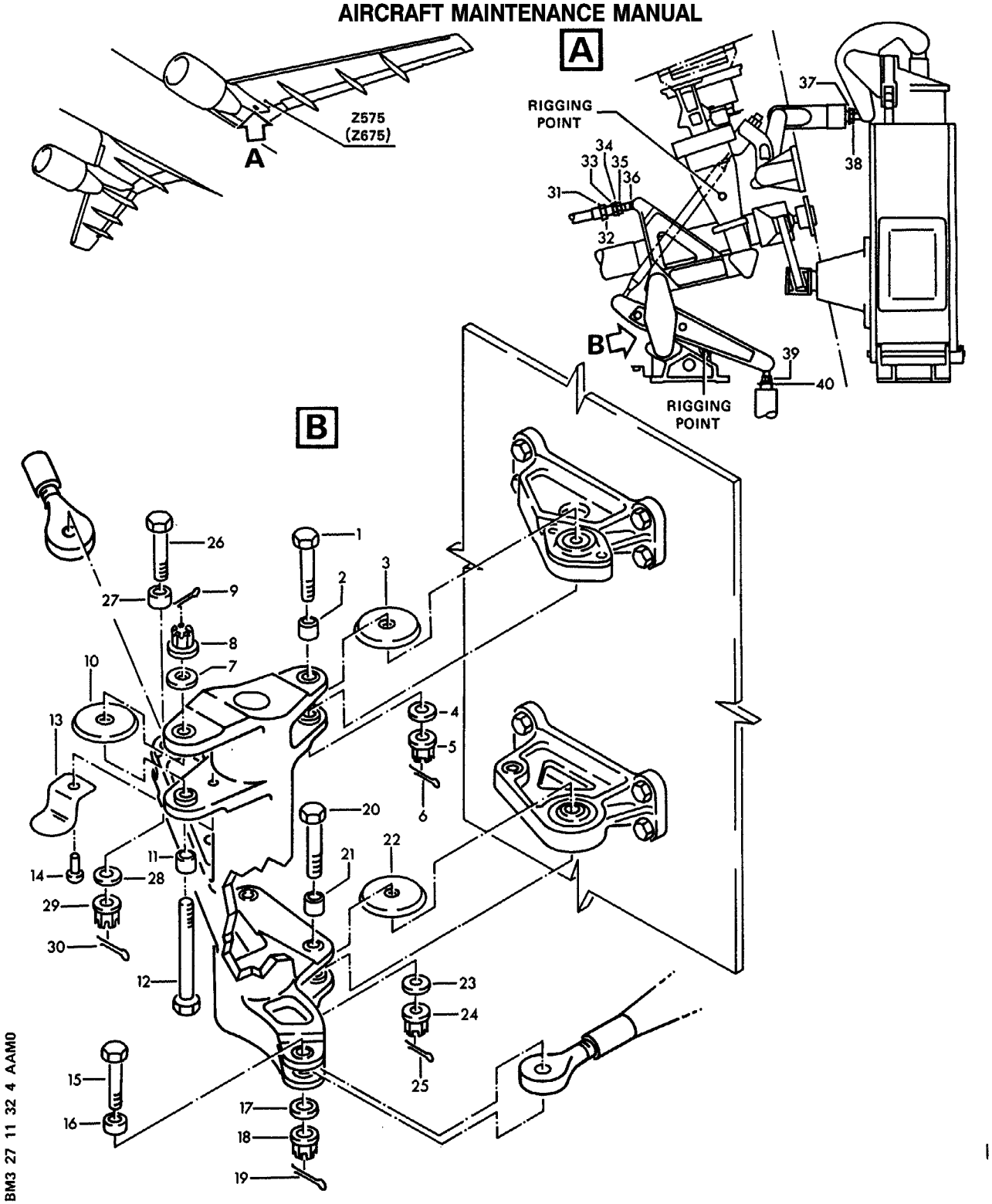
1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27108014000	Rigging Pin - Input Drum, Differential Droop Unit
C. 98A27108024000	Rigging Pin - ASA Trim Spindle
D. 98A27108025000	Rigging Pin - Droop Drive Layshaft
E. 98A27901000000	Rigging Pin - Aileron Control Wheel
F.	Torque Wrench, 1.58 - 1.64 m.daN (11.65 - 12.09 lbf.ft.)
G.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
H.	Safety Barriers
I.	Circuit Breaker Safety Clips and Tags
J.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
K.	Cotter Pins
L. Material No. 05-005	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-11-34, P. Block 401	Adjustable Lever

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up
(1)Position safety barriers.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Pressurize GREEN, BLUE or YELLOW hydraulic system (Ref. 29-10-00,



Layshaft
Figure 401

P. Block 301).
(5)Centralize aileron control wheel.
(6)Set aileron trim to zero.
(7)Install rigging pins PN 98A27901000000 in both control wheels.
(8)Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(10)Position access platform.
(11)Depressurize hydraulic system pressurized in para. 2.A.(4) and ensure other two systems are not pressurized (Ref. 29-10-00, P. Block 301).
(12)Display warning notice prohibiting pressurization of hydraulic systems.
(13)Open access doors 575AB, 575BB, 575CB, (675AB, 675BB, 675CB).
(14)Install rigging pin PN 98A27108024000 in trim screwjack.
(15)Install rigging pin PN 98A27108014000 in cable drum.

B. Removal
(1)Remove screw (14) and retaining plate (13).
(2)Remove and discard cotter pin (9); loosen castle nut (8).
(3)Remove and discard cotter pin (30); loosen castle nut (29).
(4)Remove and discard cotter pin (19); loosen castle nut (18).
(5)Remove castle nut (8), washer (7), bolt (12), bush (11) and disconnect triangle lever (support triangle lever on adjacent structure).
(6)Remove castle nut (29), washer (28), bolt (26), bush (27) and disconnect droop actuator rod end.
(7)Remove castle nut (18), washer (17), bolt (15), bush (16) and disconnect control rod.
(8)Remove and discard cotter pin (6); loosen castle nut (5).
(9)Remove and discard cotter pin (25); remove castle nut (24), washer (23), bolt (20) and bush (21).
(10)Remove castle nut (5), washer (4), bolt (1) and bush (2).
(11)Remove layshaft, and retain cover plates (3), (10) and (22) with lockwire.

C. Installation
(1)Cut and remove retaining lockwire; position cover plates (3), (10) and (22).
(2)Position layshaft on bracket assemblies and triangle lever.
(3)Install bush (2), bolt (1), washer (4) and castle nut (5). Do not tighten at this stage.

(4)Install bush (21), bolt (20), washer (23), castle nut (24) and tighten.
(5)Safety with cotter pin (25).
(6)Tighten castle nut (5) and safety with cotter pin (6).
(7)Install rigging pin PN 98A27108025000 in layshaft.
(8)Install bush (11), bolt (12), washer (7), castle nut (8) and tighten.
(9)Safety with cotter pin (9).
(10)Install retaining plate (13) and secure with screw (14).
(11)Position control rod on layshaft (if misaligned cut and remove lockwire; loosen locknut (38), separate locking device (37), adjust swivel end assembly until control rod and layshaft are aligned. Engage locking device (37), tighten locknut (38) and safety with lockwire).
(12)Install bush (16), bolt (15), washer (17), castle nut (18) and tighten.
(13)Safety with cotter pin (19).
(14)Position droop actuator rod end on layshaft, if misalignment is evident, proceed as follows:
(a)Cut and remove lockwire; loosen locknut (39) and disengage serrated washer (40).
(b)Rotate droop actuator rod end until aligned.
(c)Install bush (27), bolt (26), washer (28), castle nut (29) and tighten.
(d)Safety with cotter pin (30).
(e)Engage serrated washer (40), tighten locknut (39). TORQUE to between 1.58 and 1.64 m.daN (11.65 and 12.09 lbf.ft.).
(f)Safety with lockwire.
(15)Apply corrosion preventive (Material No. 05-005) to protruding threads of bolts (1),(12),(15),(20) and (26).
(16)Remove rigging pin from trim screwjack.
(17)Remove rigging pin from layshaft.
(18)Remove rigging pin from differential droop unit.
(19)Remove rigging pins from aileron control wheels.
(20)Check that artificial feel unit has not moved from neutral position (stops remain in contact with guide roller).
(21)If artificial feel unit has moved from neutral position, adjust length of control rod.
(a)Cut and remove lockwire; loosen nut (35).
(b)Disengage locking washer (34).
(c)Release locking device (31) and loosen nut (32).
(d)Adjust length of control rod by rotating threaded bush (33) until stops on artificial feel unit have equal contact with guide roller.
(e)Tighten nut (32) and secure with locking washer (31).
(f)Engage locking washer (34), tighten nut (35) and safety with lockwire.
(22)Remove safety clips and tags, close circuit breakers 10CV, 5CV, 6CV, 45CV, 1CB and 3CG.

D. Test
(1)Carry out adjustment of adjustable lever (Ref. 27-11-34, P. Block 401).

E. Close-Up
(1)Make certain that work area is clear of tools and equipment and close access doors 575AB, 575BB, 575CB (675AB, 675BB, 675CB).
(2)Remove safety barriers and access platform.
(3)Remove warning notice prohibiting pressurization of hydraulic systems.

(4)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

TRIANGLE LEVER - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENTS, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27108024000	Rigging Pin - ASA Trim Spindle
C. 98A27108025000	Rigging Pin - Droop Drive Layshaft
D. 98A27901000000	Rigging Pin - Aileron Control Wheel
E.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
F.	Safety Barriers
G.	Circuit Breaker Safety Clips and Tags
H.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
I.	Cotter Pins
J. Material No. 05-005	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-11-34, P. Block 401	Adjustable Lever

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Position safety barriers.

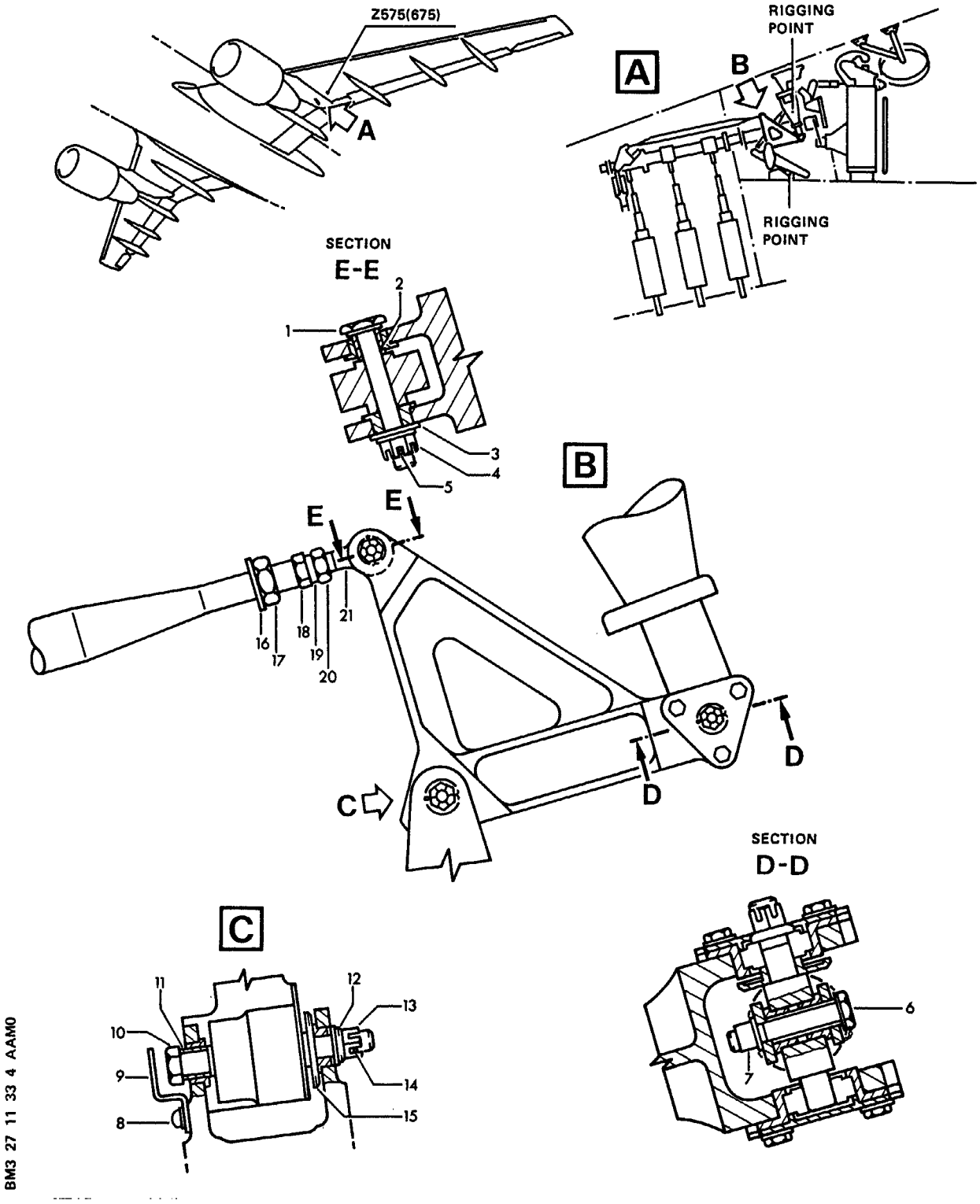
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Make certain that electronics racks ventilation is correct.

(4)Pressurize GREEN, BLUE or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).

(5)Centralize aileron control wheel.

(6)Set aileron trim to zero.



Triangle Lever
Figure 401

(7)Install rigging pins PN 98A27901000000 in both control wheels.
(8)Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(10)Position access platform.
(11)Depressurize hydraulic system pressurized in para. 2.A.(4) (Ref. 29-10-00, P. Block 301) and ensure other two systems are not pressurized.
(12)Display warning notice prohibiting pressurization of hydraulic systems.
(13)Open access doors 575BB, 575CB (675BB, 675CB).
(14)Install rigging pin PN 98A27108024000 in trim screwjack.
(15)Install rigging pin PN 98A27108025000 in layshaft.

B. Removal
(1)Remove and discard cotter pin (5); remove castle nut (4), washer (3), bolt (1) and bush (2); disconnect control rod from triangle lever.
(2)Cut and remove lockwire, remove bolt (6) from anchor nut (7); disconnect trim screwjack from triangle lever.
(3)Remove screws (8) and retainer plate (9) from layshaft.
(4)Support triangle lever. Remove and discard cotter pin (14). Remove castle nut (13), washer (12), bolt (10) and bush (11); disconnect layshaft from triangle lever.
(5)Remove triangle lever, and retain cover plate (15), with lockwire.

C. Installation
(1)Cut and remove retaining lockwire, install cover plate (15) and position triangle lever on layshaft; install bush (11), bolt (10), washer (12) and castle nut (13). Do not fully tighten at this stage.
(2)Position triangle lever on trim screwjack and install bolt (6). Do not fully tighten at this stage.
(3)Position control rod on triangle lever and install bush (2), bolt (1), washer (3) and castle nut (4). Do not fully tighten at this stage.
(4)Tighten castle nut (13) at layshaft and safety with cotter pin (14).
(5)Install retainer plate (9) and secure with screws (8).
(6)Tighten bolt (6) at trim screwjack and safety with lockwire.
(7)Tighten castle nut (4) at control rod and safety with cotter pin (5).
(8)Check that artificial feel unit has not moved from neutral position (stops remain in contact with guide roller).
(9)If artifial feel unit has moved from neutral position, adjust length of control rod.

(a)Cut and remove lockwire, loosen nut (20).
(b)Disengage locking washer (19).
(c)Release locking device (16) and loosen nut (17).
(d)Adjust length of control rod by rotating threaded bush (18) until stops on artificial feel unit have equal contact with guide roller.
(e)Tighten nut (17) and secure with locking washer (16).
(f)Engage locking washer (19); tighten nut (20) and safety with lockwire.

(10)Apply corrosion preventive (Material No. 05-005) to protruding threads of bolts (1),(6) and (10).
(11)Remove rigging pin from trim screwjack.
(12)Remove rigging pin from layshaft.
(13)Remove rigging pins from aileron control wheels.
(14)Remove safety clips and tags, and close circuit breakers 10CV, 5CV, 6CV, 45CV, 1CB and 3CG.

D. Test

(1)Carry out adjustment of adjustable lever (Ref. 27-11-34, P. Block 401).

E. Close-Up

(1)Make certain that work area is clear of tools and equipment and close access doors 575BB, 575CB (675BB, 675CB).
(2)Remove safety barriers and access platform.
(3)Remove warning notice prohibiting pressurization of hydraulic systems.
(4)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

ADJUSTABLE LEVER - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 4 m (13 ft.)
B. 98A27108014000	Rigging Pin - Input Drum, Differential Droop Unit
C. 98A27108025000	Rigging Pin - Droop Drive Layshaft
D. 98A27901000000	Rigging Pin - Aileron Control Wheel
E.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
F.	Safety Barrriers
G.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
H.	Cotter Pins
I.	Circuit Breaker Safety Clips and Tags
J. Material No. 05-005	Special Materials (Ref. 20-31-00)
K. Material No. 09-003	Sealants (Ref. 20-31-00)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Position safety barriers.

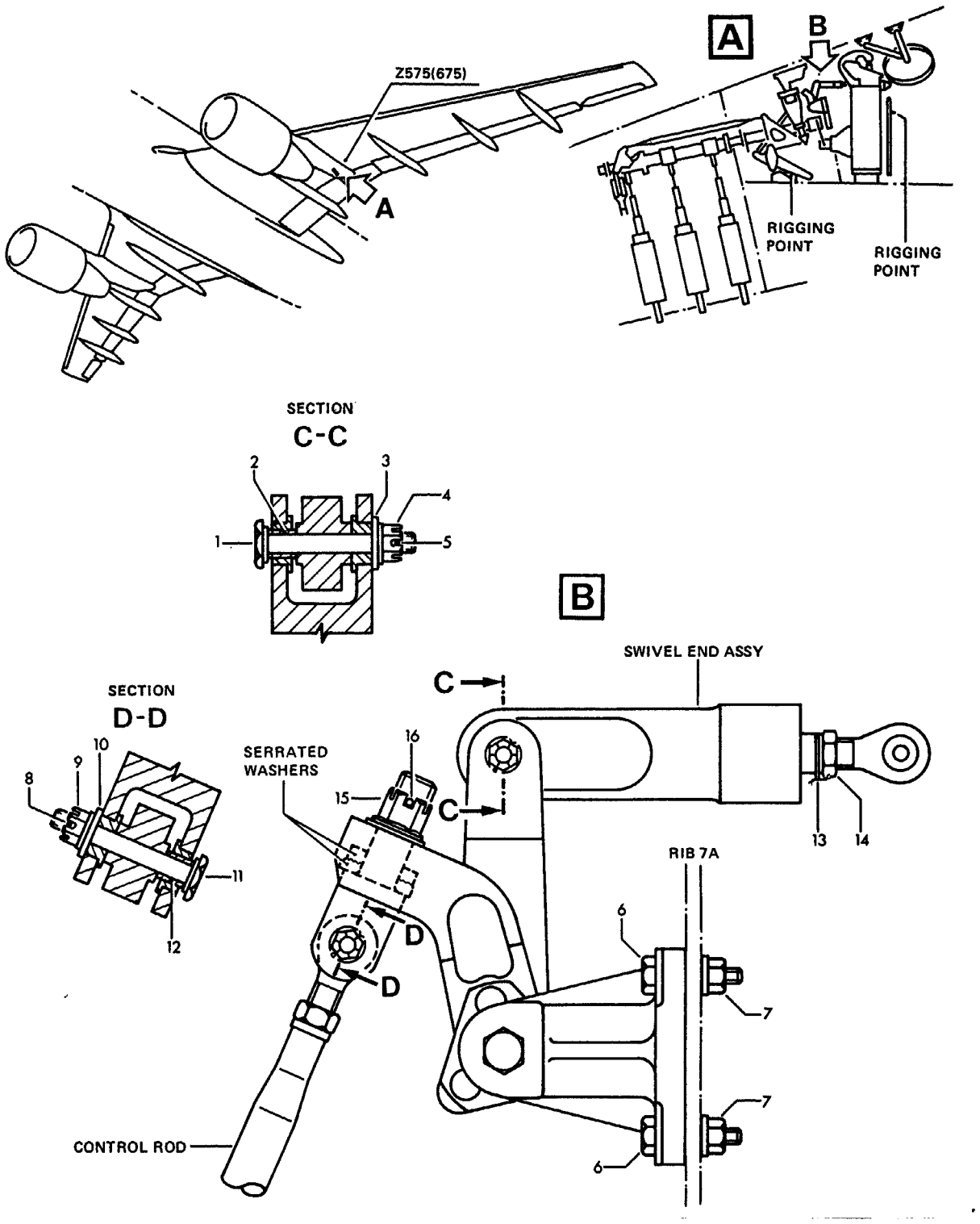
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Make certain that electronics racks ventilation is correct.

(4)Pressurize GREEN, BLUE or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).

(5)Centralize aileron control wheel.

(6)Set aileron trim to zero.



Adjustable Lever
Figure 401

(7)Install rigging pins PN 98A27901000000 in both control wheels.
(8)Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(10)Position access platform.
(11)Depressurize hydraulic system pressurized in para. 2.A.(4) and ensure other two systems are not pressurized (Ref. 29-10-00, P. Block 301).
(12)Display warning notice prohibiting pressurization of hydraulic systems.
(13)Open access doors 575AB, 575BB (675AB, 675BB).
(14)Install rigging pin PN 98A27108025000 in layshaft.
(15)Install rigging pin PN 98A27108014000 in cable drum.

B. Removal (Ref. Fig. 401)
(1)Remove and discard cotter pin (5); remove castle nut (4), washer (3), bolt (1), bush (2) and disconnect swivel end assembly.
(2)Remove and discard cotter pin (8); remove castle nut (9), washer (10), bolt (11), bush (12) and disconnect control rod.
(3)Support adjustable lever and remove nuts (7) and bolts (6).
(4)Remove adjustable lever.

C. Installation
(1)Apply sealant (Material No. 09-003) to contact faces of adjustable lever.
(2)Apply corrosion prevente (Material No. 05-005) to bolts (6).
(3)Position adjustable lever on rib 7A and install bolts (6), nuts (7) and tighten.
(4)Connect control rod to adjustable lever; install bush (12), bolt (11), washer (10), castle nut (9) and tighten.
(5)Safety with cotter pin (8).
(6)Connect swivel end to adjustable lever, if misalignment is evident proceed as follows:
(a)Cut and remove lock wire.
(b)Loosen lock nut (14) and disengage serrated washer (13).
(c)Rotate swivel end assembly until aligned.
(d)Install bush (2), bolt (1), washer (3), castle nut (4) and tighten.
(e)Safety with cotter pin (5).
(f)Engage serrated washer (13), tighten lock nut (14) and safety with lockwire.
(7)Apply corrosion preventive (Material No. 05-005) to protruding threads of bolts (1) and (11).

(8)Remove rigging pin from layshaft.
(9)Remove rigging pin from differential droop unit.
(10)Remove rigging pins from aileron control wheels.

D. Adjustment
(1)Make certain that travel range of ailerons and spoilers is clear.
(2)Remove safety clips and tags and close circuit breakers 10CV, 5CV, 6CV, 45CV, 1CB and 3CG.
(3)Remove warning notice prohibiting pressurization of hydraulic systems and pressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301).
(4)On panel 428VU press JAM/OFF pushbutton switch G (OFF legend goes off).
(5)Turn aileron control wheel over full range, checking that relevant aileron moves in the correct sense.
(6)Extend slats (15°) and krueger flaps (Ref. 27-80-00, P. Block 301).
(7)Repeat step (5).
(8)Install rigging pins in aileron control wheels.
(9)Press JAM/OFF pushbutton switch G on SERVO CTL section of panel 428VU (OFF legend comes on).
(10)Depressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301).
(11)Check that artificial feel unit has not moved from neutral position (stops remain in contact with guide roller).
(12)If artificial feel unit has moved from neutral position, adjust fork end of adjustable lever.
(a)Remove and discard cotter pin (16).
(b)Loosen castle nut (15).
(c)Adjust fork end by sliding it along the lever slot until artificial feel unit stops are in contact with guide roller.
(d)Make certain that serrated lever washers are installed correctly, tighten castle nut (15).
(e)Make certain that artificial feel unit stops remain in contact with guide roller.
(f)If movement has occurred, repeat steps (b) thru (e).
(13)Retract slats and krueger flaps (Ref. 27-80-00, P. Block 301).
(14)Check that artificial feel unit has not moved from neutral position. If movement has occurred, repeat step (12).
(15)Safety castle nut (15) with cotter pin (16).
(16)Remove rigging pins from aileron control wheels.

E. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment and close access doors 575AB, 575BB (675AB, 675BB).
(2)Remove safety barriers and access platform.
(3)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

BELLCRANK LEVER - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 4 m (13 ft.)
B. 98A27108024000	Rigging Pin - ASA Trim Spindle
C. 98A27108025000	Rigging Pin - Droop Drive Layshaft
D. 98A27901000000	Rigging Pin - Aileron Control Wheel
E.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
F.	Safety Barriers
G.	Circuit Breaker Safety Clips and Tags
H.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
I. Material No. 05-005	Special Materials (Ref. 20-31-00)
J. Material No. 09-003	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-11-34, P. Block 401	Adjustable Lever

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Position safety barriers.

(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

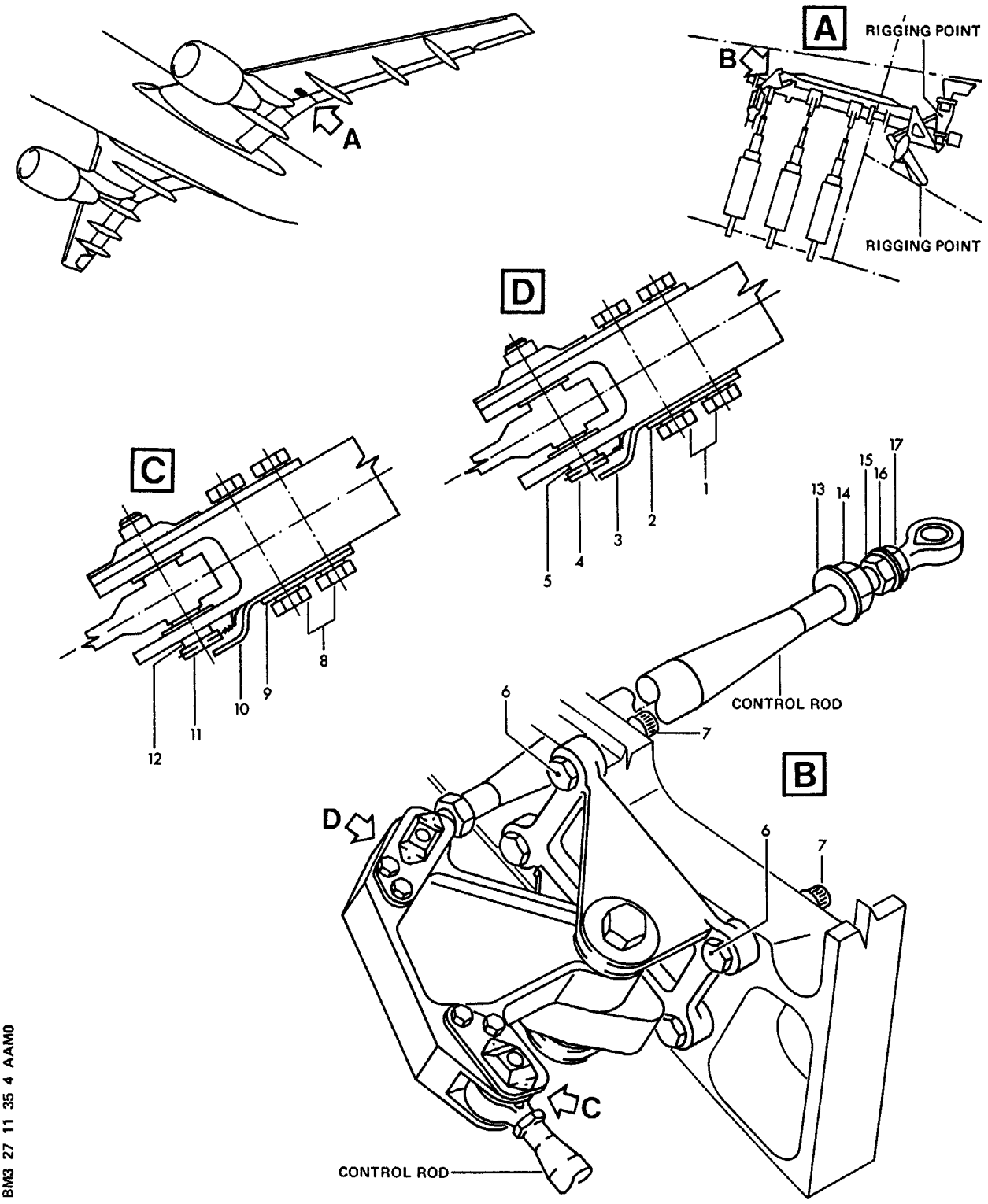
(3)Make certain that electronics racks ventilation is correct.

(4)Pressurize GREEN, BLUE or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).

(5)Centralize aileron control wheel.

(6)Set aileron trim to zero.

(7)Install rigging pins PN 98A27901000000 in both control wheels.



Bellcrank Lever
Figure 401

(8)Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(10)Position access platform.
(11)Depressurize hydraulic system pressurized in para. 2.A.(4) and ensure other two systems are not pressurized (Ref. 29-10-00, P. Block 301).
(12)Display warning notice prohibiting pressurization of hydraulic systems.
(13)Open access doors 575BB, 575CB (675BB, 675CB).
(14)Install rigging pin PN 98A27108024000 in trim screwjack.
(15)Install rigging pin PN 98A27108025000 in layshaft.

B. Removal
(1)Remove bolts (1), washers (2) and retainer plate (3).
(2)Cut and remove lockwire.
(3)Remove bolt (4), bush (5) and disconnect control rod.
(4)Remove bolts (8), washers (9) and retainer plate (10).
(5)Cut and remove lockwire.
(6)Remove bolt (11), bush (12) and disconnect control rod.
(7)Support bellcrank lever and remove bolts (6) and nuts (7).
(8)Remove bellcrank lever.

C. Installation
(1)Apply sealant (Material No. 09-003) to contact faces of bellcrank lever.
(2)Apply corrosion preventive (Material No. 05-005) to bolts (6).
(3)Install bellcrank lever and secure with bolts (6) and nuts (7).
(4)Connect control rod to bellcrank lever; install bush (12), bolt (11) and tighten.
(5)Safety with lockwire.
(6)Install retainer plate (10), washer (9) and secure with bolts (8).
(7)Connect control rod to bellcrank lever; install bush (5), bolt (4) and tighten.
(8)Safety with lockwire.
(9)Install retainer plate (3), washers (2) and secure with bolts (1).
(10)Check that artificial feel unit has not moved from neutral position (stops remain in contact with guide roller).
(11)If artificial feel unit has moved from neutral position, adjust length of control rod.
(a)Cut and remove lockwire; loosen nut (17).
(b)Disengage locking washer (16).
(c)Release locking device (13) and loosen nut (14).

(d)Adjust length of control rod by rotating threaded bush (15) until stops on artificial feel unit have equal contact with guide roller.
(e)Tighten nut (14) and secure with locking washer (13).
(f)Engage locking washer (16); tighten nut (17) and safety with lockwire.

(12)Apply corrosion preventive (Material No. 05-005) to protruding threads of bolts (4) and (11).
(13)Remove rigging pin from trim screwjack.
(14)Remove rigging pin from layshaft.
(15)Remove rigging pins from aileron control wheels.
(16)Remove safety clips and tags and close circuit breakers 10CV, 5CV, 6CV, 45CV, 1CB and 3CG.

D. Adjustment/Test

(1)Carry out adjustment of adjustable lever (Ref. 27-11-34, P. Block 401).

E. Close-Up

(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment and close access doors 575BB, 575CB (675BB, 675CB).
(2)Remove safety barriers and access platform.
(3)Remove warning notice prohibiting pressurization of hydraulic systems.
(4)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE SURE THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENTS, MAKE SURE THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

R WARNING : BE CAREFUL WHEN YOU USE SOLVENTS/CLEANING AGENTS, SEALANTS AND OTHER
R MATERIALS. OBEY THE MATERIAL MANUFACTURER'S INSTRUCTIONS AND THE
R LOCAL REGULATIONS. MAKE SURE THAT THERE IS A GOOD FLOW OF AIR
R THROUGH THE WORK AREA.
R DO NOT BREATHE THE FUMES.
R DO NOT SMOKE.
R DO NOT USE THESE MATERIALS NEAR A FLAME, SPARKS OR SOURCES OF HEAT.
R USE PROTECTIVE CLOTHING, GOGGLES AND GLOVES.
R IF YOU GET ONE OF THESE MATERIALS:
R - ON YOUR SKIN OR IN YOUR EYES, FLUSH IT AWAY WITH A FLOW OF CLEAN
R WATER.
R - IN YOUR MOUTH, GET IMMEDIATE MEDICAL AID.
R IN GENERAL, THESE MATERIALS ARE FLAMMABLE, POISONOUS AND SKIN
R IRRITANTS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27108025000	Rigging Pin - Droop Drive Layshaft
C. 98A27901000000	Rigging Pin - Aileron Control Wheel
D.	Torque Wrench, 1.58 to 1.64 m.daN (11.65 to 12.09 lbf.ft.)
E.	Clinometer
F.	Safety Barriers
G.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
H.	Hydraulic Blanking Caps
I.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
J.	Cotter Pins
K.	Circuit Breaker Safety Clips and Tags
L. Material No. 05-005	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)

- 29-10-00, P. Block 301 Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301 Hydraulic Reservoir Pressurizing System

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

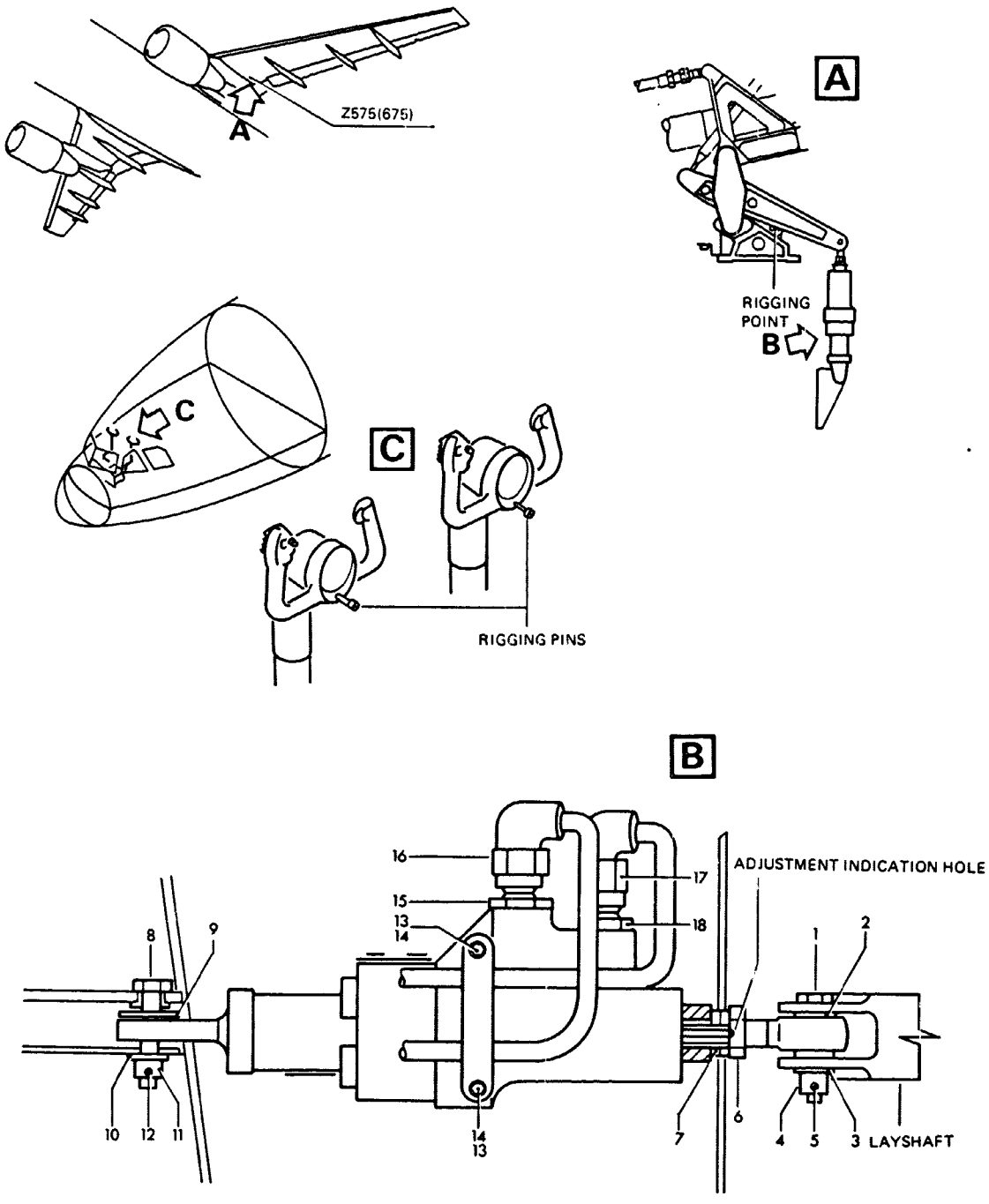
(1)Position safety barriers.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Pressurize GREEN, BLUE, or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).
(5)Centralize aileron control wheel.
(6)Set aileron trim to zero.
(7)Install rigging pins PN 98A27901000000 in both control wheels.
(8)Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(10)Position access platform.
(11)Depressurize hydraulic system pressurized in para. 2.A.(4) (Ref. 29-10-00, P. Block 301) and ensure other two systems are not pressurized.
(12)Display warning notice prohibiting pressurization of hydraulic systems.
(13)Depressurize GREEN hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(14)Open access doors 572DB, 575BB, (672DB, 675BB).
(15)Install rigging pin PN 98A27108025000 in layshaft.

B. Removal

(1)Remove nuts (13) and bolts (14), remove clamp block and bracket from droop actuator.
(2)Disconnect pipe unions (16),(17) and cap open ends.
(3)Remove and discard cotter pin (5).
(4)Remove castle nut (4), washer (3) and bolt (1).
(5)Disconnect droop actuator from bracket assembly and remove flange bush (2).
(6)Remove and discard cotter pin (12).
(7)Remove castle nut (11), washer (10), bolt (8) and bush (9).
(8)Remove droop actuator taking care not to damage any hydraulic pipes.



Droop Actuator
Figure 401

(9)Remove union adapters (15),(18) and install blanking caps in open ports of droop actuator.

C. Preparation of Replacement Component
(1)Install union adapters (15),(18) in replacement droop actuator.

D. Installation
(1)Position droop actuator on droop actuator bracket and install flange bush (9), bolt (8), washer (10), castle nut (11) and tighten.
(2)Safety with cotter pin (12).
(3)Apply corrosion preventive (Material No. 05-005) to bolt (8) and castle nut (11).
(4)Position droop actuator on layshaft; if misalignment is evident adjust droop actuator as follows:
(a)Cut and remove lockwire from locknut (6).
(b)Loosen locknut (6) and disengage serrated washer (7).
(c)Adjust droop actuator rod end until aligned.
NOTE : When center of hole in slot is visible this indicates full extent of rod end adjustment.
(5)Install bush (2), bolt (1), washer (3), castle nut (4) and tighten.
(6)Safety with cotter pin (5).
(7)Apply corrosion preventive (Material No. 05-005) to bolt (1) and castle nut (2).
(8)Engage serrated washer (7) and TORQUE locknut (6) to between 1.58 and 1.64 m.daN (11.65 and 12.09 lbf.ft.).
(9)Safety with lockwire.
(10)Remove blanking caps and connect pipe unions (16),(17) to droop actuator and tighten.
(11)Install bracket clamp block and secure with bolts (14) and nuts (13).
(12)Remove rigging pin from layshaft.
(13)Remove warning notice prohibiting the pressurization of hydraulic systems.
(14)Remove safety clips and tags and close circuit breakers 10CV, 5CV, 6CV, 1CB, 3CG and 45CV.

(15)Pressurize the GREEN hydraulic system (Ref. 29-10-00, P. Block 301).
(16)Extend slats to 15° and retract slats (Ref. 27-80-00, P. Block 301) at least 7 times in order to bleed droop actuator.
NOTE : Insufficient bleeding of the droop actuator will be indicated by "juddering" at the aileron control wheel during droop actuation.

E. Test
(1)On SERVO CTL section of panel 428VU, press G JAM/OFF pushbutton switch (OFF legend goes off).
(2)Extend slats to 15° position (Ref. 27-80-00, P. Block 301).
(3)Using clinometer check that angle of aileron droop is 6.6 ±0.5°.

(4)Retract slats to "0" position (Ref. 27-80-00, P. Block 301).
(5)Using clinometer check that aileron has returned to neutral position.
(6)Remove rigging pins from aileron control wheels.

F. Close-Up
(1) On SERVO CTL section of panel 428VU, release G JAM/OFF pushbutton switch (OFF legend comes on).
(2) Shut down and disconnect the hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(4) Make certain that work area is clear of tools and equipment and close access doors 572DB, 575BB (672DB, 675BB).
(5) Remove safety barriers and access platform.

TRIM (AILERON) - DESCRIPTION AND OPERATION

1. General

(Ref. Fig. 001)

Trim control is electrically signalled. An electrical actuator installed in the hydraulics compartment (center fuselage) drives two trim screwjacks via sprockets, chains and cables.

The actuator is controlled from panel 408VU located at the rear part of the center pedestal. Two switches on this panel allow the crew to select constant speed displacement in the appropriate direction.

Trim position is indicated on scales at the top of the control columns (Ref. 27-15) when the wheels are released.

In each wing root, displacement of the trim screwjack drives the all speed aileron servo control input linkage through the artificial feel unit, whose spring rod remains at neutral.

When the ailerons are drooped, the droop signal drives a differential mechanism between the trim screwjack and the artificial feel unit.

The mechanism pivots the artificial feel unit, thus allowing the spring rod to remain at neutral and the unit is held in this position by the trim screw jack.

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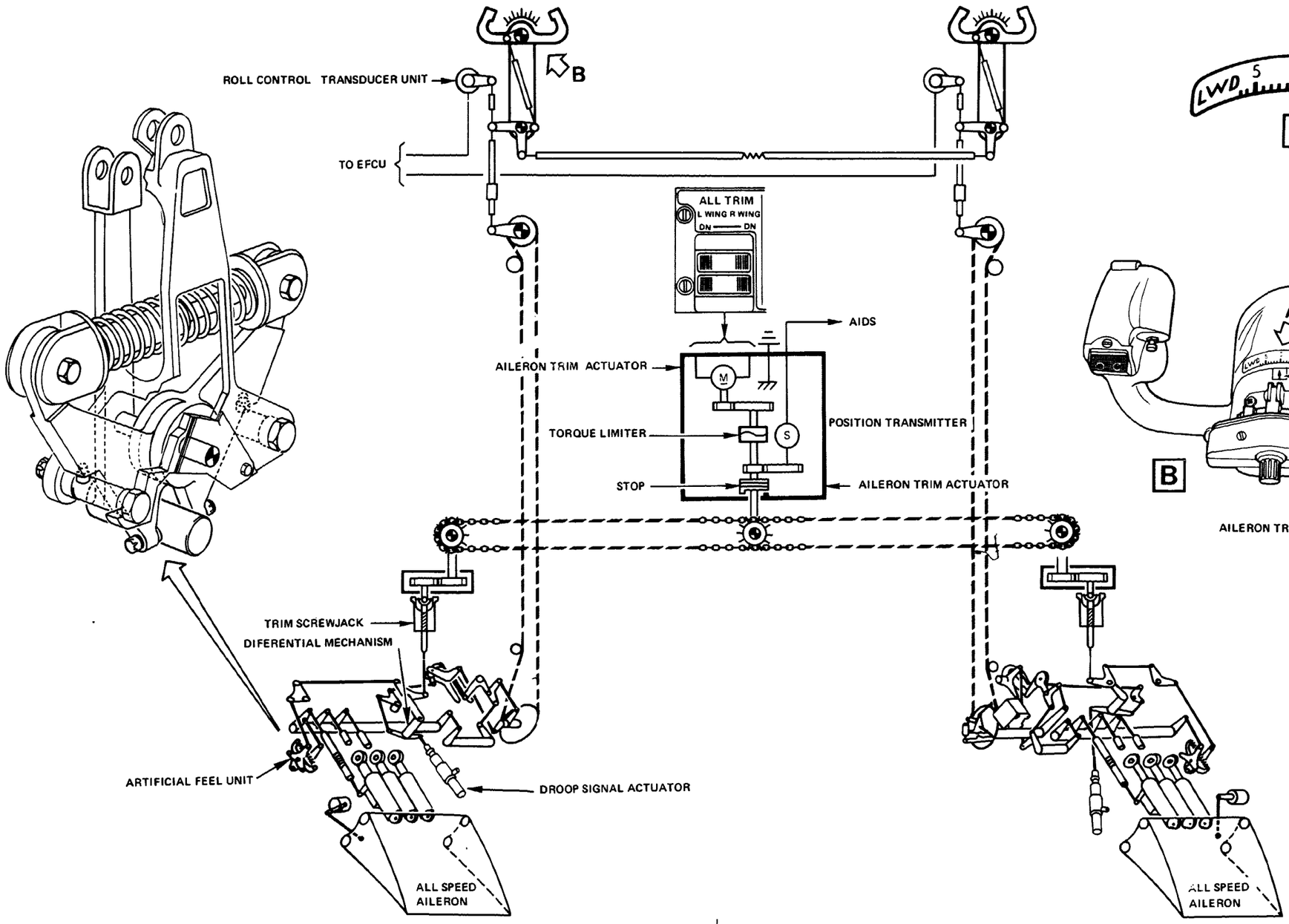

AILERON TRIM INDICATION

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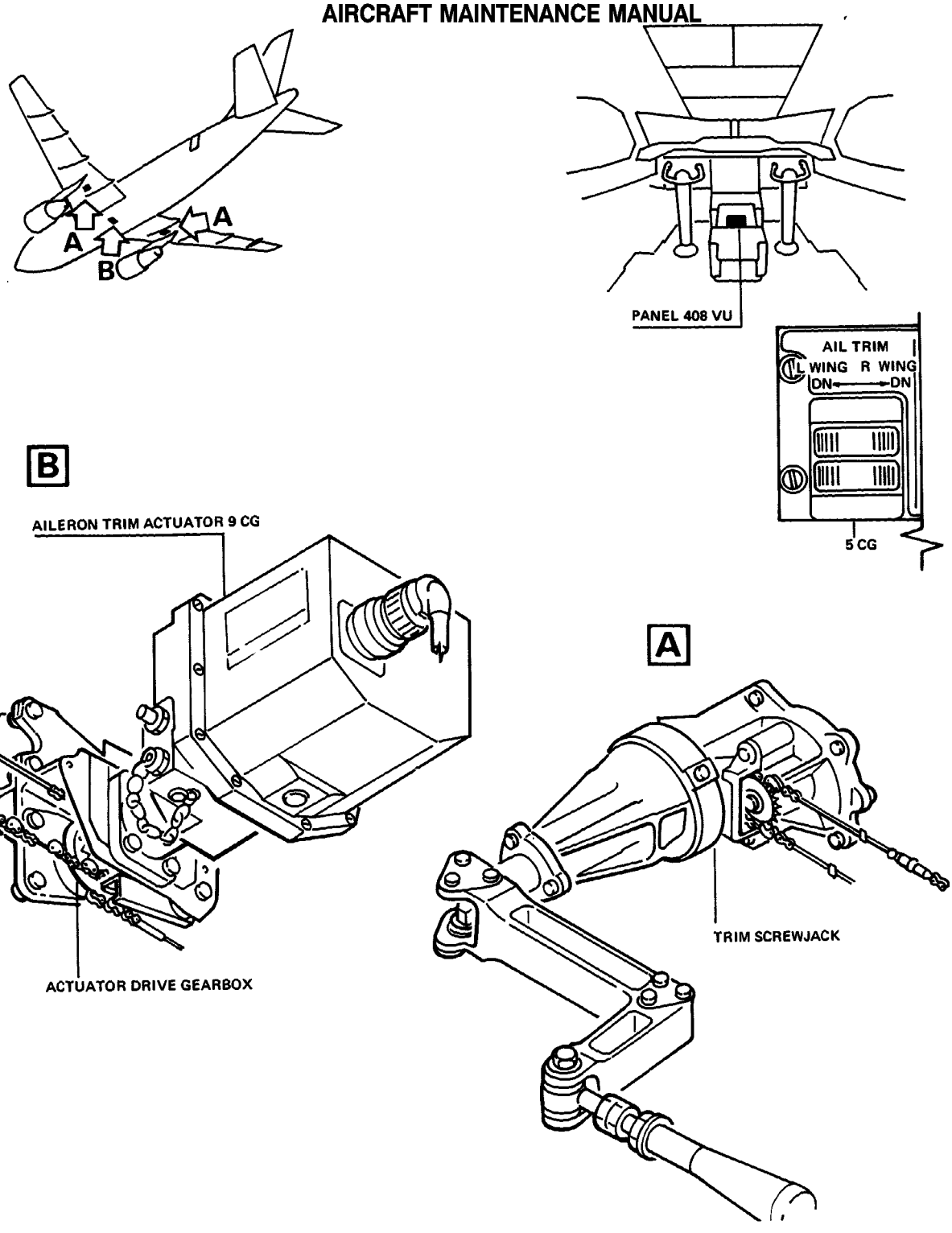
Trim (Aileron)
Figure 001

2. Component Location
(Ref. Fig. 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
5CG	SWITCH-AIL TRIM CONTROL	408VU	211		27-12-31
9CG	ACTUATOR-AILERON TRIM		147		27-12-33
	GEAR BOX-ACTUATOR DRIVE		147		27-12-32
	TRIM SCREWJACK-L		575	575BB	27-12-37
	TRIM SCREWJACK-R		675	675BB	27-12-37



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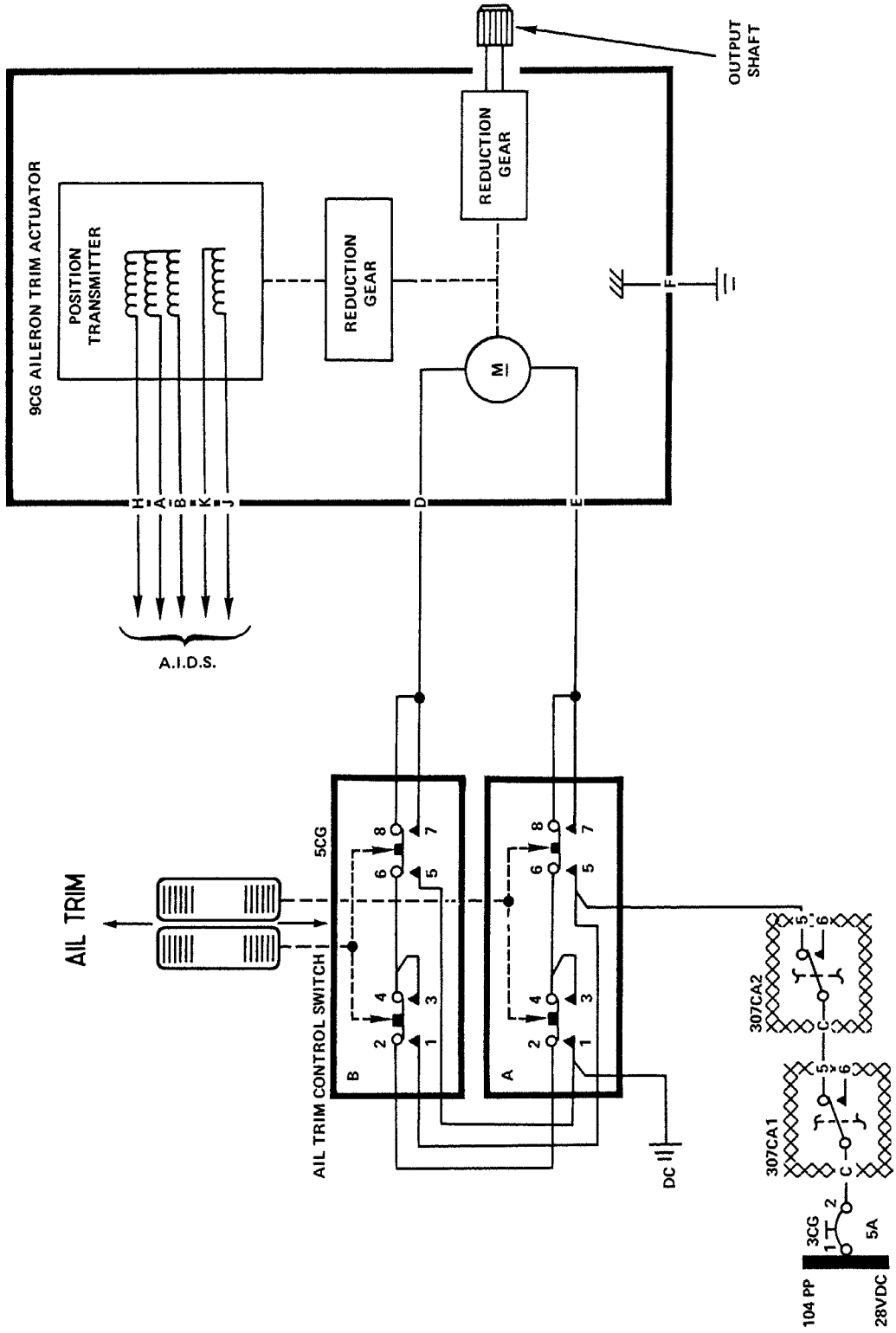
Component Location
Figure 002

3. Component Description

A. Aileron Trim Actuator (Ref. Fig. 003, 004)
The actuator is driven by a 28VDC electric motor through a reduction gear and a torque limiter.The motor is a permanent magnet motor with on-off control. A strong dynamic braking effect is obtained by shorting the motor winding as soon as they are no longer energized (no static braking on the actuator itself : trim irreversibility is provided by the screwjacks downstream of the actuators).
- Rotary stops limit output shaft rotation within the range allowed by the screws.
- When the electric motor is energized, it is protected by a torque limiter when the stops are reached (motor rotation is not stopped).
- The actuator includes a 26V 400 Hz synchro transmitter (ARINC 407) for AIDS purposes.
- A rigging pin is used to set the output shaft at mid angular travel (zero trim position and also zero reference for synchro transmitter settings).

B. Electric Motor Control (Ref. Fig. 003)
The electric motor windings of aileron trim actuator 9CG are energized through contacts of two adjacent three position switches (5CG) on control panel 408VU. The switches are spring loaded to the center position and must both be moved simultaneously in the same direction for the windings to be energized.
The switch tabs are not mechanically connected, to prevent run-away in the event of mechanical jamming of one tab. The windings are shorted when the two switches are in the center position.

C. Leading Particulars
Output shaft angular travel : 6.412 ± 0.03 revolutions
ASA corresponding deflection : ± 7°
Speed : 0.4 ± 0.06°/s of ASA (under output torque of 1 mN) (0.74 lbf.ft.).
Maximum breakout torque of torque limiter : 13 ±1 mN (9.6 ±0.74 lbf.ft.)
Maximum duration of torque limiter operation without damage : 3 minutes.



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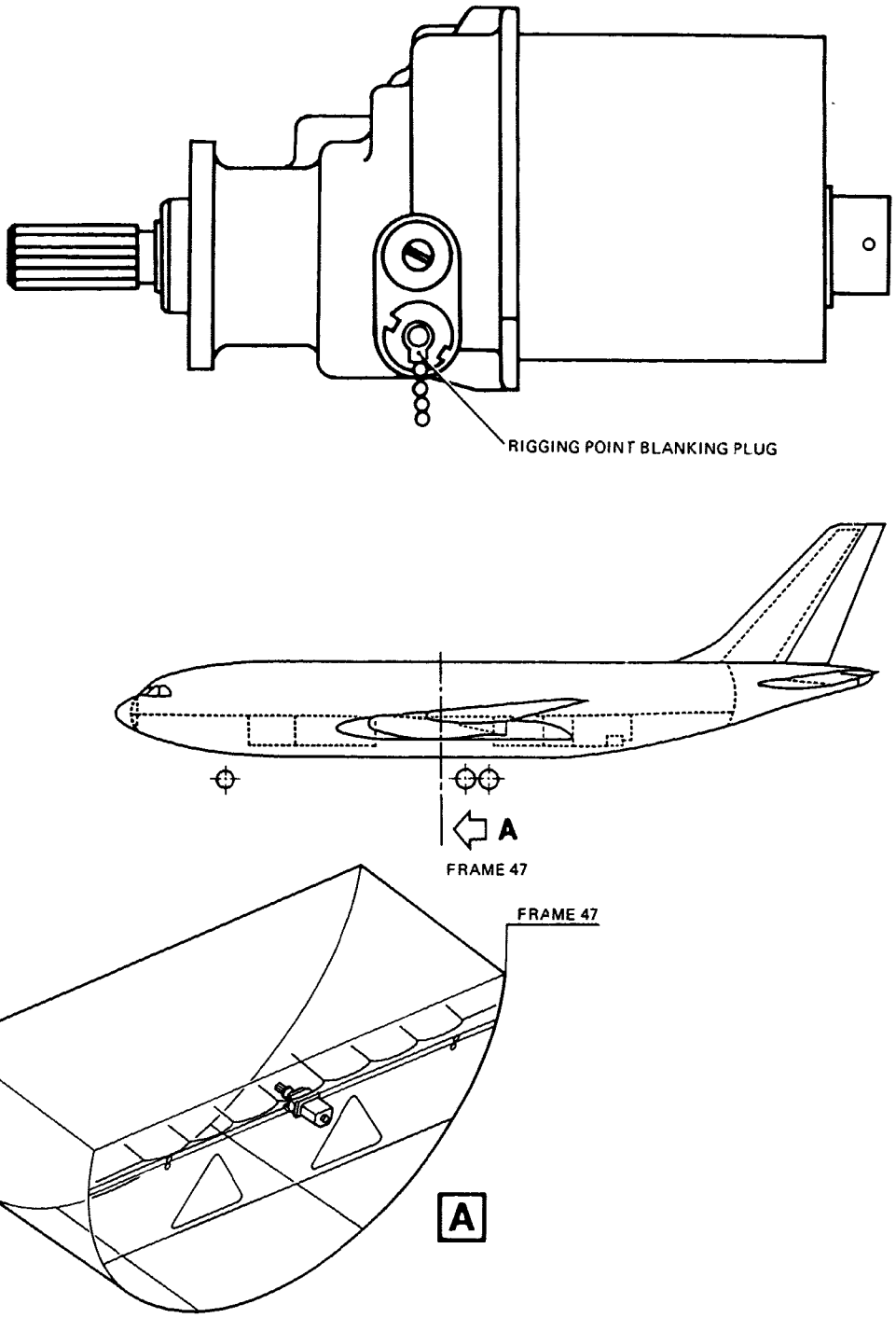
Trim (Aileron)
Figure 003



Aileron Trim Actuator
Figure 004

R **WARNING** : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Adjustment of Trim Control
(Ref. 27-11-00, P. Block 501).

2. Adjustment of Trim Cable Tension
(Ref. 27-10-00, P. Block 501).

3. Operational Test/Functional Test
NOTE : With both engines stopped, manually assist, if necessary, control wheel to assure :
- the pointer faces the 7th graduation on the scale when selecting the AIL TRIM switch to the full trim deflection (control wheel stays in this position after hand removal)
- the system comes back to zero degree.

A. Reason for the Job
Check proper operation of aileron trim.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
(1)Job set-up
(a)Initial conditions
- correct electrical power supply (Ref. 24-41-00, P. Block 301),
- forward services ventilation system in operation.
- overhead and rear panel circuit breakers closed, particularly those associated with FLT CTL (133VU).

- aircraft in ground configuration (L/G PROX DET & RELAYS SYS1 and SYS2 circuit breakers closed, on panel 133VU).
- hydraulic power supply on using Green, Blue and Yellow auxiliary power (Ref. 29-21-00, P. Block 301)(Ref. 29-22-00, P. Block 301) (Ref. 29-23-00, P. Block 301),
- on SERVO CTL and SPLR & SPD BRK Sections of panel 428VU, all pushbutton switches pressed (in) and all legends off,
- flap and slat control lever in second notch position (S/F 15°/0°),
- SPEEDBRAKE control lever in RET position, ground spoiler function not preselected.

(b)Make certain that Captain's and First Officer's control wheels are at zero (trim at zero).

(c)On panel 11VU, on ECAM control panel

- press F/CTL pushbutton switch to call up FLT CTL page on R ECAM display unit.
- make certain that RIGHT DISPLAY knob is not in OFF position.

(2)Test

ACTION	RESULT
1. On AIL TRIM section of panel 408VU - place AIL TRIM switch in L WING/DN position and maintain in this position	- Captain's and First Officer's control wheels progressively rotate to the left until pointer reaches the 7th graduation (± 1 graduation) on LWD section of scale located on control column. - Left ASA deflects upwards, right ASA deflects downwards - On left wing, spoilers 3 to 7 extended. On right ECAM display unit, FLT CTL page. On L AIL and R AIL scales - Bugs reproduce movement On ROLL scale - Green arrows representing left spoilers 3 to 7 appear.
2. Release AIL TRIM switch	- Captain's and First Officer's control wheels do not move - Switch returns to intermediate position - No change for ASA and spoilers.
3. On AIL TRIM section of panel 408VU - place AIL TRIM switch in R WING/DN position and maintain in this position	- Captain's and First Officer's control wheels return progressively to zero and move to the right until pointer reaches the 7th graduation (± 1 graduation) on RWD section of

ACTION	RESULT
	scale located on control column - Left ASA deflects downwards, right ASA deflects upwards through neutral position.
R	- On left wing, spoilers 3 to 7 retract
R	- On right wing, spoilers 3 to 7 are extended. On right ECAM display unit, FLT CTL page. On L AIL and R AIL scales - Bugs reproduce movement On ROLL scale - Green arrows representing right
R	spoilers 3 to 7 appear - Green arrows representing left
R	spoilers 3 to 7 disappear.
4. Release AIL TRIM switch	- Switch returns to intermediate position - Captain's and First Officer's control wheels do not move. - No change for ASA and spoilers.
5. On AIL TRIM section of panel 408VU - place AIL TRIM switch in L WING/DN position until pointer reaches position 0 on scale. - release switch	- Switch returns to intermediate position - Captain's and First Officer's control wheels are at zero. - Right and left ASA return to neutral position. - On right wing, spoilers retract. On right ECAM display unit, FLT CTL page. On L AIL and R AIL scales - Bugs reproduce movement On ROLL scale - Green arrows representing right spoiler disappear.

(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Shut down pressurization of Green, Blue and Yellow hydraulic systems.
(c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)Close access doors.

4. System Test

NOTE : With both engines stopped, manually assist, if necessary, control wheel to assure :
- the pointer faces the 7th graduation on the scale when selecting the AIL TRIM switch to the full trim deflection (control wheel stays in this position after hand removal)
- the system comes back to zero degree.

A. Reason for the Job

The purpose of this test is to measure deflection of ASA in trim function.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)TR12-18	Rigmaster System
	TR31	Rigmaster System - Protractor
R	or	
R	TR50	Rigmaster System
R	TR51	Rigmaster System - Protractor
R	or	
R	TR60	Rigmaster System
	or	
	98A27308005000	Protractor - Control Surface Deflection
R	or	
R	3028000	Clinometer
R	98A27203500000	Measurement Base - Flight Control Surface
R		Deflection
	(2)98A27901000000	Pin - Rigging, Aileron Control Wheel
	(3)	Access Platform 4 m (13 ft. 1 in.)
	(4)	Safety Barriers
	Referenced Procedures	
	- 24-41-00, P. Block 301	AC External Power Control
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 29-21-00, P. Block 301	Green Auxiliary Power
	- 29-22-00, P. Block 301	Blue Auxiliary Power
	- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up

(a)Initial conditions
- correct electrical power supply (Ref. 24-41-00, P. Block 301),
- forward services ventilation system in operation.
- overhead and rear panel circuit breakers closed, particularly those associated with FLT CTL (133VU).
- aircraft in ground configuration (LDG GEAR PROX DET & RELAYS SYS1 and SYS2 circuit breakers closed, on panel 133VU).

- hydraulic power supply on using Green, Blue and Yellow auxiliary power (Ref. 29-21-00, P. Block 301) (Ref. 29-22-00, P. Block 301) (Ref. 29-23-00, P. Block 301) or hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
- on SERVO CTL and SPLR & SPD BRK Sections of panel 428VU, all pushbutton switches pressed(in) and all legends off.
- flap and slat control lever in first notch position,
- SPEEDBRAKE control lever in RET position, ground spoiler function not preselected.

(b)Make certain that Captain's and First Officer's aileron control wheels are at zero and insert rigging pin 98A27901000000 (rigging pin shall be inserted freely).

(c)Install access platforms and safety barriers.

R (d)Position these equipment tools as follows :

R - control surface deflection protractor 98A27308005000

R or

R - rigmaster system TR12-18 and rigmaster system protractor TR31

R or

R - rigmaster system TR50 and rigmaster system protractor TR51

R or

R - rigmaster system TR60

R or

R - clinometer 3028000 and flight control surface deflection measurement

R base 98A27203500000 and set protractor to zero.

(e)Remove rigging pins 98A27901000000 from Captain's and First Officer's aileron control wheels.

(2)Measurement of ASA deflection in trim function.

NOTE : Only the test for measurement of deflections in left turn is described. Repeat test with indications between brackets to measure deflection in right turn.

ACTION	RESULT
1. On AIL TRIM section of panel 408VU - place AIL TRIM switch in L WING/ DN (R WING/DN) and maintain in this position until trim reaches stop then release	Control Wheel rotates to the left (right) until pointer reaches 7th graduation on LWD scale (RWD) Left (right) ASA deflects upwards by 7° ± 30'. Right (left) ASA deflects downwards by 7° ± 30'.
2. Return AIL TRIM switch to neutral.	

(3)Operating time

ACTION	RESULT
1. On AIL TRIM section of panel 408VU - place AIL TRIM switch in R WING/ DN position and maintain in this position until trim reaches R turn stop then release.	

ACTION	RESULT
2. On **AIL TRIM** section of panel 408VU - place **AIL TRIM** switch in L **WING/ DN** position and maintain in this position until trim reaches L turn stop then release.	Trim operation time from full right turn stop to full left turn stop is : 30 s < t < 41 s.
3. Return **AIL TRIM** switch to neutral	

(4)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove safety barriers and access platforms.
(c)Shut down pressurization of hydraulic systems.
(d)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

TRIM (AILERON AND RUDDER) - INSPECTION/CHECK

1. Check of Aileron Trim Control Cable Tension
(Ref. Fig. 27-10-00, P. Block 601).

2. Permissible Limits

A. General
The Flight Control System is designed and adjusted on new aircraft to provide straight and level flight with + or - 1° of rudder trim with aileron trim at zero.
Reports of trim discrepancies in excess of these values may occur due to tolerance build up or minor deterioration in component condition. The following information is presented to aid maintenance in determining the corrective action required in response to specific trim bias reports.
For aerodynamical reasons it is recommended to apply the "zero control wheel procedure" for aircraft lateral trimming.
This means that the rudder trim should be used to obtain a straight and level flight with the aileron control wheel and the aileron trim at zero.

B. Limits
(1)During cruise, a max. of + or - 1.5° of rudder trim with aileron
R trim at zero and/or bank angle not exceeding 2° are normal and any
R aircraft with any trim reports up to these amounts may continue in
R service with no further action beyond a visual check for obvious
R damage:
NOTE : On aircraft fitted with aids it is recommended to record the actual rudder deflection instead of the rudder trim value displayed on the rudder trim indicator on the center pedestal.
(2)If trim reports exceed the above limit, the following operations must be accomplished :
(a)Visually check spoilers for damage, floating or misrigging.
(b)Visually check flaps and slats for damage or misrigging particularly for proper retract position.
(c)Visually check ailerons for damage or misrigging.
(d)Visually check rudder for damage or misrigging.
(e)Visually check structure (external) of the wings, horizontal stabilizer and vertical stabilizer.
(f)Visually check structure (external) of fuselage.
(g)Perform an operational check of the primary flight control system. Confirm that surfaces respond properly to control inputs.
NOTE : Surface thorough check is not required. Visually check operation of surface and the surface position indicator with respect to control inputs.

AILERON TRIM CONTROL SWITCH (5CG)
REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

1. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-42-00, P. Block 301	AC External Power Control
- 27-12-00, P. Block 501	Trim (Aileron) - Adjustment/Test
- 27-12-31, P. Block 401	Aileron/Rudder Trim Control Panel
R - ESPM 20-51-30	

2. Procedure

A. Job Set-Up

(1)Energize the ground service network (Ref. 24-42-00, P. Block 301).
(2)In flight compartment, on electrical center pedestal 11VU, gain access to panel 408VU.
(3)Display warning notices prohibiting operation of aileron and rudder controls.
(4)Remove panel 408VU and disconnect electrical connectors (Ref. 27-12-31, P. Block 401).

B. Removal

(Ref. Fig. 401)

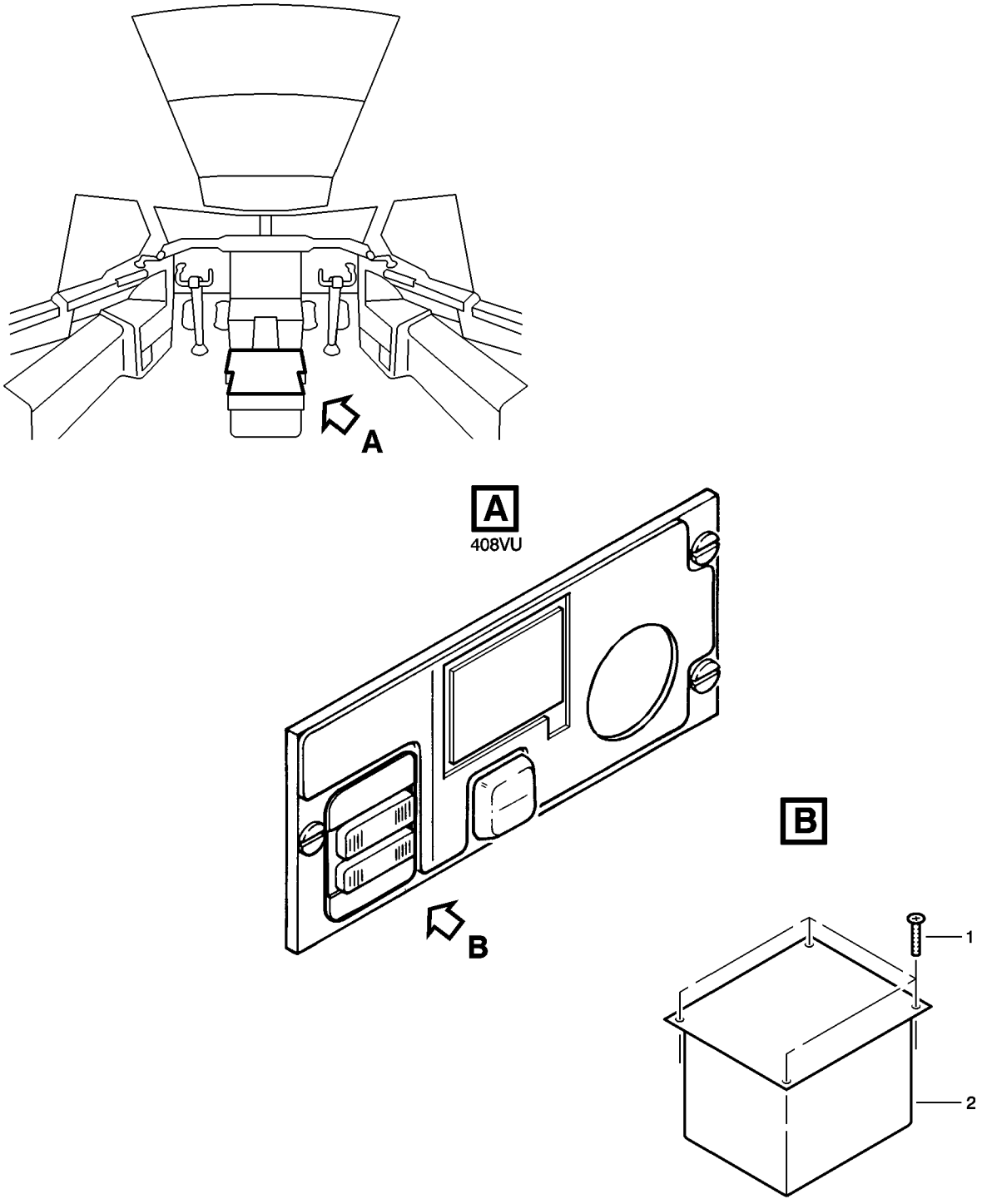
R NOTE : The following actions must be performed outside of the aircraft.
(1)Remove the four screws (1) from control switch (2).
R (2)Make a mark on each wire of control switch (2) and unsolder wires. If
R necessary, cut tie wraps of control switch harness (Ref. ESPM 20-51-30).
(3)Remove control switch (2).

C. Installation

R NOTE : The following actions must be performed outside of the aircraft.
(1)Clean component interface and/or adjacent area.
(2)Perform visual inspection of component interface and/or adjacent area.
R (3)On rear of control switch (2), solder each wire in its original position
R (Refer to marks); if necessary, install new tie wraps on
R control switch harness (Ref. ESPM 20-51-30).
(4)Install control switch (2) on structural panel 408VU.
(5)Install the four screws (1) on control switch (2).
(6)Tighten screws (1).

D. Close-Up

(1)Connect electrical connectors and install panel 408VU (Ref. 27-12-31, P. Block 401, Para. Installation).



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Aileron Trim Control Switch (5CG)
Figure 401

(2)Perform operational test of aileron trim (Ref. 27-12-00, P. Block 501).
(3)Make sure that working area is clean and clear of tools and miscellaneous items of equipment.
(4)De-energize aircraft electrical network (Ref. 24-42-00, P. Block 301).
(5)Remove warning notice.

R AILERON/RUDDER TRIM CONTROL PANEL

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE. BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

Removal for replacement of panel 408VU.

NOTE : Panel 408VU is equipped with the following items :

- RUD TRIM control switch 4CG
- AIL TRIM control switch 5CG
- Rudder trim RESET pushbutton switch 6CG
- RUD TRIM indicator 7CG.

In this topic, only the removal/installation procedure of panel assembly 408VU is described.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Plugs/Caps for Electrical Connectors
C.	Warning Notices Prohibiting Operation of Aileron and Rudder Controls
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power

3. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/2 & 3	5CP	335/R63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/6 & 7	7CP	335/R62
133VU	EFCU/NORM/SUPPLY/SPLR 2 & 3	8CP	333/T62
133VU	EFCU/LAND RECOVERY/NORM SUPPLY/SPLR/6 & 7	9CP	333/T66
133VU	EFCU/NORM/SUPPLY/SPLR 6 & 7	10CP	332/U62

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/1 & 4	53CP	334/S63
133VU	LAND/RECOVERY/SUPPLY/SPLR/1 & 4 & 6 & 7	54CP	334/S67
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/5	55CP	334/S64
133VU	EFCU/NORM/SUPPLY/SPLR 5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM/SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	EFCU/LAND RECOVERY/SUPPLY/SPLR/1 & 4	72CP	333/T67

(2)In flight compartment, on electrical center pedestal 11VU, gain access to panel 408VU.
(3)Display warning notices prohibiting operation of aileron and rudder controls.

B. Removal

**ON A/C ALL

R

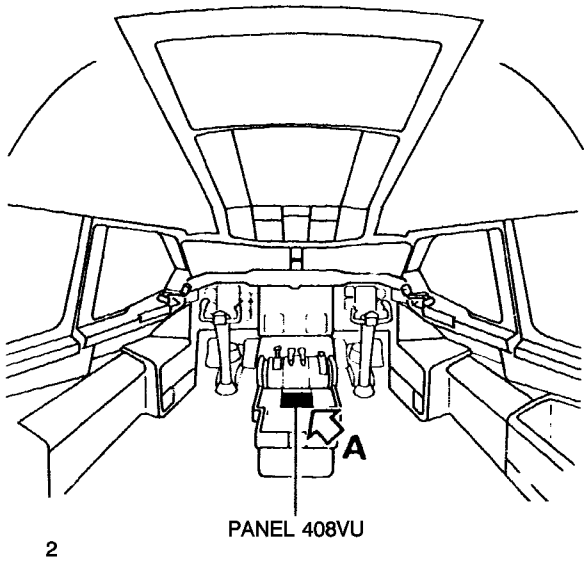
(Ref. Fig. 401)

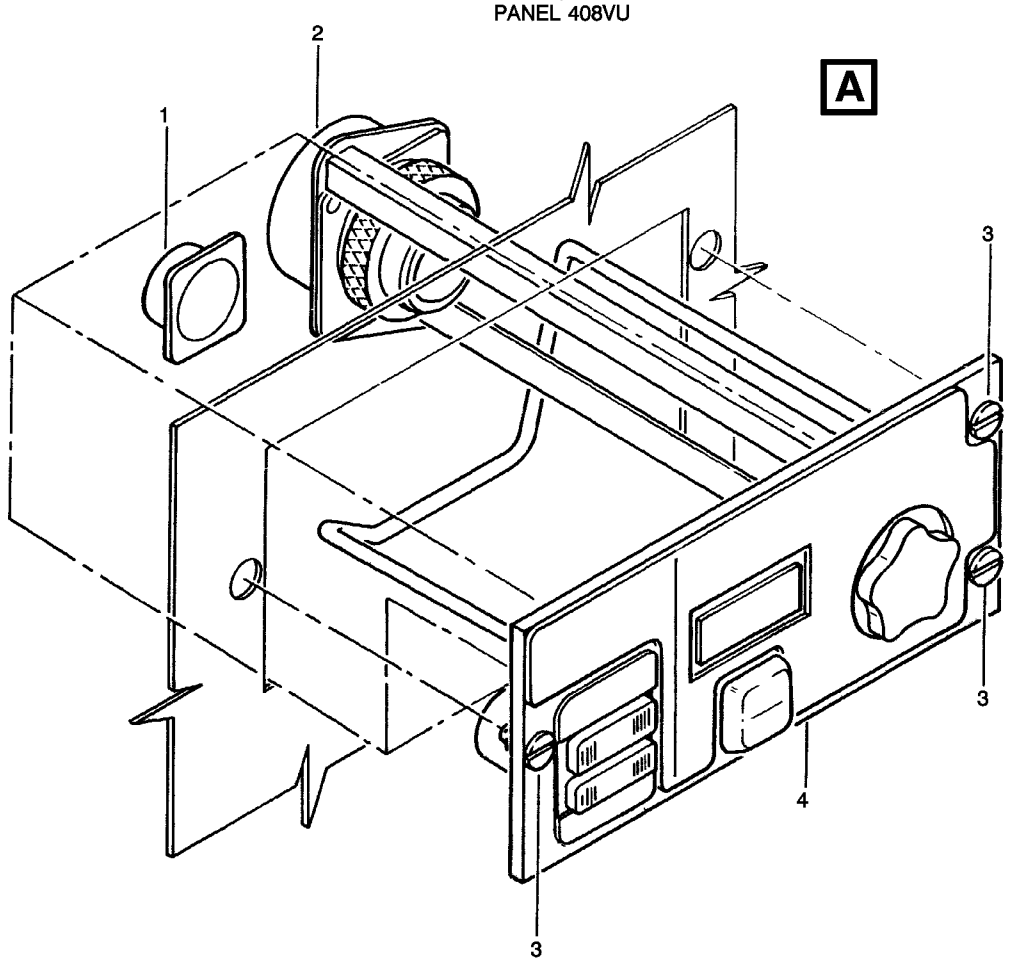
**ON A/C ALL

(1)On electrical center pedestal 11VU, loosen quick attach/detach fasteners (3) securing panel 408VU (4).
(2)Pull panel 408VU to disconnect electrical connectors 7CG-A (1) and 1816VC (2).
(3)Remove panel assembly 408VU (4).
(4)Install protective plugs/caps on connector and receptacle 7CG-A (1) and18VC (2).

C. Installation
(1)Remove protective plugs/caps from connector and receptacle 7CG-A (1) and 1816VC (2). Check correct condition.
(2)Engage panel assembly 408VU (4) into housing in electrical center pedestal 11VU and push fully home until connection of connector and receptacle 7CG-A (1) and 1816VC (2) is achieved.
(3)Secure panel 408VU (4) to electrical center pedestal 11VU with quick attach/detach fasteners (3).

D. Test
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)Pressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block 301).
(4)On SERVO CTL section of panel 428VU, make certain that G pushbutton switch is pressed (in) (legend off).
(5)Make certain that flap and slat control lever is in first notch position.





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Panel 408VU
Figure 401

(6)Make certain that **SPEED BRAKE** control lever is in **RET** position, ground spoiler function not preselected.
(7)Make certain that control surface travel range is clear.
(8)Remove safety clips and tags and close **EFCU TRANSDUCERS** circuit breakers **1CG, 3CG, 5CP, 7CP, 8CP, 9CP, 10CP, 53CP, 54CP, 55CP, 70CP, 71CP** and **72CP**.
(9)On **ECAM** control panel, press **F/CTL** pushbutton switch to display **FLT CTL** page on right **ECAM** display unit.
(10)Perform the following aileron trim test :

ACTION	RESULT
1. On panel **40BVU**, place **AIL TRIM** control switch in **L WING/DN** position and maintain in this position	Aileron control wheel rotates to the left ; index moves to **LWD7** position. Left **ASA** deflects upwards. Right **ASA** deflects downwards. On right **ECAM** display unit, **FLT CTL** page, **L/AIL** and **R/AIL** scale bugs reproduce deflection.
2. Release **AIL TRIM** control switch	No change.
3. Place **AIL TRIM** control switch in **R WING/DN** position and maintain in this position	Aileron control wheel rotates to the right ; index moves to **RWD7** position. Left **ASA** deflects downwards. Right **ASA** deflects upwards. On right **ECAM** display unit, **FLT CTL** page, **L/AIL** and **R/AIL** scale bugs reproduce deflection.
4. Place **AIL TRIM** control switch in **L WING/DN** position and maintain in this position until control wheel index indicates zero.	On right **ECAM** display unit, **FLT CTL** pages, bugs reproduce deflection.

(11)Perform the following rudder trim test :

ACTION	RESULT
1. On panel **40BVU**, place **RUD TRIM** control switch in **NOSE L** position and maintain in this position	On panel **40BVU**, on **RUD TRIM** indicator, indication varies from 0 to L21. Rudder deflects to the left.

ACTION	RESULT
	On right **ECAM** display unit, **FLT CTL** page, **RUD** scale, bug reproduces deflection.
2. Release **RUD TRIM** control switch	No change.
3. On panel 408VU, press **RESET** pushbutton switch	Corresponding **ON** legend comes on. On **RUD TRIM** indicator, indication varies from L21 to 0 - **ON** legend goes off - Rudder returns to zero - On right **ECAM** display unit, **FLT CTL** page, **RUD** scale, bug reproduces deflection.
4. On panel 408VU, place **RUD TRIM** control switch in **NOSE/R** position and maintain in this position	On **RUD TRIM** indicator, indication varies from 0 to R21. Rudder deflects to the right. On right **ECAM** display unit, **FLT CTL** page, **RUD** scale, bug reproduces deflection.
5. Release **RUD TRIM** control switch	No change.
6. On panel 408VU, place **RUD TRIM** control switch in **NOSE L** position and maintain in this position until indicator displays 0. Release control switch.	Rudder returns to zero. On right **ECAM** display unit, **FLT CLT** page, **RUD** scale, bug reproduces deflection.

E. Close-Up
(1) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2) Depressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block 301).
(3) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

ACTUATOR DRIVE GEAR BOX
REMOVAL/INSTALLATION

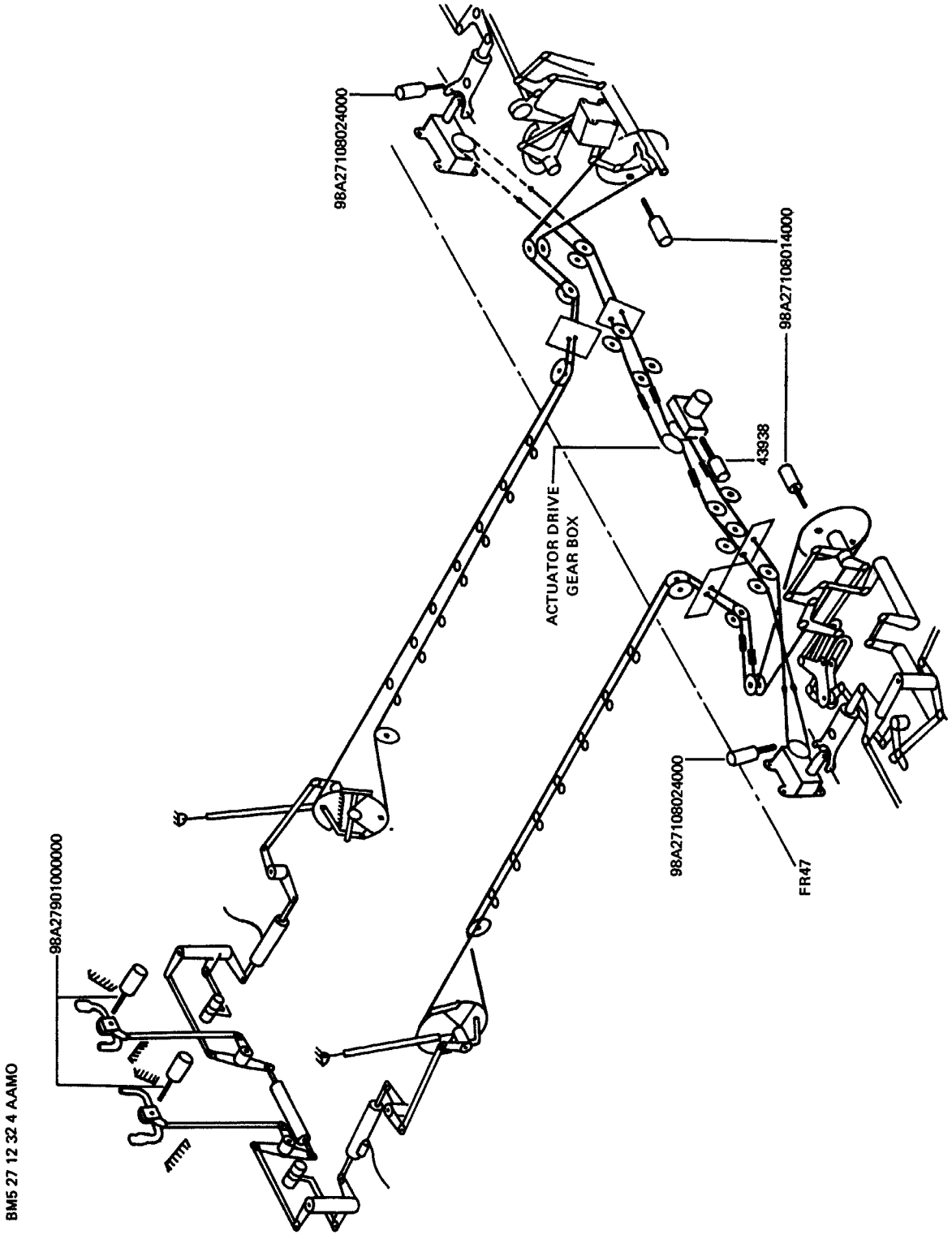
WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A27108024000	Rigging Pin - ASA Trim Spindle (Qty 2)
B. 43938	Pin - Rigging, Rudder and Aileron Trim Actuators
C. 98A27901000000	Pin-Rigging, Aileron Control Wheel
D. 98A27108014000	Rigging Pin - Cable Drum Differential Droop Unit
E.	Circuit Breaker Safety Clips
F.	Warning Notice Prohibiting Depressurization of Hydraulic System
G.	Access Platform (1.5 m to 7 m) (5 ft. to 23 ft.)
H.	Lockwire - Corrosion Resistant Steel (Dia. 0.8 mm) (0.032 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 27-12-00, P. Block 501	Trim (Aileron)
- 27-12-33, P. Block 401	Aileron Trim Actuator
- 27-10-00, P. Block 501	Aileron

2. Procedure

A. Job Set-Up (Ref. Fig. 401)
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(2)Connect hydraulic ground power cart and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(3)Position access platform and open forward passenger/crew door.
(4)Display a warning notice on overhead panel in flight compartment and on



Location of Components and Rigging Points
Figure 401

hydraulic ground power cart prohibiting depressurization of hydraulic system.

(5)Make certain that Captain's and First Officer's control wheels are in neutral position (aileron trim at neutral).

(6)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/AIL/TRIM	3CG	331/V63

(7)Make certain that flap and slat control lever is in first notch position (flaps and slats fully retracted).

(8)Remove cover plates from Captain's and First Officer's control wheels.

(9)Install rigging pins 98A27901000000 in Captain's and First Officer's control wheels.

(10)Open main gear main doors (Ref. 32-12-11, P. Block 301).

(11)Remove fairings from each side of trim actuator.

(12)Cut and remove lockwire, remove plug blanking rigging hole of trim actuator. Install plug on actuator body.

(13)Check trim actuator output shaft mid travel position (indicator visible in slot on actuator lower section). Insert rigging pin 43938 in trim actuator.

(14)Open access doors 575AB and 675AB.

(15)Install rigging pins 98A27108014000 in all speed aileron cable quadrants.

(16)Open access doors 575BB and 675BB.

(17)On left and right trim screwjack gear boxes, install rigging pins 98A27108024000.

(18)Remove trim actuator (Ref. 27-12-33, P. Block 401).

(19)Remove safety clips from cable turnbuckles.

B. Removal

(Ref. Fig. 402)

(1)Remove cotter pins, then nuts (6), washers (5), bolts (1), spacers (3) and chain guide (4).

(2)Remove cotter pins, then nuts (9), washers (10), bolts (12) and chain guide (11).

(3)Remove both chains (2).

(4)Remove nuts (13), bolts (14) and gear box (8).

C. Preparation of Replacement Component

(1)Remove the two chain guides from gear box.

D. Installation

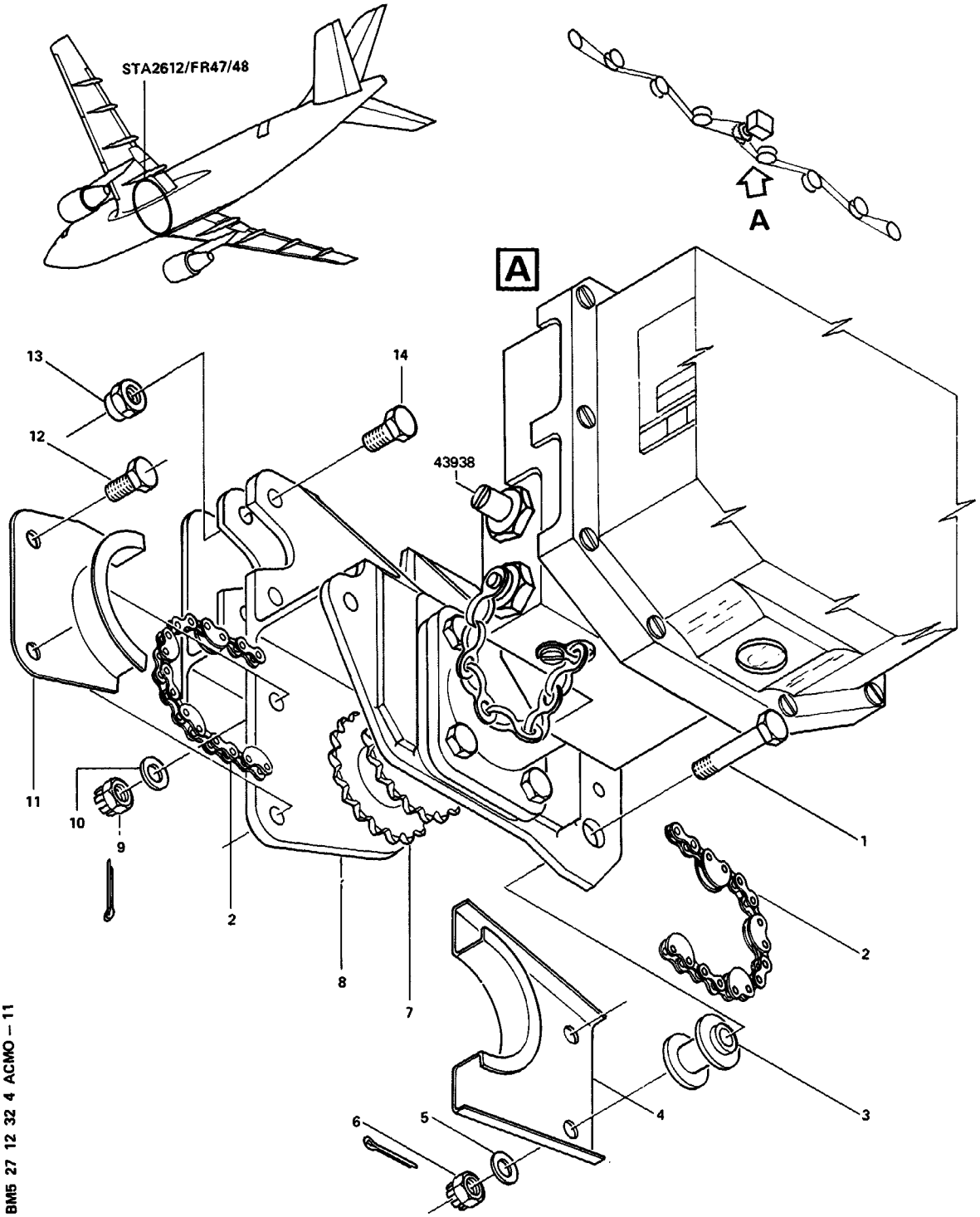
(1)Position gear box (8); install bolts (14) and secure with nuts (13).

(2)Install the two chains (2) on gears (7).

(3)Position chain guide (11); install bolts (12), washers (10) and secure with nuts (9). Safety with cotter pins.

(4)Install bolts (1) together with spacers (3). Position chain guide (4) and secure with washers (5) and nuts (6). Safety with cotter pins.

(5)Connect chains to cables.
Check that chain ends are as nearly as possible equidistant from the axis



Actuator Drive Gear Box - Removal/Installation
Figure 402

of their driving gear. The difference between the two lengths must not exceed half a chain pitch.

(6)Install cable turnbuckle safety clips.

(7)Install trim actuator (Ref. 27-12-33, P. Block 401).

NOTE : Do not remove rigging pin from trim actuator.

(8)Adjust tension of cables (Ref. 27-10-00, P. Block 501).

(9)Remove rigging pin from trim actuator.

(10)Remove blanking plug from actuator body and install plug in rigging hole of actuator. Wirelock.

(11)Remove all rigging pins.

(12)Install cover plates on Captain's and First Officer's control wheels.

(13)Close circuit breaker 3CG.

E. Test

(1)Perform functional test as described in 27-12-00, P. Block 501.

F. Close-Up

(1)Remove warning notices.

(2)Depressurize hydraulic system and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).

(3)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(5)Close access doors.

(6)Close main gear main doors (Ref. 32-12-11, P. Block 301).

(7)Remove access platform.

AILERON TRIM ACTUATOR (9CG) - REMOVAL/INSTALLATION

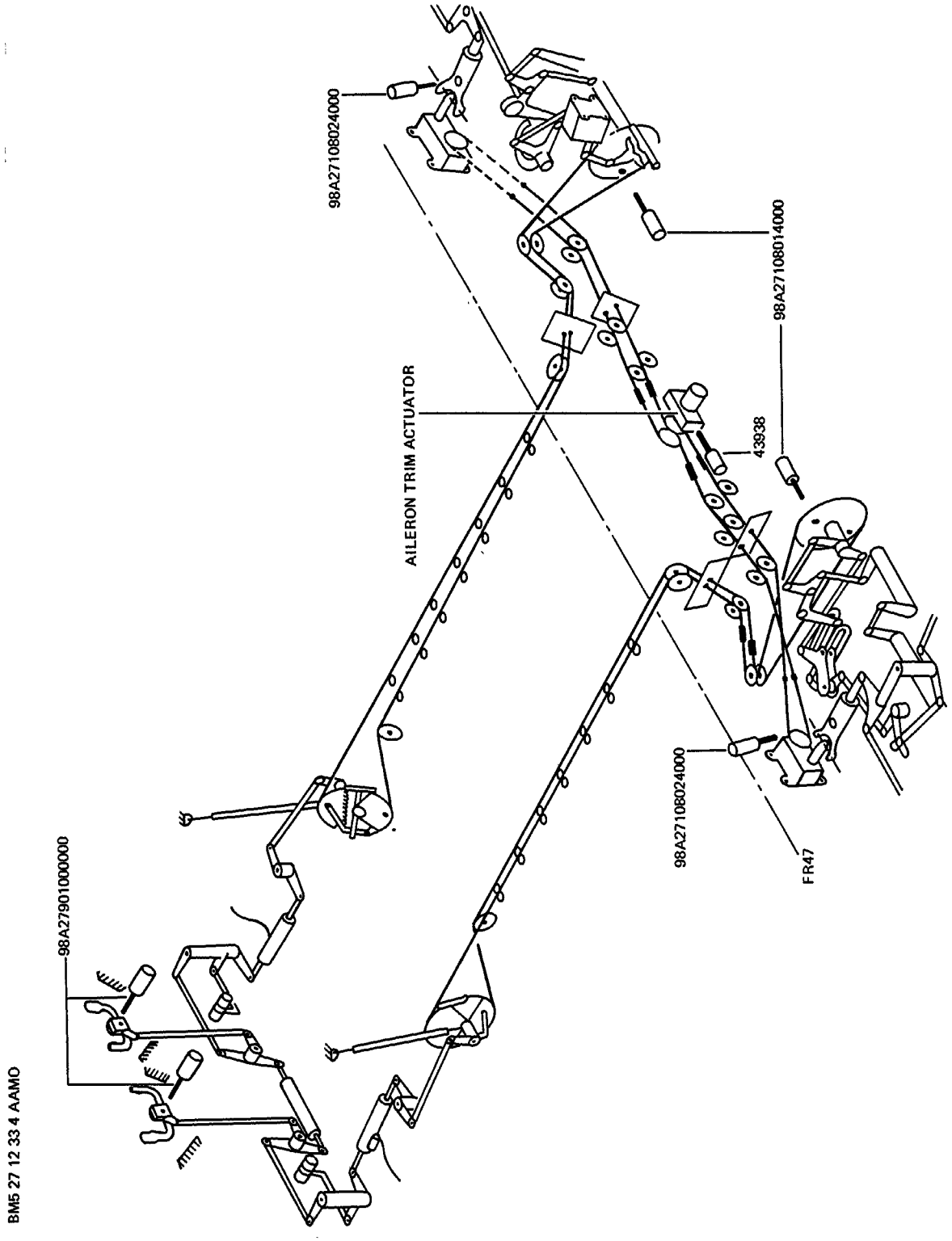
WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A27108024000	Rigging Pin - ASA Trim Spindle
B. 43938	Pin - Rigging, Rudder and Aileron Trim Actuators
C. 98A27901000000	Pin - Rigging, Aileron Control Wheel
D. 98A27108014000	Rigging Pin - Cable Drum Differential Droop Unit
E. Material No. 04-004	Common Greases (Ref. 20-31-00)
F.	Circuit Breaker Safety Clips
G.	Blanking Plugs
H.	Warning Notice Prohibiting Depressurization of Hydraulic System
J.	Access Platform (1.5 m to 7 m) (5ft. to 23 ft.)
K.	Lockwire - Corrosion Resistant Steel (Dia. 0.8 mm) (0.032 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 27-12-00, P. Block 501	Trim (Aileron)

2. Procedure

A. Job Set-up
(Ref. Fig. 401)
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(2)Connect hydraulic ground power cart and pressurize the Green hydraulic system (Ref. 29-10-00, P. Block 301).
(3)Position access platform and open forward passenger/crew door.
(4)Display a warning notice on overhead panel in flight compartment and on



Location of Components and Rigging Points
Figure 401

hydraulic ground power cart prohibiting depressurization of hydraulic system.

(5)Make certain that Captain's and First Officer's control wheels are in neutral position (aileron trim at neutral).

(6)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/AIL/TRIM	3CG	331/V63

(7)Make certain that flap and slat control lever is in first notch position (flaps and slats fully retracted).

(8)Remove cover plates from Captain's and First Officer's control wheels.

(9)Install rigging pins 98A27901000000 in Captain's and First Officer's control wheels.

(10)Open main gear main doors (Ref. 32-12-11, P. Block 301).

(11)Cut and remove lockwire, remove plug blanking rigging hole of trim actuator. Install plug on actuator body.

(12)Check trim actuator output shaft mid travel position (indicator visible in slot on actuator lower section). Install rigging pin 43938 in trim actuator.

(13)Position access platform.

(14)Open access doors 575AB and 675AB.

(15)Install rigging pin 98A27108014000 in all speed aileron cable quadrants.

(16)Open access doors 575BB and 675BB.

(17)Install rigging pins 98A27108024000 on left and right trim screw jacks.

B. Removal

(Ref. Fig. 402)

(1)Disconnect electrical connector (1) 9CG-A and install blanking plugs/caps.

(2)Hold aileron trim actuator (2).

(3)Remove bolts (3) and washers (4).

(4)Remove aileron trim actuator (2)

C. Preparation of Replacement Component

(1)Make certain that rigging pin is installed in replacement aileron trim actuator.

(2)Affix placard 9CG to aileron trim actuator.

D. Installation

NOTE : Lubricate bolts with grease Material No. 04-004

(1)Position aileron trim actuator (2) on actuator drive gearbox (5).

(2)Attach with bolts (3) and washers (4).

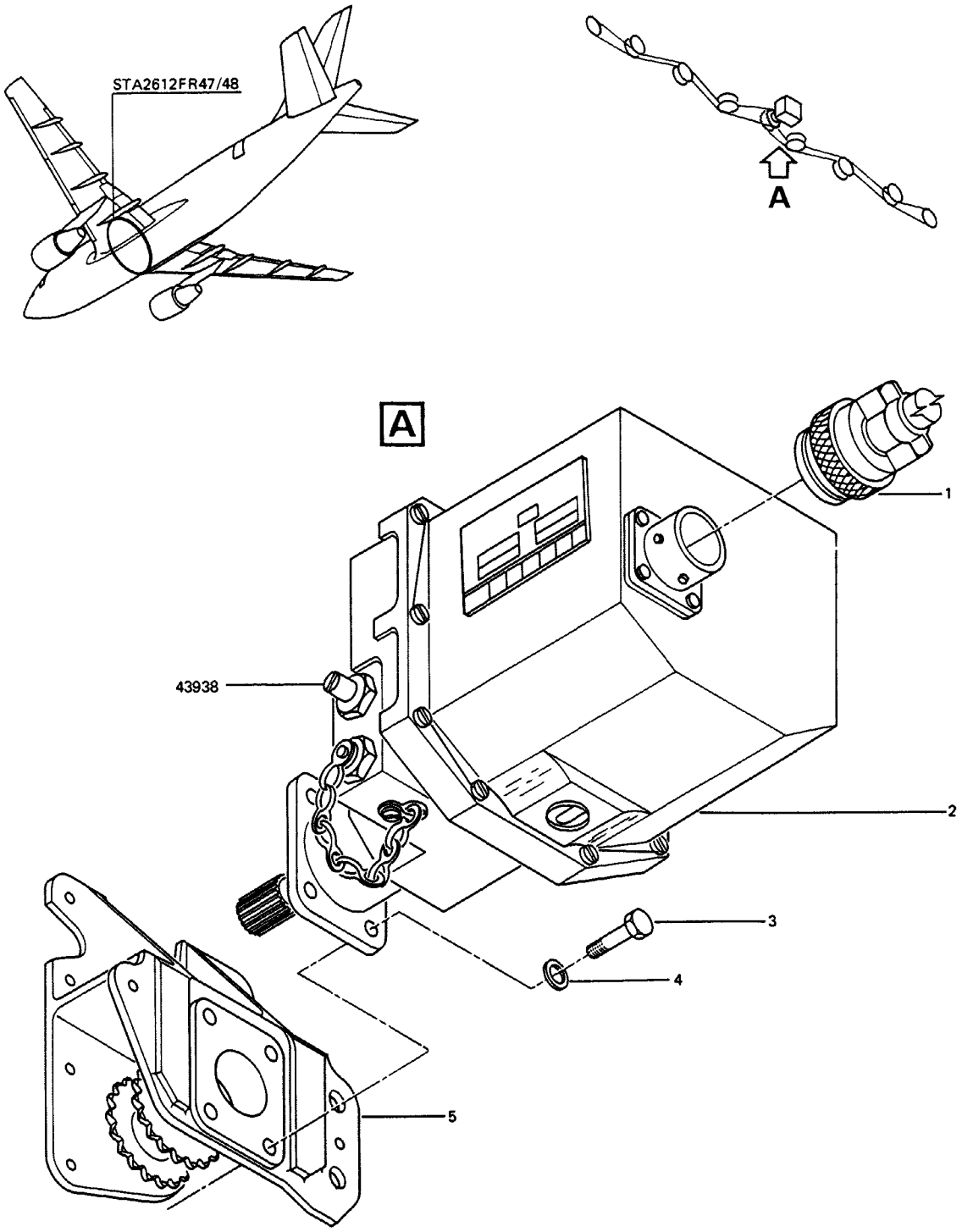
(3)Remove blanking plugs/caps and connect electrical connector (1) 9CG-A

(4)Remove rigging pins from Captain's and First Officer's control wheels and from all speed aileron cable quadrants.

(5)Install cover plates on Captain's and First Officer's control wheels.

(6)Remove rigging pins from trim actuator and left and right trim screw jacks.

(7)Remove blanking plug from actuator body and install plug in rigging hole



Aileron Trim Actuator
Figure 402

of actuator. Wirelock.
(8)Remove safety clip and close circuit breaker 3CG.

E. Test
Perform functional test as described in 27-12-00, P. Block 501.

F. Close-up
(1)Remove warning notices
(2)Depressurize hydraulic system and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(3)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(5)Close access doors
(6)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(7)Remove access platform.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENTS, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 4 m (13 ft.)
B. 98A27108024000	Rigging Pin - ASA Trim Spindle
C. 98A27108025000	Rigging Pin - Droop Drive Layshaft
D. 98A27901000000	Rigging Pin - Aileron Control Wheel
E.	Warning Notice Prohibiting the Pressurization of Hydraulic Systems
F.	Safety Barriers
G.	Circuit Breaker Safety Clips and Tags
H.	Turnbuckle Safety Clips
I.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
J. Material No. 04-004	Common Greases (Ref. 20-31-00)
K. Material No. 05-005	Special Materials (Ref. 20-31-00)
L. Material No. 09-003	Sealants (Ref. 20-31-00)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-10-00, P. Block 501	Aileron
R - 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 27-11-34, P. Block 401	Adjustable Lever
- 27-12-00, P. Block 501	Trim (Aileron)
- 27-13-13, P. Block 401	Artificial Feel Unit
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

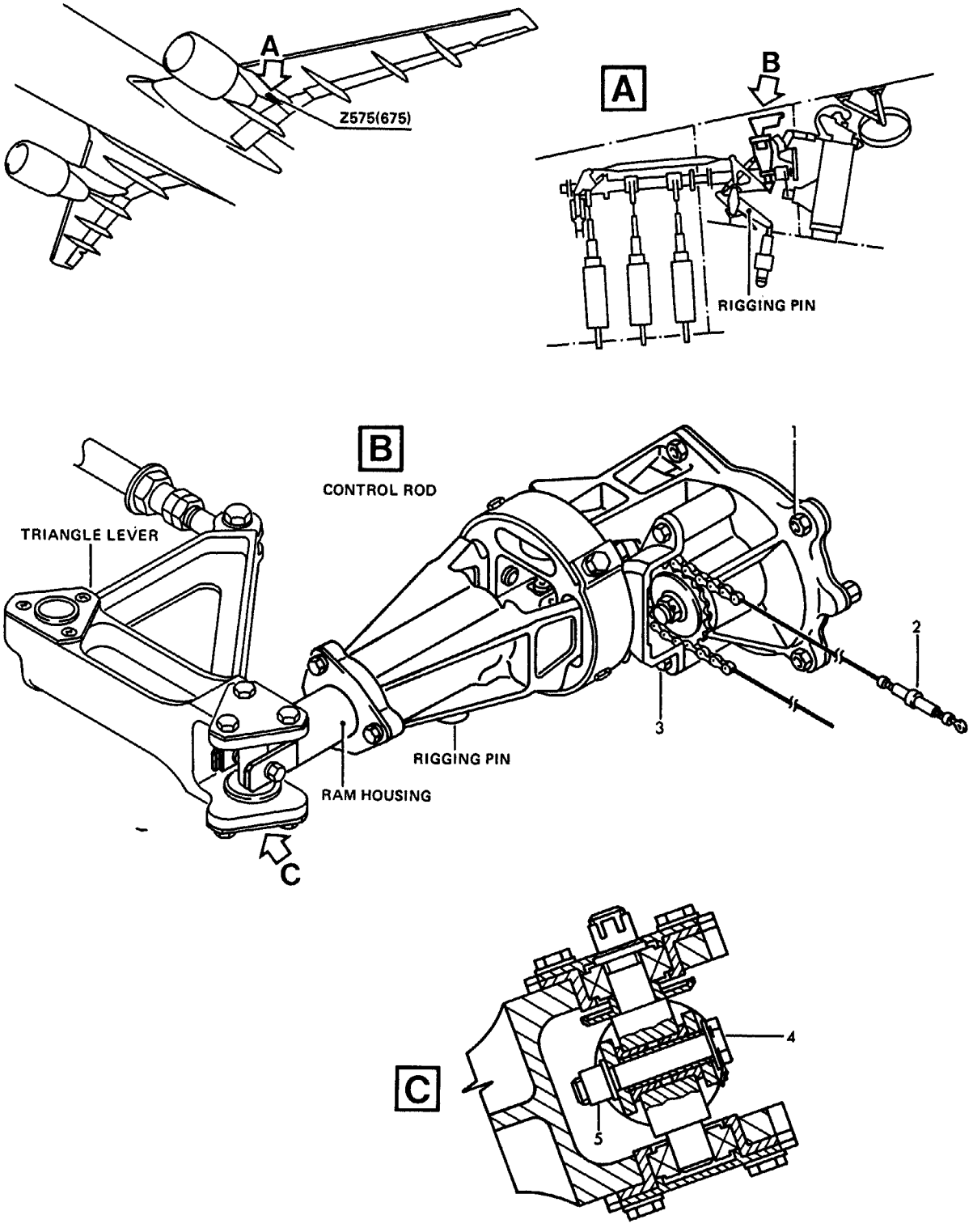
2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Position safety barriers.

(2)Connect electrical ground power unit and energize the aircraft



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Trim Screwjack
Figure 401

electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Pressurize GREEN, BLUE, or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).
(5)Centralize aileron control wheel.
(6)Set aileron trim to zero.
(7)Install rigging pins PN 98A27901000000 in both control wheels.
(8)Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(10)Position access platform.
(11)Depressurize hydraulic system pressurized in para. 2.A.(4) and ensure other two systems are not pressurized (Ref. 29-10-00, P. Block 301).
(12)Display warning notice prohibiting pressurization of hydraulic systems.
(13)Open access door 575BB, (675BB).
(14)Install rigging pin PN 98A27108025000 in layshaft.

B. Removal
(1)Cut and remove lockwire.
(2)Remove bolts (3) and remove sprocket guard from trim screwjack.
(3)Slacken chain at turnbuckle (2) and disengage chain from sprocket (Ref. 27-10-00, P. Block 501).
(4)Disconnect trim screwjack from triangle lever by removing bolt assembly (4)from anchor nut (5).
(5)Support trim screwjack and remove nuts (1).
(6)Remove trim screwjack.

C. Installation
(1)Apply sealant (Material No. 09-003) to contact faces of trim screwjack and studs.
(2)Install trim screwjack on studs, install nuts (1) and tighten.
(3)Rotate trim screwjack sprocket by hand until rigging pin PN 98A27108024000 can be easily inserted into trim screwjack setting the neutral position.
Further rotate sprocket until rigging pin is lightly pinched by ram housing and held in position.
(4)Connect trim screwjack to triangle lever, install bolt assembly (4) and tighten.
(5)Safety with lockwire.
(6)Engage chain on sprocket so that the ends of the chain are equally

disposed within half a link.
(7)Adjust cable tension (Ref. 27-10-00, P. Block 501).
(8)Check that ram housing has not moved from previously set position.
NOTE : Rigging pin should remain lightly held in position as described in step (3).
(9)If movement of ram housing has occurred, repeat steps (7) and (8).
(10)Safety turnbuckle with safety clips.
(11)Lightly lubricate chain and sprocket with grease (Material No. 04-004).
(12)Install sprocket guard and secure with bolts (3).
(13)Apply corrosion preventive coating (Material No. 05-005) to protruding threads of studs and bolt assembly (4).
(14)Check that artificial feel unit has not moved from neutral position. If artificial feel unit has moved from neutral position adjust length of control rod (Ref. 27-13-13, P. Block 401).
(15)Remove rigging pin from trim screwjack.
(16)Remove rigging pin from layshaft.
(17)Remove rigging pins from aileron control wheels.
(18)Remove safety clips and tags and close circuit breakers 10CV, 5CV, 6CV, 45CV, 1CB and 3CG.

D. Test
(1)Carry out adjustment of adjustable lever (Ref. 27-11-34, P. Block 401).
(2)Carry out operational test of aileron trim system (Ref. 27-12-00, P. Block 501).
R (3)Do the adjustment of the all speed ailerons to neutral (Ref. 27-11-00,
R P. Block 501).

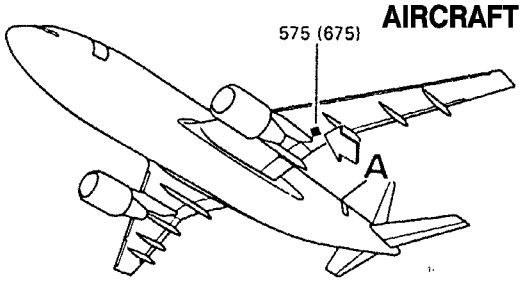
E. Close-Up
(1)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(2)Make certain that work area is clean and clear of tools and miscellaneous items of equipment and close access door 575BB (675BB).
(3)Remove safety barriers and access platform.
(4)Remove warning notice prohibiting pressurization of hydraulic systems.

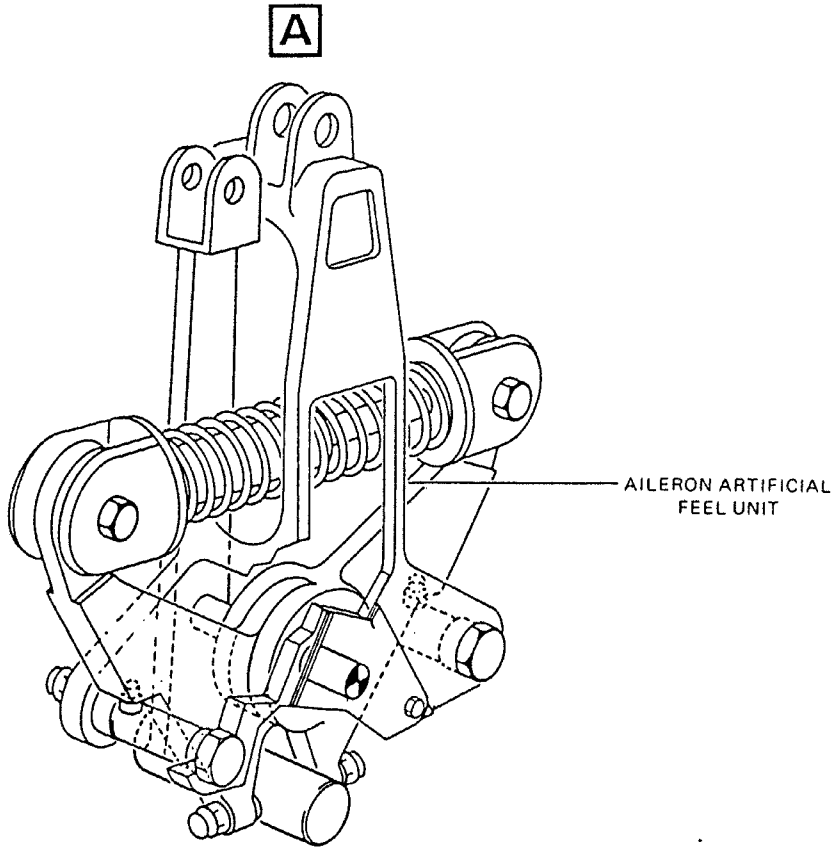
ARTIFICIAL FEEL (AILERON) - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 002)
   There are two identical artificial feel units, each installed immediately downstream of the all speed aileron servo control actuating spring rods. The units each include a spring rod and are held in position ty the trim screwjacks (Ref. 27-12).
   Their function is :
   - To maintain servo control input linkage in trim position in the event of disconnection of the control linkage upstream of the servo controls ;
   - To provide artificial feel loads proportional to control wheel deflection ;
   - To provide accurate return of the surfaces to neutral.

2. Component Location
   (Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	AILERON ARTF FEEL UNIT-L		575	575BB	27-13-13
	AILERON ARTF FEEL UNIT-R		675	675BB	27-13-13





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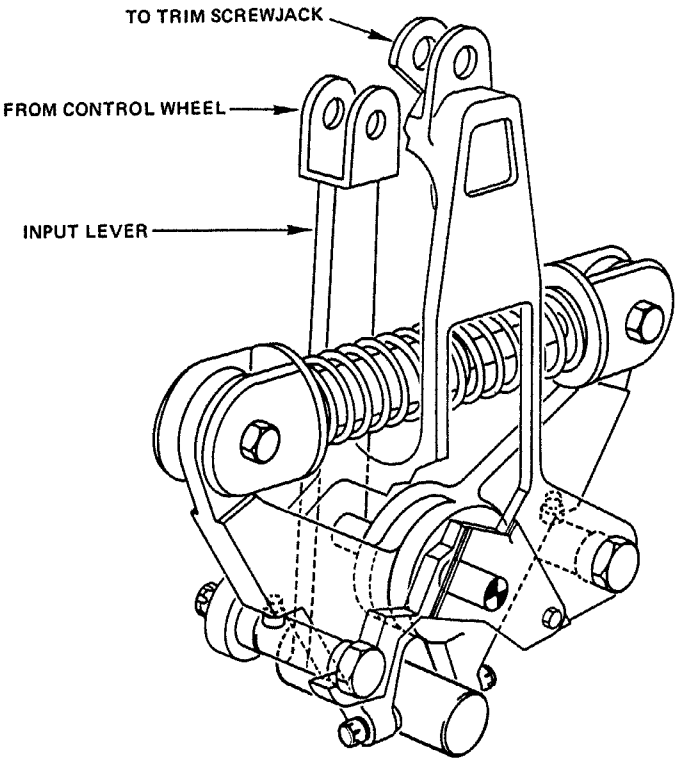
Component Location
Figure 001

3. Leading Particulars

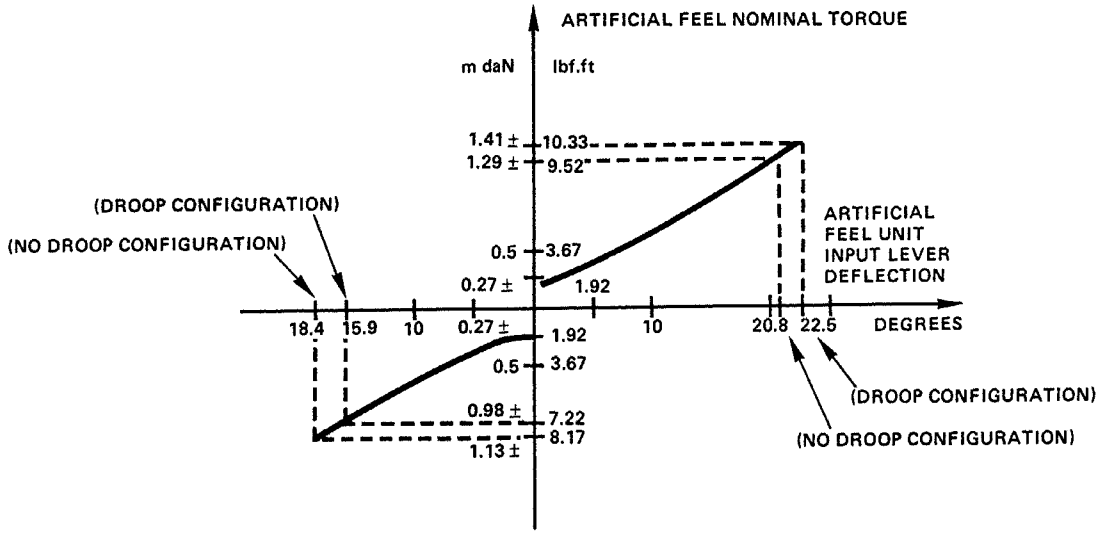
A. Artificial Feel Unit Characteristic

(Ref. Fig. 002)

B. Control Wheel Force Versus Deflection (Ref. Fig. 003)



DETAIL A



DETAIL B CHARACTERISTIC

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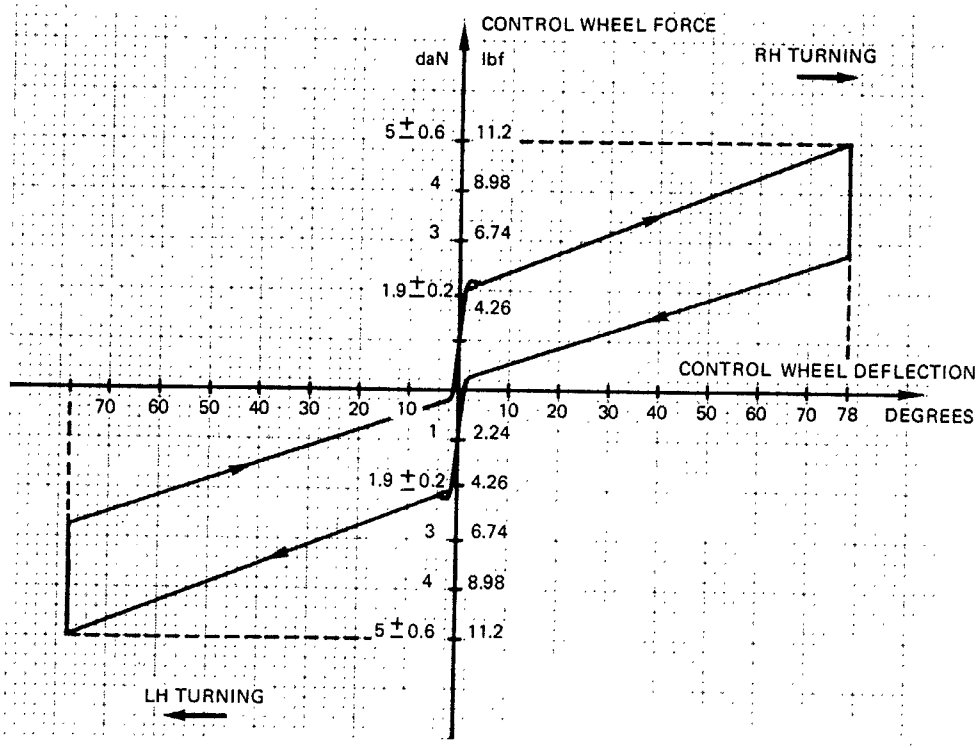
Artificial Feel Unit
Figure 002



NOTE - THIS CHARACTERISTIC REPRESENTS A COMPLETE CYCLE MADE IN A SLOW MOVEMENT

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Control Wheel Force Versus Deflection
Figure 003

ARTIFICIAL FEEL UNIT - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENTS, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 4 m (13 ft.)
B. 98A27108024000	Rigging Pin - ASA Trim Spindle
C. 98A27108025000	Rigging Pin - Droop Drive Layshaft
D. 98A27901000000	Rigging Pin - Aileron Control Wheel
E.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
F.	Safety Barriers
G.	Circuit Breaker Safety Clips and Tags
H.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
I.	Cotter Pins
J. Material No. 04-004	Common Greases (Ref. 20-31-00)
K. Material No. 05-005	Special Materials (Ref. 20-31-00)

Referenced Procedures

R	- 24-41-00, P. Block 301	AC External Power Control
R	- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
R	- 27-11-34, P. Block 401	Adjustable Lever
R	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)

2. Procedure

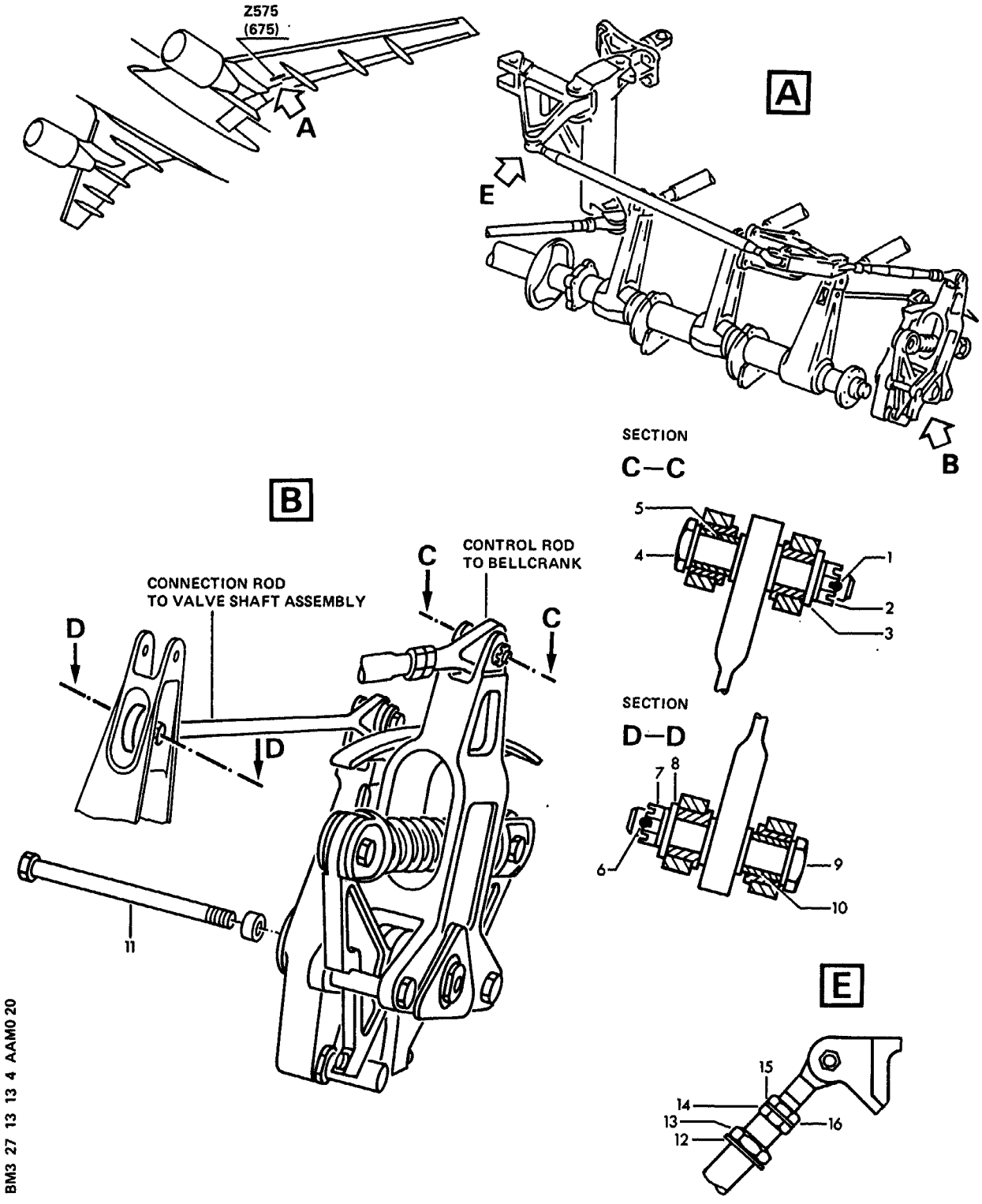
(Ref. Fig. 401)

A. Job Set-Up

(1)Position safety barriers.

(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Make certain that electronics racks ventilation is correct.



Artificial Feel Unit
Figure 401

(4)Pressurize GREEN, BLUE, or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).
(5)Centralize aileron control wheel.
(6)Set aileron trim to zero.
(7)Install rigging pins PN 98A27901000000 in both control wheels.
(8)Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(10)Position access platform.
(11)Depressurize hydraulic system pressurized in para.2.A.(4) (Ref. 29-10-00, P. Block 301) and ensure other two systems are not pressurized.
(12)Display warning notice prohibiting pressurization of hydraulic systems.
(13)Open access doors 575BB, 575CB (675BB, 675CB).
(14)Install rigging pin PN 98A27108024000 in trim screwjack.
(15)Install rigging pin PN 98A27108025000 in layshaft.

B. Removal
(1)Remove and discard cotter pin (1); remove castle nut (2), washer (3), bolt (4) and bush (5); disconnect connection rod from valve operating shaft.
(2)Remove and discard cotter pin (6); remove castle nut (7), washer (8), bolt (9) and bush (10); disconnect control rod from artificial feel unit.
(3)Cut and remove lockwire; support artificial feel unit and remove bolt (11).
(4)Remove artificial feel unit.

C. Installation
(1)Apply grease (Material No. 04-004) over full length of bolt (11).
(2)Support artificial feel unit; install bolt (11) and tighten.
(3)Safety with lockwire.
(4)Positon connection rod on valve operating shaft; install bush (5), bolt (4), washer (3), castle nut (2) and tighten.
(5)Safety with cotter pin (1).
(6)Position control rod on artificial feel unit; install bush (10), bolt (9), washer (8), castle nut (7) and tighten.
(7)Safety with cotter pin (6).
(8)Check that artificial feel unit has not moved from neutral position

(stops remain in contact with guide roller).

(9)If artificial feel unit has moved from neutral position, adjust length of control rod:

(a)Cut and remove lockwire; loosen nut (16).

(b)Disengage locking washer (15).

(c)Release locking device (12) and loosen nut (13).

(d)Adjust length of control rod by rotating threaded bush (14) until stops on artificial feel unit have equal contact with guide roller.

(e)Tighten nut (13) and secure with locking washer (12).

(f)Engage locking washer (15); tighten nut (16) and safety with locking wire.

(10)Apply corrosion preventive (Material No. 05-005) to protruding threads of bolts (4) and (9).

(11)Remove rigging pin from trim screwjack.

(12)Remove rigging pin from layshaft.

(13)Remove rigging pins from aileron control wheels.

(14)Remove safety clips and tags and close circuit breakers 10CV, 5CV, 6CV, 45CV, 1CB and 3CG.

D. Test

(1)Carry out adjustment of adjustable lever (Ref. 27-11-34, P. Block 401).

R (2)Do the adjustment of the all speed ailerons to neutral (Ref. 27-11-00,
R P. Block 501).

E. Close-Up

(1)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(2)Make certain that work area is clean and clear of tools and miscellaneous items of equipment and close access doors 575BB, 575CB (675BB, 675CB).

(3)Remove safety barriers and access platform.

(4)Remove warning notice prohibiting pressurization of hydraulic systems.

HYDRAULIC ACTUATION (AILERON) - DESCRIPTION AND OPERATION

1. General

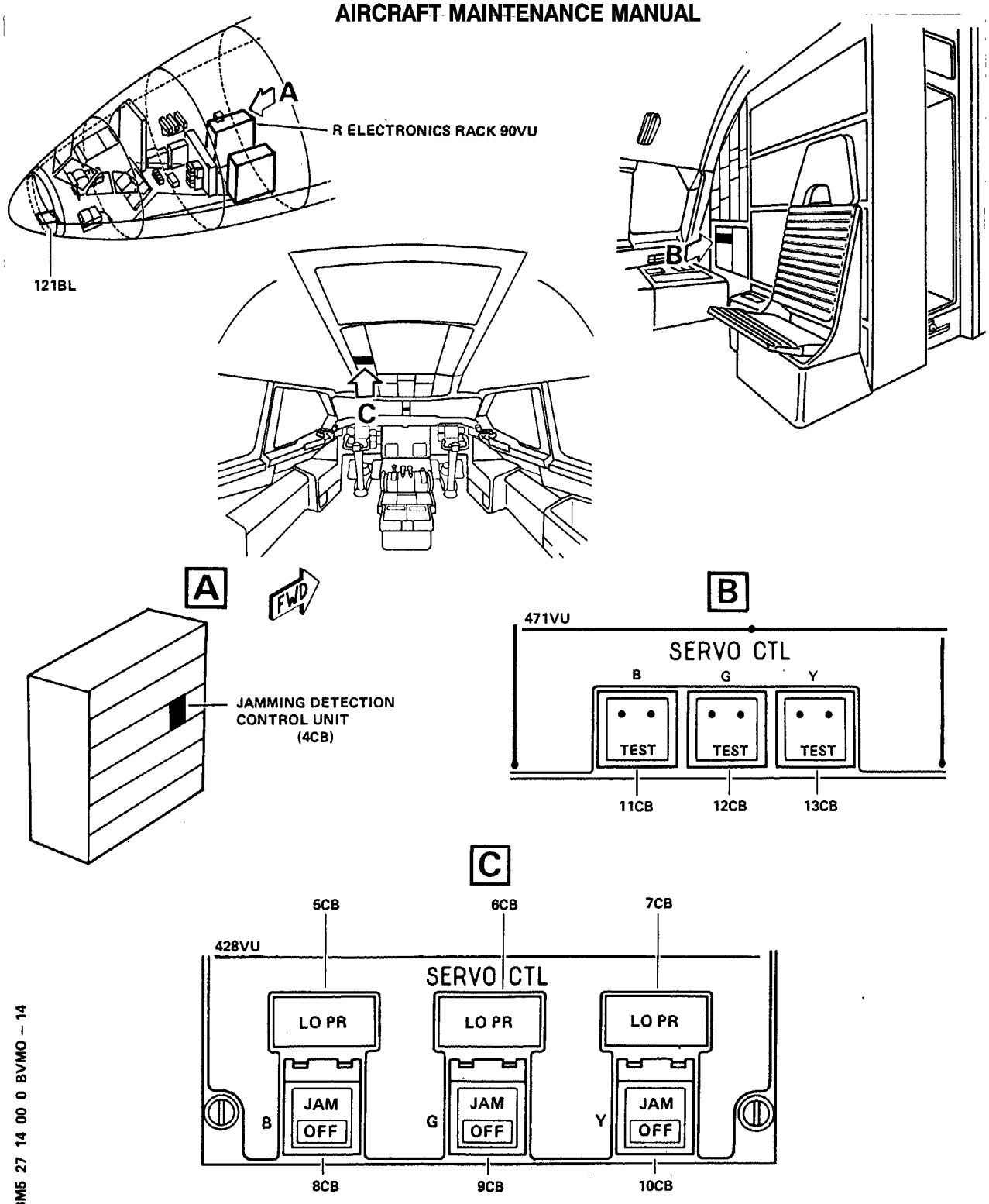
Hydraulic actuation is achieved by :

- Three mechanical input servo controls associated with a control valve jamming detection system for each all speed aileron.
- One hydraulic actuator controlled by one electrical input valve group for each spoiler, 3 to 7 (Ref. 27-64).

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
1064	PRIORITY VALVE-GREEN		147		27-14-14
1135	ISOL VALVE BLOCK-LEAKAGE MEASUREMENT, GREEN		147		27-14-21
2064	PRIORITY VALVE-BLUE		571		27-14-14
2135	ISOL VALVE BLOCK-LEAKAGE MEASUREMENT, BLUE		571		27-14-22
3064	PRIORITY VALVE-YELLOW		148		27-14-14
3135	ISOL VALVE BLOCK-LEAKAGE MEASUREMENT, YELLOW		148		27-14-23
4CB	CTL UNIT-JAMMING DETECTION	90VU	122	121BL	27-14-17
5CB	WARNING LIGHT-SERVO CTL/LO PR	428VU	211		
6CB	WARNING LIGHT-SERVO CTL/LO PR	428VU	211		
7CB	WARNING LIGHT-SERVO CTL/LO PR	428VU	211		
8CB	P/BSW-SERVO CTL/B	428VU	211		
9CB	P/BSW-SERVO CTL/G	428VU	211		
10CB	P/BSW-SERVO CTL/Y	428VU	211		
11CB	P/BSW-SERVO CTL/B	471VU	212		
12CB	P/BSW-SERVO CTL/G	471VU	212		
13CB	P/BSW-SERVO CTL/Y	471VU	212		
14CB	SEL VALVE-SERVO CTL, GREEN		147		27-14-11
15CB	SEL VALVE-SERVO CTL, BLUE		571		27-14-11
16CB	SEL VALVE-SERVO CTL, YELLOW		148		27-14-11
17CB	PRESS SWITCH-SERVO CTL, B		571		27-14-18
18CB	PRESS SWITCH-SERVO CTL, Y		148		27-14-18
19CB	PRESS SWITCH-SERVO CTL, G		147		27-14-18
20CB	SERVO CTL-R ASA, BLUE		675	675CB	27-14-12
21CB	SERVO CTL-L ASA, BLUE		575	575CB	27-14-12
25CB	SERVO CTL-L ASA, GREEN		575	575CB	27-14-12
26CB	SERVO CTL-R ASA, GREEN		675	675CB	27-14-12
30CB	SERVO CTL-R ASA, YELLOW		675	675CB	27-14-12
31CB	SERVO CTL-L ASA, YELLOW		575	575CB	27-14-12
	MICROSWITCH-ASA SERVO CTL, JAMMING DETECTION				27-14-24



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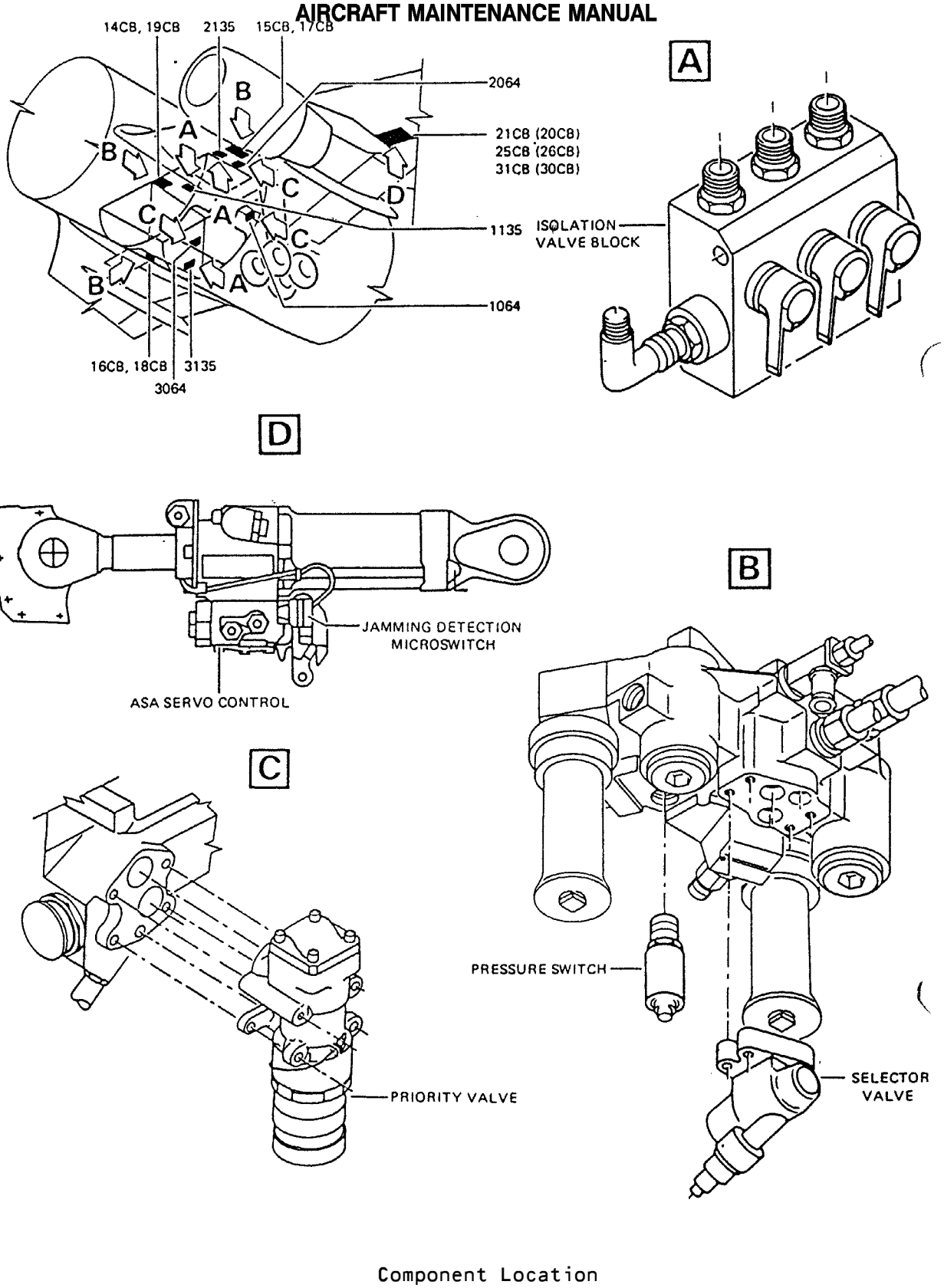
Component Location
Figure 001



Component Location
Figure 002

3. Component Description

A. All Speed Aileron Servo Control
(Ref. Fig. 003)
(Ref. Fig. 004)

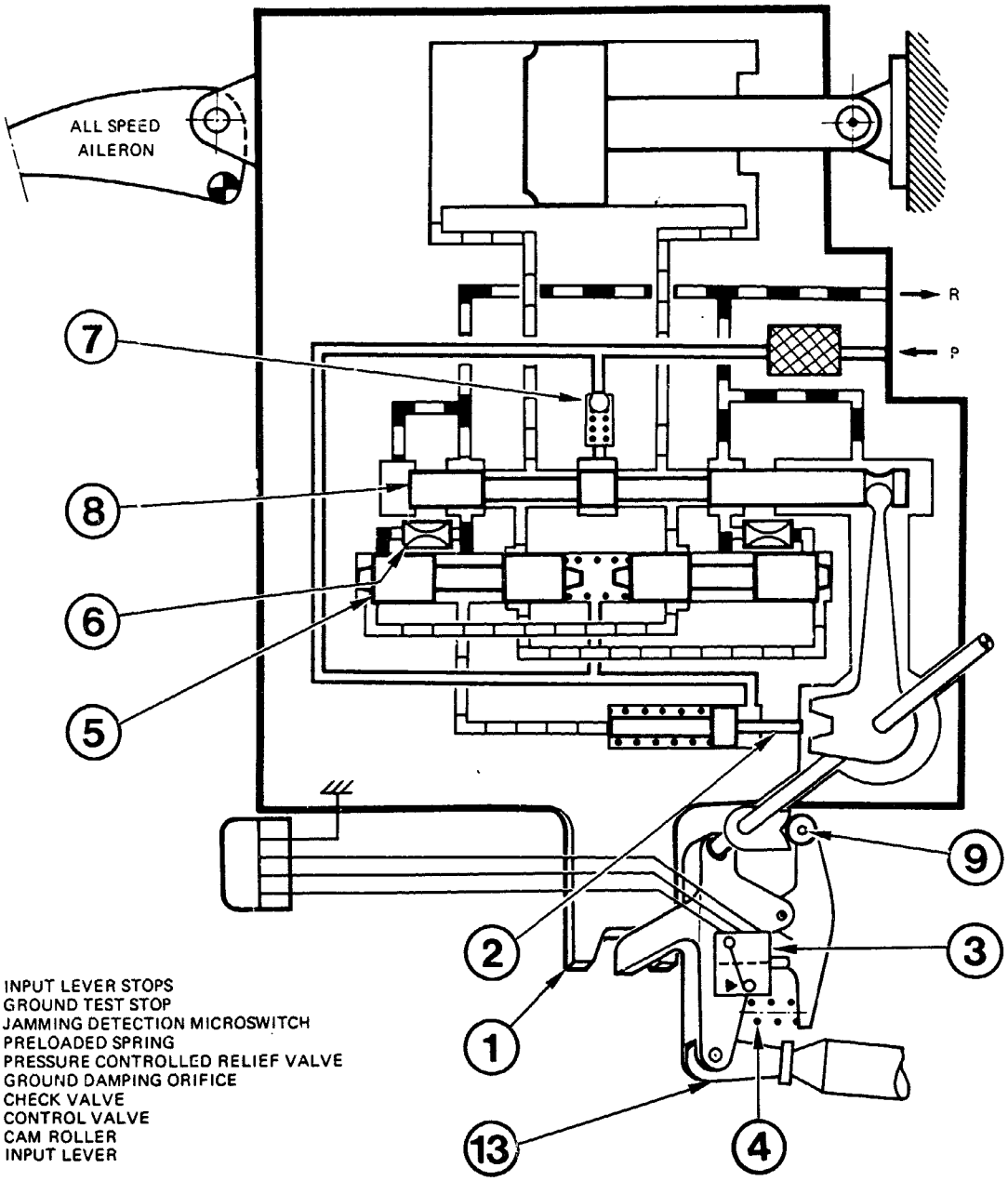
(1) General
The six servo controls (three per ASA) are interchangeable.

(2) Normal operation with the servo control pressurized
The moving servo control body is slaved to the mechanical input signal via input lever (13), travel of which is limited by stops (1). The lever actuates control valve (8).
In the event of overpressure in one of the chambers, check valve (7) holds supply pressure against one of the faces of pressure controlled relief valves (5). Chamber overpressure is then applied to the other face of one valve (5) and causes it to move ; the two chambers are then connected to the return line, thus ensuring anti-cavitation and over pressure limitation functions.

(3) Operation in the event of control valve jamming
When the input force is higher than pre-loaded spring (4) force, roller (9) moves out of its cam. This depresses microswitch (3) which transmits a warning signal to the crew via the jamming detection system. The crew must then shut off the power supply from the hydraulic system involved.
The warning is provided to prevent excessive fatigue loads on the structural attachments of the servo control, if the failure has remained hidden for several flights.

(4) Operation on the ground, with the servo control depressurized
In the event of the control surface being subjected to external forces (e.g. gust forces), pressure increases in one of the chambers, thus causing one pressure controlled relief valve to open. This chamber then empties into the return line via a small orifice (6) which provides a ground gust damping function, for gust speeds up to 80 kts.

(5) Ground test device
The jamming detection device can be tested by means of stop (2) which is extended when there is no pressure, and limits the travel of the control valve.
Operation of input lever (13) over a sufficient amount of travel then depresses microswitch (3) and allows it to be checked for correct operation.



1 – INPUT LEVER STOPS
2 – GROUND TEST STOP
3 – JAMMING DETECTION MICROSWITCH
4 – PRELOADED SPRING
5 – PRESSURE CONTROLLED RELIEF VALVE
6 – GROUND DAMPING ORIFICE
7 – CHECK VALVE
8 – CONTROL VALVE
9 – CAM ROLLER
13 – INPUT LEVER

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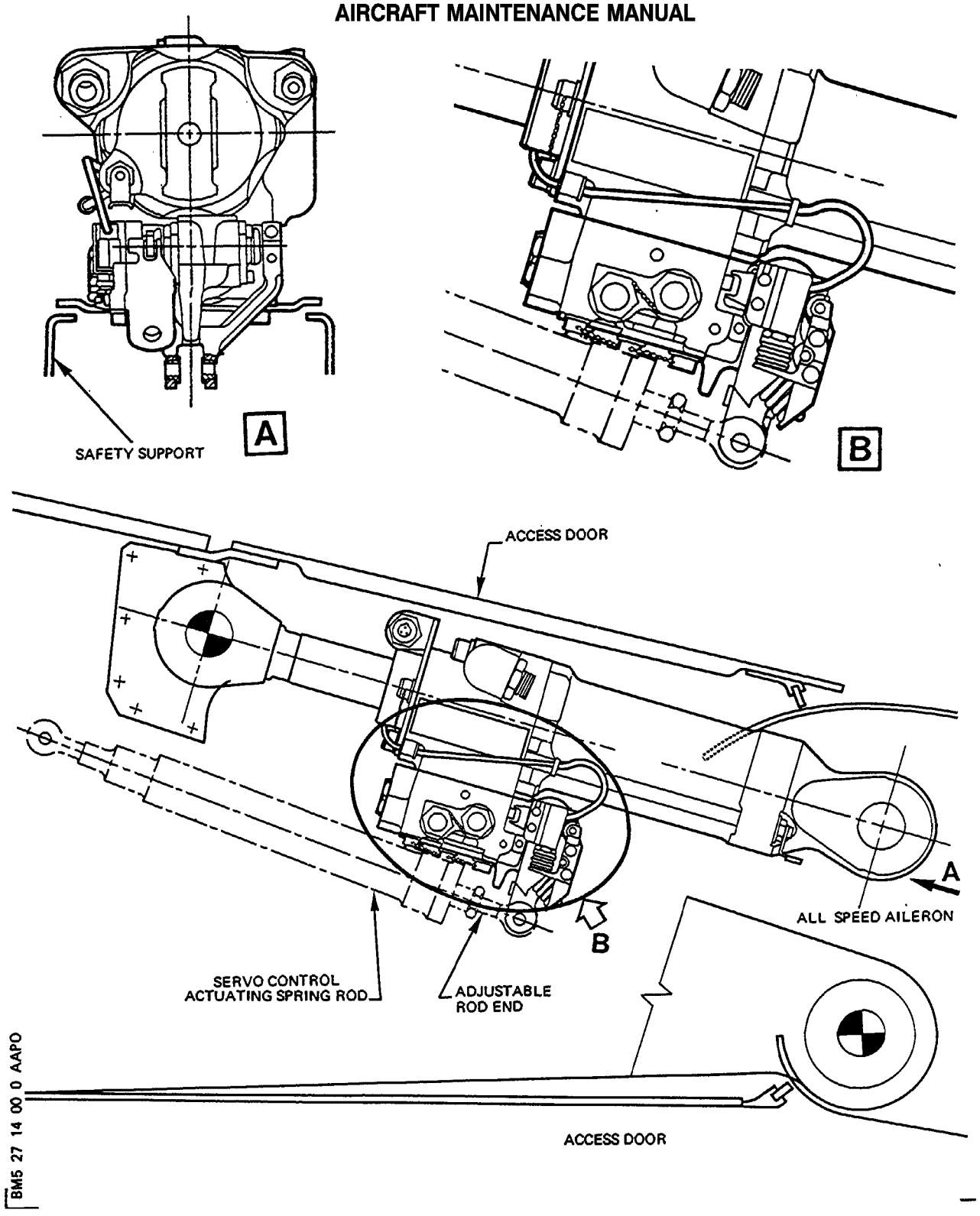
All Speed Aileron Servo Control
Figure 003



All Speed Aileron Servo Control - Installation
Figure 004

(6)Maintenance : on condition
LRUs : - filter
- microswitch.

(7)Leading particulars

(a)Mechanical

- Piston area
  - . Large.....38.15 cm² (5.95 in.²)
  - . Small (annular).....27.63 cm² (4.28 in.²)
- Stall load (for HP = 200 bars/2900 psi and LP = 5 bars/73 psi and no friction)
  - . Extension.....7492 daN (16874 lbf)
  - . Retraction.....5326 daN (11995 lbf)
- Operating stroke.....112.5 mm (4.4 in.) corresponding to ASA deflection of.....23° up or down
- Stop-to-stop stroke.....125.2 mm /4.9 in.)
- Maximum jamming detection spring breakout force.....70 N
- Maximum input lever operating force.....2 N
- Weight (filled with fluid)

(b)Hydraulic

- Maximum speed without external load, in degrees/s of ASA deflection :
  - . Extension.....51 ±10°/s
  - . Retraction.....47 ±10°/s
- Corresponding to a maximum flow (l/mn) for HP = 175 bars (2538 psi) and LP = 15 bars (218 psi)
  - . Extension.....34.4 l/mn (9 US gal)
  - . Retraction.....23.2 l/mn (6.1 US gal)
- Maximum internal leakage
  - . When new.....0.2 l/mn (0.05 US gal)
  - . After 12 000 flight hours.....2 l/mn (0.52 US gal)
- Maximum external leakage
  - . When new.....nil
  - . After 12 000 flight hours.....1 drop every 3 mn

4. Control Valve Jamming Detection System

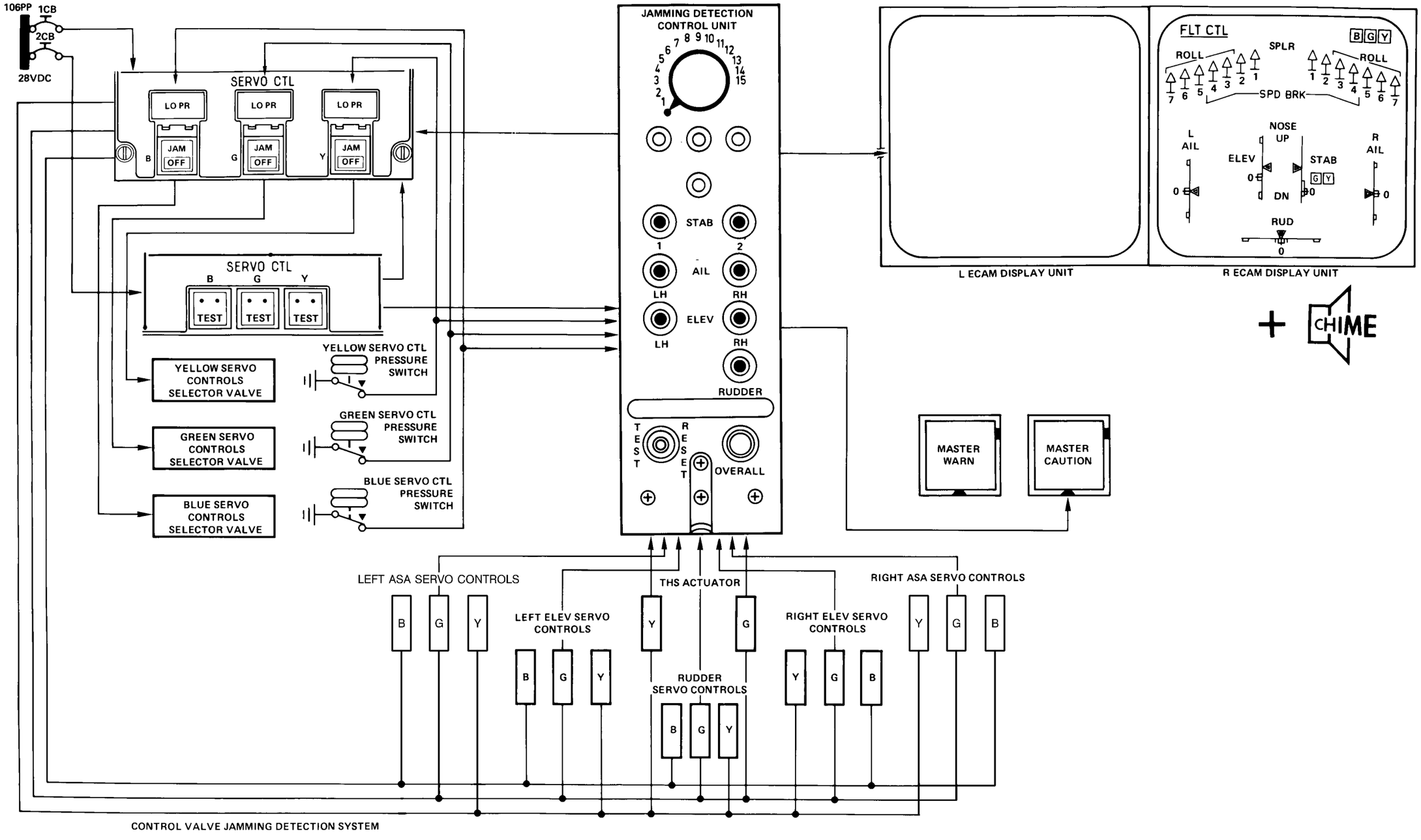
R (Ref. Fig. 005)

A. General

The following main components are associated with the hydraulic selection and jamming detection system.

- On SERVO CTL section of control panel 428VU
  . Three pushbutton switches : 8CB, 9CB, 10CB
  . Three LO PR warning lights : 5CB, 6CB, 7CB
- On SERVO CTL section of maintenance panel 471VU
  . Three magnetic latch pushbutton switches 11CB, 12CB, 13CB.
- Jamming detection control unit 4CB, in shelf 93VU
- A jamming detection microswitch on each servo control driving the following surfaces :
  . Left and right all speed ailerons (Ref. 27-10)
  . Left and right elevators (Ref. 27-30)
  . Rudder (Ref. 27-20)
- Two microswitches on the control valve control mechanism of each THS actuator hydraulic motor (Ref. 27-40)
  The first microswitch (1) is actuated when discrepancy between control input and feedback position information in the control valve control mechanism reaches a first threshold.
  The second microswitch (2) is actuated when the discrepancy reaches a threshold higher than the previous one. When microswitch 2 is actuated, microswitch 1 is also actuated.
- Three hydraulic servo controls selector valves : 14CB, 15CB, 16CB, one on each hydraulic system. The selector valves are open, allowing fluid flow, when de-energized. When energized they close, shutting off downstream pressure supply.
- Three pressure switches : 17CB, 18CB, 19CB downstream of each hydraulic selector valve.

NOTE : The circuitry has been so designed as to prevent the possibility of hydraulic power supply to the flight controls being simultaneously cut off on all three hydraulic systems. For this purpose the + 28V used to energize the hydraulic selector valves by an OFF selection on each pushbutton switch is available only if the OFF legend on at least one of the two remaining pushbutton switches is not on.



Control Valve Jamming Detection System
Figure 005

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R

B. Jamming Indicating

(1)If jamming occurs :

- On the control panel : the JAM legend on the corresponding SERVO CTL pushbutton switch comes on.
- On the control unit face : a light indicates the hydraulic system involved, and a magnetic indicator indicates the surface affected.
- On CAPT and F/O main instrument panel 3VU and 5VU :
  . MASTER CAUTION lights flash
  . Single chime sounds.
- On the left ECAM display unit : indication of the jammed component and of crew action then required (OFF selection for the corresponding hydraulic system).

(2)After crew action

- On the control panel : the LO PR warning light associated with the hydraulic system involved comes on. The associated JAM legend goes off and the OFF legend comes on.
- On the control unit : the magnetic indicator of the jammed surface remains activated.
- On CAPT and F/O main instrument panels 3VU and 5VU
  . MASTER CAUTION lights flash.
- On the left ECAM display unit : indication of the result of the operation (Blue, Yellow or Green SERVO LO PR).
- On the right ECAM display unit (flight controls page) : the indication of the hydraulic system involved changes.

NOTE : On the ground, the servo control or motor involved can be identified on jamming detection control unit 4CB by the light associated with the hydraulic system concerned and the magnetic indicator of the surface affected.

(Ref. Fig. 006)

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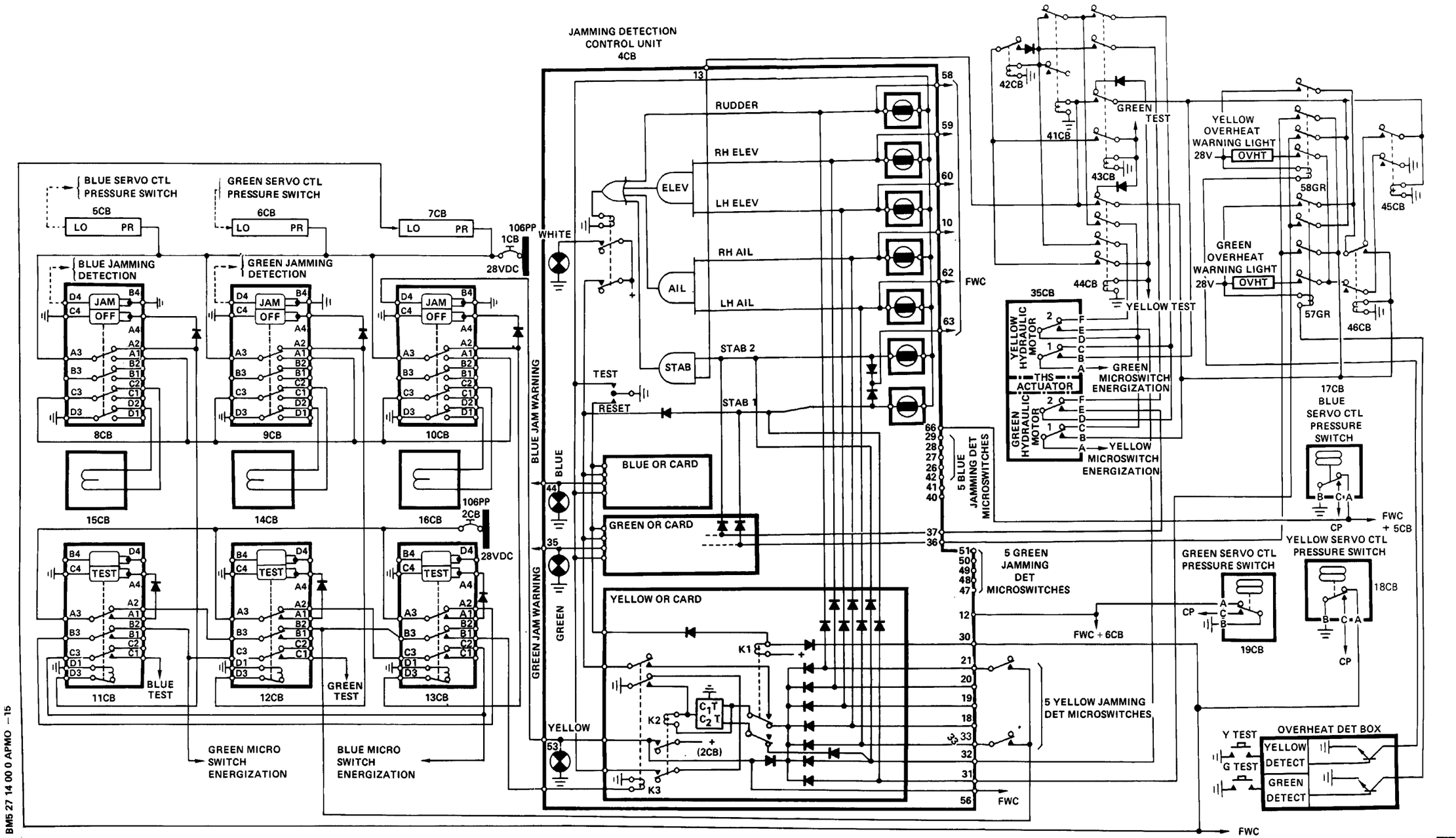


Jamming Detection Control System
Figure 006

R

C. Servo Controls Jamming Detection

There is one jamming detection circuit for each hydraulic system.
If jamming occurs the electronic circuity inside the jamming detection control unit receives a + 28V directly from the jamming detection microswitch if a servo control is involved and from an intermediate logic if a THS actuator hydraulic motor is involved.
The ± 28V is also delivered to the associated magnetic indicator control coil.
After 500 ms (50 ms for THS) jamming indication relay K2 is energized and self latched (jam indicated).
When hydraulic pressure has been cut off, relay K1 controlled by the pressure switch de-energized relay K2 and the jam indication disappears.
One contact of relay K2 is also used to connect the magnetic indicator control coils to ground. The magnetic indicator associated with the surface involved is then activated and will remain in this position until reset.
Jamming detection is associated with the mechanicaly driven control valves of the left and right all speed aileron, left and right elevator, and rudder servo controls. It is also associated with the THS actuator hydraulic motor control valves (for the Green and Yellow systems only).
NOTE : When a hydraulic system is selected OFF, the + 28V sent to the corresponding jamming detection microswitches is cut off.

D.Trimmable Horizontal Stabilizer Actuator Control Valve Jamming Detection

Two microswitches identified 1 and 2 are associated with each control valve.
The microswitches (Ref. 27-44) are actuated either in the event of stalling of the actuator, or in the event of valve jamming.
If the actuator stalls, microswitches 1 associated wit both control valves will be actuated ; the logic takes this into account and inhibits jamming indication.
If the control valve jams, only microswitches 1 and 2 associated with the jammed valve will be actuated.
Two cases of jamming may be considered :
First case : The jamming position is far enough from the valve neutral position for both microswitches 1 and 2 to be operated and a jamming indication to be delivered by microswitch 2 receiving a + 28V through contacts of microswitch 1 of the other control valve (this is to prevent jamming detection due to a speed limitation as explained previously).
Second case : the jamming position is close to the valve neutral position and only microswitch 1 is operated. The motor associated with the jammed control valve rotates permanently but this rotation is nulled in the differential gear by an opposite rotation of the second hydraulic motor. This can result in high fluid flow in the two hydraulic systems with a consequent risk of overheat detection on one of the two systems (either the one associated with the jammed hydraulic motor control valve or the other system).
A logic has therefore been added upstream of the jamming detection control unit whereby, when actuation of microswitch 1 is associated with overheat detection, a jamming indication is delivered to the jamming detection control unit, but overheat indication in the flight compartment is inhibited.

E. Safety Tests (Ref. Fig. 007, 008)

(1)Servo control jamming detection tests

The test is carried out system by system.

Pressure is shut off from the tested system (OFF selection on SERVO CTL section of control panel 428VU).

A test selection is made for the tested system on the SERVO CTL section of maintenance panel 471VU (the pushbutton switch TEST selection is maintened only if the system is also selected OFF). After OFF and TEST selection :

- Only the microswitches on the tested system are energized.
- Test relay K3 is energized : the time constant is then eliminated, and
R the coil of relay K2 is directly controlled by the test logic output.

The control column, control wheel and pedals must then be moved quickly. During each operation, the jamming detection microswitches on the corresponding axis are actuated for a short period. If signals are received from all the microswitches, the test circuits cause the JAM legend to flash.

NOTE : If the result of a test is negative (JAM legend does not flash) the fault isolation procedure is as follows :

- place TEST RESET switch on the face of the jamming detection control unit in TEST position
- Move the associated control as indicated previously
- If the microswitches are OK the corresponding magnetic indicators will transfer.
- If a microswitch is failed, the corresponding magnetic indicator will not transfer.

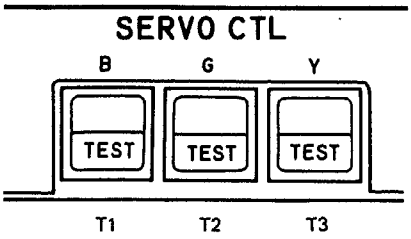
(2)Trimmable horizontal stabilizer hydraulic motor jamming detection tests

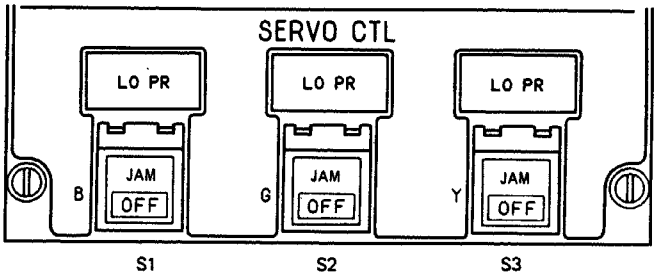
On SERVO CTL section of panel 428VU :

- Blue pressure must be provided
- Green and Yellow pressure is selected OFF.

On maintenance panel 471VU, Green system TEST is selected. Green RSVR OVHT TEST PUSHBUTTON SWITCH ON HYD PWR section of maintenance panel 471VU is then pressed and the Green JAM legend on panel 428VU comes on, then goes off When the pushbutton switch is released. When Yellow RSVR OVHT TEST pushbutton switch is pressed, the same Green JAM legend comes on. Relay 43CB is energized when TEST is selected : Relay 42CB is energized through Yellow system jamming detection microswitch 1 and Green system jamming detection microswitch 2. It is self latched.

The detents are then operated by a manual input from the pedestal mounted pitch trim control wheels actuated in either direction. The control valves are then bottomed on their stops. When jamming detection microswitch 1 (Yellow system) is actuated, relay 41CB is energized and logic ONE is received on the first input of the AND gate used for this test operation (the 28V for microswitch 2 is then delivered by relay 41CB).





ACTION						RESULTS
S1	T1	S2	T2	S3	T3	
OFF	TEST	ON	OFF	ON	OFF	→ BLUE SYS LO PR WARNING LIGHT COMES ON
· CONTROL WHEEL MOVEMENT · CONTROL COLUMN MOVEMENT · RUDDER PEDALS						→ BLUE SYS JAM LEGEND FLASHES
ON	OFF	OFF	TEST	ON	OFF	→ GREEN SYS LO PR WARNING LIGHT COMES ON
· CONTROL WHEEL MOVEMENT · CONTROL COLUMN MOVEMENT · RUDDER PEDALS						→ GREEN SYS JAM LEGEND FLASHES
ON	OFF	ON	OFF	OFF	TEST	→ YELLOW SYS LO PR WARNING LIGHT COMES ON
· CONTROL WHEEL MOVEMENT · CONTROL COLUMN MOVEMENT · RUDDER PEDALS						→ YELLOW SYS JAM LEGEND FLASHES
ON	OFF	OFF	TEST	OFF	OFF	→ GREEN AND YELLOW SYS LO PR WARNING LIGHTS COME ON
· PITCH TRIM CONTROL WHEEL MOVEMENT · GREEN RSVR OVHT TEST PRESSED · YELLOW RSVR OVHT TEST PRESSED						→ GREEN SYS JAM LEGEND COMES ON
ON	OFF	OFF	OFF	OFF	TEST	→ GREEN AND YELLOW SYS LO PR WARNING LIGHTS COME ON
· PITCH TRIM CONTROL WHEEL MOVEMENT · GREEN RSVR OVHT TEST PRESSED · YELLOW RSVR OVHT TEST PRESSED						→ YELLOW SYS JAM LEGEND COMES ON

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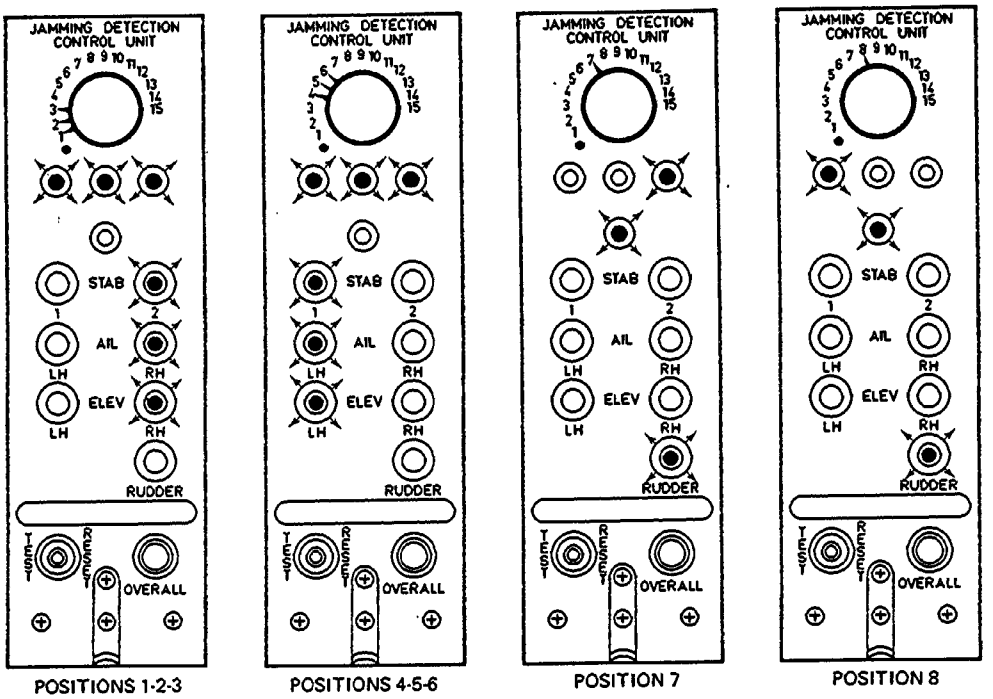
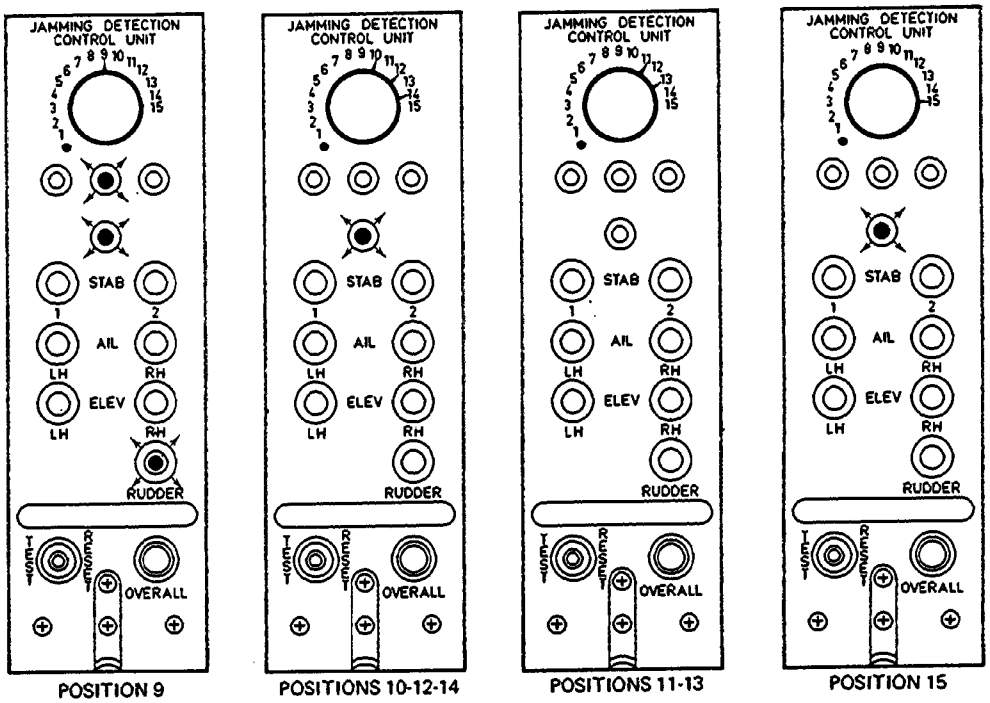
Pilot Tests
Figure 007



POSITIONS 1-2-3 | POSITIONS 4-5-6 | POSITION 7 | POSITION 8



POSITION 9 | POSITIONS 10-12-14 | POSITIONS 11-13 | POSITION 15

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Maintenance Test
Figure 008

When jamming detection microswitch 2 is actuated, logic signal **ONE** is received on the second input of the **AND** gate. Then the Green system jamming detection relay coil is controlled by the test logic and the Green **JAM** legend comes on.

For the Yellow system test, the pitch trim control wheel is returned to zero, Green system **TEST** selection is eliminated and the Yellow system **TEST** is selected.

When the **GREEN RSVR OVHT TEST** pushbutton switch is pressed, the Yellow **JAM** legend comes on, then goes off when the pushbutton switch is released. When the Yellow **RSVR OVHT TEST** pushbutton switch is pressed, the same Yellow **JAM** legends comes on.

The same operation is performed as for the Green system test to operate the detents and obtain Yellow **JAM** indication.

F. Maintenance (Ref. Fig. 007, 008)

The electronic circuits of the control unit can be tested periodically by means of a selector switch located on its face. The result also appears on the face.

R The STAB 1 magnetic indicator is associated with the micro switch No. 1
R (overheat warning) of Yellow and Green micro switch assies whereby the
R STAB 2 magnetic indicator is associated to the micro switch No. 2 (jam
R warning) of the Yellow and Green micro switch assies.

The three indicator lights (blue, yellow green) are associated with the three hydraulic systems and are in parallel with the JAM warning on the control panel.

A white indicator light is energized whenever an AND gate is tested.

The TEST-RESET switch must be placed in RESET position after each test result to cancel the previous test action.

The selector switch bus is supplied with + 28V through the OVERALL pushbutton switch.

- Positions 1 - 2 - 3

  The following three magnetic indicators are actuated

  . STAB 2
  . RH AIL
  . RH ELEV

  The three colored indicator lights (blue, green, yellow) come on.
  Position 1 : Yellow after 50 ms, green and blue after 500 ms.
  Position 2 : green after 50 ms, yellow and blue after 500 ms.
  Position 3 : blue after 50 ms, yellow and green after 500 ms.

- Position 4 - 5 - 6

  The following three magnetic indicators are actuated.

  . STAB 1
  . LH AIL
  . LH ELEV

  The three colored indicator lights (blue, green, yellow) come on, after 500 ms.

- Position 7

  The rudder magnetic indicator is actuated.
  The white and green indicator lights come on.

- Position 8

  The rudder magnetic indicator is actuated.
  The white and blue indicator lights comes on.

- Position 9

  The rudder magnetic indicator is actuated.
  The white and yellow indicator lights come on.

- Position 10

  Tests the aileron AND gate and the aileron input of the OR gate.
  The white indicator light comes on.
  It goes off 3 seconds after the OVERALL pushbutton switch is released.

- Position 12

  Tests the elevator AND gate and the elevator input of the OR gate.
  The white indicator light comes on.
  It goes off 3 seconds after the OVERHALL pushbutton switch is released.

- Position 14

  Tests the stabilizer AND gate and the stabilizer input of the OR gate.

The white indicator light comes on.
It goes off 3 seconds after the OVERALL pushbutton switch is released.

- Position 11
  Only one of the two inputs to the three AND gates is tested.
  No indication.
- Position 13
  The other input to the three AND gates is tested.
  No indication.
- Position 15
  The white indicator light comes on (tests the rudder input of the OR gate.
  It goes off 3 seconds after the OVERALL pushbutton switch is released.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Operational Test

A. Reason for the Job
(1)Operational test of inhibition preventing simultaneous OFF selection of servo control hydraulic power supply.
(2)Test of annunciator lights.
(3)Test of servo control selection.
(4)Test of servo control jamming detection (roll, yaw, pitch).
(5)Test of Green/Yellow OVHT warning inhibition.
(6)THS jamming detection using jamming detection microswitch.
(7)Test of pitch trim system.
(8)Test of systems using jamming detection control unit 4CB.
(9)Test of roll system (ailerons and spoilers) with individual hydraulic system.
(10)Test of rudder system with individual hydraulic system.
(11)Test of elevator system with individual hydraulic system.
(12)Test of THS system with individual hydraulic system.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 27-11-16, P. Block 401	Spring Rod - Control Wheel Interconnecting
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling

R

C. Procedure
(1)Job set-up
(a)Initial conditions
- Correct electrical power supply (Ref. 24-41-00, P. Block 301).

- Forward services ventilation system in operation.
- Overhead and aft panel circuit breakers closed particularly those associated with FLT CTL (133VU), ECAM (21VU).
- Aircraft on ground (L/G PROX DET & RELAYS SYS1 and SYS2 circuit breakers closed on panel 133VU).

(b)Pressurize Green, Blue and Yellow hydraulic systems using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU,

- Make certain that B, G and Y pushbutton switches are pressed and legends off.

(d)Make certain that all control surfaces are set to zero.

(e)Make certain that flap and slat control lever is in first notch position (slats and flaps retracted).

(f)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.

(g)On panel 11VU, on ECAM control panel

- press and release CLR pushbutton switch until light goes off. Select FLT/CTL page using F/CTL pushbutton switch on ECAM control panel (depending on test performed)
- adjust brightness on right ECAM display unit using RIGHT DISPLAY knob.

NOTE : For reading messages mentioned during the tests it may be necessary to press CLR pushbutton switch on ECAM control panel several times before message appears.

D. Test

(1)Operational test of inhibition preventing simultaneous OFF selection of servo control B, G and Y hydraulic power supply

ACTION	RESULT
1. ON SERVO CTL section of panel 428VU - Release B pushbutton switch	- single chime sounds. On panel 428VU : - corresponding OFF legend comes on, - corresponding LO PR warning light comes on, - Spoilers No. 2, 3, 7 FAULT legends come on. On CAPT and F/O main instrument panels 3VU and 5VU : - MASTER CAUTION light comes on. On right ECAM display unit : - Spoilers No. 2, 3, 7 come on amber.
- Release G pushbutton switch	On panel 428VU : - OFF legend of B pushbutton switch

ACTION	RESULT
	remains on, - OFF legend of G pushbutton switch comes on, - B LO PR warning light remains on, - G LO PR warning light comes on, - Spoilers No. 2, 3, 7 FAULT legends remain on, - Spoiler No. 5 FAULT legend comes on. On CAPT and F/O main instrument panels 3VU and 5VU : - MASTER CAUTION light remains on. On right ECAM display unit : - Spoilers No. 2, 3, 7 remain amber, - Spoiler No. 5 comes on amber.
- Release Y pushbutton switch	On panel 428VU : - OFF legend of B pushbutton switch remains on, - OFF legend of G pushbutton switch remains on, - OFF legend of Y pushbutton switch comes on, - B LO PR warning light goes off, - G LO PR warning light goes off, - Y LO PR warning light remains off, - Spoilers No. 2, 3, 5, 7 FAULT legends go off. On CAPT and F/O main instrument panels 3VU and 5VU : - MASTER CAUTION light goes off. On right ECAM display unit : - Spoilers No. 2, 3, 5, 7 come on green.
- Press B, Y and G pushbutton switches	- single chime sounds. On panel 428VU : - corresponding OFF legends go off, - LO PR warning lights come on and go off, - Spoilers No. 2, 3, 5, 7 FAULT legends come on then go off. On CAPT and F/O main instrument panels 3VU and 5VU : - MASTER CAUTION light come on then go off. On right ECAM display unit : - Spoilers No. 2, 3, 5, 7 come on

ACTION	RESULT
	amber then go green.

(2)Test of annunciator lights

ACTION	RESULT
1. ON ANN LT section of panel 436VU - place switch in TEST position	On SERVO CTL section of panel 428VU - JAM/OFF legends of B, G and Y pushbutton switches come on. - G, B and Y LO PR warning lights come on.
2. Place switch in BRT position	- Above annunciator lights go off
3. On panel 472VU, place ANN LT switch in TEST position	On SERVO CTL section of panel 471VU - B, G and Y TEST legends come on.
4. On SERVO CTL section of panel 428VU - release B, G and Y pushbutton switches	- OFF legends of these switches come on. - LO PR warning lights remain off. - Single chime sounds.
5. On ANN LT section of panel 436VU - place switch in DIM position - place switch in BRT position	On SERVO CTL section of panel 428VU - OFF legends dim - Above annunciator lights resume normal brightness.
6. On SERVO CTL section of panel 428VU - press B, G and Y pushbutton switches	- OFF legends of these switches go off. Single chime sounds. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on then go off.

(3)Test of servo control selection

ACTION	RESULT
1. On SERVO CTL section of panel 428VU - release G and Y pushbutton switches	- corresponding OFF legends and LO PR warning lights come on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on - single chime sounds. On left ECAM display unit following messages appear FLT CTL GREEN SERVO LO PR YELLOW SERVO LO PR
2. On SERVO CTL section of panel 428VU - press G and Y pushbutton switches.	- corresponding OFF legends and LO PR warning lights go off
3. On SERVO CTL section of panel 428VU - release Y and B pushbutton switches.	- corresponding OFF legends and LO PR warning lights come on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights remain on. - Single chime sounds On left ECAM display unit following messages appear FLT CTL YELLOW SERVO LO PR BLUE SERVO LO PR
4. On SERVO CTL section of panel 428VU - press Y and B pushbutton switches.	- corresponding OFF legends and LO PR warning lights go off.
5. On SERVO CTL section of panel 428VU - release G and B pushbutton switches.	- corresponding OFF legends and LO PR warning lights come on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. - Single chime sounds On left ECAM display unit following messages appear. FLT CTL GREEN SERVO LO PR BLUE SERVO LO PR

ACTION	RESULT
6. ON SERVO CTL section of panel 428VU - press G and B pushbutton switches.	- corresponding OFF legends and LO PR warning lights go off.

(4)Test of servo control jamming detection (roll, yaw and pitch).

ACTION	RESULT
1. On SERVO CTL section of panel 428VU - release B and Y pushbutton switches	- corresponding OFF legends and LO PR warning lights come on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on - single chime sounds. On left ECAM display unit following messages appear FLT CTL BLUE SERVO LO PR YELLOW SERVO LO PR
2. On maintenance section of panel 472VU - place ANN LT switch in READ position	
3. On SERVO CTL section of panel 471VU - press B pushbutton switch	- corresponding TEST legend comes on and remains on
4. In electronics rack 90VU, on jamming detection control unit - place and hold TEST/RESET switch in TEST position	
5. Rapidly turn Captain or First Officer control wheel to the right or to the left	On SERVO CTL section of panel 428VU - JAM legend of B pushbutton switch comes on then goes off - single chime sounds On jamming detection control unit - blue and white indicator lights come on then go off. - both AIL magnetic indicators are activated.
6. Rapidly move rudder pedals to either right or left turn	- JAM legend of B pushbutton switch comes on then goes off - single chime sounds. On jamming detection control unit - blue and white indicator lights come on then go off. - RUDDER magnetic indicator is

ACTION	RESULT
	activated.
7. Rapidly move control column to either nose up or nose down attitude	- JAM legend of B pushbutton switch comes on then goes off - single chime sounds On jamming detection control unit - blue and white indicator lights come on then go off. - both ELEV magnetic indicators are activated.
8. On jamming detection control unit - place TEST/RESET switch in RESET position then release switch	Switch automatically returns to neutral position - magnetic indicators are reset.
9. On SERVO CTL section of panel 428VU - press B pushbutton switch - release G pushbutton switch	- corresponding OFF legends and LO PR warning lights go off - corresponding OFF legends and LO PR warning lights come on On SERVO CTL section of panel 471VU - TEST legend of B pushbutton switch goes off. On left ECAM display unit following messages appear : GREEN SERVO LO PR YELLOW SERVO LO PR
10. On SERVO CTL section of panel 471VU - press G pushbutton switch	- corresponding TEST legend comes on and remains on
11. In electronics rack 90VU, on jamming detection control unit - place and hold TEST/RESET switch in TEST position	
12. Rapidly turn Captain or First Officer control wheel to the right or to the left	On SERVO CTL section of panel 428VU - JAM legend of G pushbutton switch comes on then goes off - single chime sounds. On jamming detection control unit - green and white indicator lights come on then go off - both AIL magnetic indicators are

ACTION	RESULT
	activated.
13. Rapidly move rudder pedals to either right or left turn	- JAM legend of G pushbutton switch comes on then goes off - single chime sounds On jamming detection control unit - green and white indicator lights come on then go off - RUDDER magnetic indicator is activated.
14. Rapidly move control column to either nose up or nose down attitude	- JAM legend of G pushbutton switch comes on then goes off - single chime sounds. On jamming detection control unit - green and white indicator lights come on then go off - both ELEV magnetic indicators are activated.
15. On jamming detection control unit - place TEST/RESET switch in RESET position then release	- switch automatically returns to neutral position - magnetic indicators are reset through this action
16. On SERVO CTL section of panel 428VU - press G pushbutton switch	On SERVO CTL section of panel 471VU - TEST legend of G pushbutton switch goes off. On left ECAM display unit following message is displayed FLT CTL YELLOW SERVO LO PR
17. On SERVO CTL section of panel 471VU - press Y pushbutton switch	On SERVO CTL section of panel 471VU - TEST legend of Y pushbutton switch comes on
18. On jamming detection control unit - place and hold TEST/RESET switch in TEST position.	
19. Rapidly turn Captain or First Officer control wheel to the right or to the left	On SERVO CTL section of panel 428VU - JAM legend of Y pushbutton switch comes on then goes off - single chime sounds On jamming detection control unit - Yellow and White indicator lights come on then go off - AIL magnetic indicators are

ACTION	RESULT
	activated.
20. Rapidly move rudder pedals to either right or left turn	- JAM legend of Y pushbutton switch comes on then goes off - single chime sounds On jamming detection control unit - Yellow and White indicator lights come on then go off - RUDDER magnetic indicator is activated.
21. Rapidly move control column to either nose up or nose down attitude	- JAM legend of Y pushbutton switch comes on then goes off. - single chime sounds On jamming detection control unit - Yellow and White indicator lights come on then go off. - both ELEV magnetic indicators are activated.
22. On jamming detection control unit - place TEST/RESET switch in RESET position then release.	- switch automatically returns to neutral position - magnetic indicators are reset through this action
23. On SERVO CTL section of panel 428VU - press Y pushbutton switch	- corresponding OFF legend and LO PR warning light goes off. On SERVO CTL section of panel 471VU - TEST legend of Y pushbutton switch goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off.
24. On maintenance panel 472VU - place ANN LT switch in OFF position	

(a) Perform the following operational tests :
- Operational test of the roll control system (Ref. 27-11-16, P. Block 401),

R

- Operational test of the rudder (Ref. 27-21-00, P. Block 501),
- Operational test of the pitch control system (Ref. 27-31-00, P. Block 501).

(5) Test of Green/Yellow OVHT warning inhibition

ACTION	RESULT
1. On maintenance panel 472VU - place ANN LT switch in READ position	
2. On SERVO CTL section of panel 428VU - release G pushbutton switch	On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on and remain on. - corresponding OFF legends and LO PR warning lights come on - single chime sounds
- B and Y pushbutton switches are pressed and legends off	On left ECAM display unit following message is displayed FLT CTL GREEN SERVO LO PR
3. On SERVO CTL section of panel 471VU - Press G pushbutton switch	- corresponding TEST legend comes on and remains on.
4. On RSVR OVHT TEST section of panel 471VU - press and hold G pushbutton switch	On SERVO CTL section of panel 428VU - JAM legend of G pushbutton switch comes on. - Single chime sounds On left ECAM display unit, following messages appear in addition to the GREEN SERVO LO PR one : FLT CTL GREEN STAB SERVO JAM GREEN SERVO CTL... OFF
5. On SERVO CTL section of panel 471VU - release G pushbutton switch	On SERVO CTL section of panel 428VU - JAM legend of G pushbutton switch goes off. On SERVO CTL section of panel 471VU - corresponding TEST legend goes off On left ECAM display unit following messages disappear. GREEN STAB SERVO JAM GREEN SERVO CTL ... OFF - The GREEN SERVO LO PR message is still displayed.
6. On RSVR OVHT TEST section of panel 471VU - release G pushbutton switch	- No change.
7. On SERVO CTL section of panel 471VU	- corresponding TEST legend comes on

ACTION	RESULT
- Press G pushbutton switch On RSVR OVHT TEST section of panel 471VU - press and hold Y pushbutton switch	- JAM legend of G pushbutton switch comes on. - single chime sounds - on left ECAM display unit, following messages appear : FLT CTL GREEN STAB SERVO JAM GREEN SERVO CTL... OFF
8. On SERVO CTL section of panel 471VU - release G pushbutton switch	On SERVO CTL section of panel 428VU - JAM legend of G pushbutton switch goes off On SERVO CTL section of panel 471VU - corresponding TEST legend goes off On left ECAM display unit following messages disappear. GREEN STAB SERVO JAM GREEN SERVO CTL ... OFF
9. On RSVR OVHT TEST section of panel 471VU - release Y pushbutton switch	- No change
10. On SERVO CTL section of panel 428VU - press G pushbutton switch	On SERVO CTL section of panel 428VU - OFF legend of G pushbutton switch and corresponding LO PR warning light go off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On left ECAM display unit message disappears
- release Y pushbutton switch	- OFF legend of Y pushbutton switch and corresponding LO PR warning light come on. - single chime sounds. On left ECAM display unit following message is displayed YELLOW SERVO LO PR On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on and remain on

ACTION	RESULT
11. On SERVO CTL section of panel 471VU - Press Y pushbutton switch	- corresponding TEST legend comes on and remains on
12. On RSVR OVHT TEST section of panel 471VU - press and hold Y pushbutton switch	On SERVO CTL section of panel 428VU - JAM legend of Y pushbutton switch comes on. - On left ECAM display unit, following messages appear. FLT CTL YELLOW STAB SERVO JAM YELLOW SERVO CTL ... OFF - Single chime sounds
13. On SERVO CTL section of panel 471VU - release Y pushbutton switch	On SERVO CTL section of panel 428VU - JAM legend of Y pushbutton switch goes off On SERVO CTL section of panel 471VU - corresponding TEST legend goes off. - On left ECAM display unit following messages disappear. YELLOW STAB SERVO JAM YELLOW SERVO CTL ... OFF
14. On RSVR OVHT TEST section of panel 471VU - release Y pushbutton switch	- No change.
15. On SERVO CTL section of panel 471VU - Press Y pushbutton switch On RSVR OVHT TEST section of panel - press and hold G pushbutton switch	On SERVO CTL section of panel 471VU - corresponding TEST legend comes on On SERVO CTL section of panel 428VU - JAM legend of Y pushbutton switch comes on - single chime sounds. On left ECAM display unit, following messages appear FLT CTL YELLOW STAB SERVO JAM YELLOW SERVO CTL... OFF
16. On SERVO CTL section of panel 471VU - release Y pushbutton switch	On SERVO CTL section of panel 428VU - JAM legend of Y pushbutton switch goes off. On SERVO CTL section of panel 471VU - TEST legend of Y pushbutton switch goes off.

ACTION	RESULT
	On left ECAM display unit following messages disappear. YELLOW STAB SERVO JAM YELLOW SERVO CTL ... OFF
17. On RSVR OVHT TEST section of panel 471VU - release G pushbutton switch	- No change.
18. On SERVO CTL section of panel 428VU - press Y pushbutton switch	- corresponding OFF legends and LO PR warning lights go off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On left ECAM display unit message disappears.
19. On maintenance panel 472VU - place ANN LT switch in OFF position	

(6)THS jamming detection using jamming detection microswitch

CAUTION : MAKE CERTAIN THAT THE PITCH TRIM WHEEL IS IN NEUTRAL POSITION.

CAUTION : ALL ALONG THIS PROCEDURE THE PITCH TRIM LEVERS MUST NOT BE ENGAGED.

ACTION	RESULT
1.On SERVO CTL section of panel 428VU - release G and Y pushbutton switches	On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on - single chime sounds. On left ECAM display unit following messages appear - FLT CTL GREEN SERVO LO PR YELLOW SERVO LO PR On SERVO CTL section of panel 428VU - corresponding OFF legend and LO PR warnings come on.
2. On maintenance panel 472VU - place ANN LT switch in READ position On SERVO CTL section of panel 471VU - press G pushbutton switch	- corresponding TEST legend comes on and remains on.
3. In electronics rack 90VU, on jamming detection control unit - place and hold TEST/RESET switch in TEST position	
4. On center pedestal - Turn and maintain pitch trim control wheel in nose up or nose down position.	On SERVO CTL section of panel 428VU - JAM legend of G pushbutton switch comes on. On jamming detection control unit - STAB 2 magnetic indicator is activated - White and Green indicator lights are on. On left ECAM display unit following messages appear FLT CTL GREEN SERVO LO PR YELLOW SERVO LO PR GREEN STAB SERVO JAM GREEN SERVO CTL... OFF - Single chime sounds.
5. Return pitch trim control wheel to zero position to recenter the primary detents of the THSA.	- White and Green indicator lights go off. - magnetic indicator remains

ACTION	RESULT
On jamming detection control unit - release TEST/RESET switch	activated On left ECAM display unit following messages are displayed GREEN SERVO LO PR YELLOW SERVO LO PR
	On SERVO CTL section of panel 428VU - JAM legend of G pushbutton switch goes off.
6. On jamming detection control unit - place TEST/RESET switch in RESET position then release.	- STAB 2 magnetic indicator is reset through this action
7. On SERVO CTL section of panel 428VU - press then release G pushbutton switch	On SERVO CTL section of panel 471VU - TEST legend of G pushbutton switch goes off
8. On SERVO CTL section of panel 471VU - press Y pushbutton switch	- corresponding TEST legend comes on and remains on.
9. On jamming detection control unit - place and hold TEST/RESET switch in TEST position	
10. On center pedestal - turn and maintain pitch trim control wheel in nose up or nose down position.	On SERVO CTL section of panel 428VU - JAM legend of Y pushbutton switch come on - Stab 2 magnetic indicator is actived. - Single chime sounds. - White and yellow indicator lights are on. On left ECAM display unit following messages appear : FLT CTL GREEN SERVO LO PR YELLOW SERVO LO PR YELLOW STAB SERVO JAM YELLOW SERVO CTL... OFF
11. Return pitch trim control wheel to zero position to recenter the primary detents of the THSA. On jamming detection control unit - release TEST/RESET switch	- White and Yellow indicator lights go off. - magnetic indicators remain activated - on left ECAM display unit following messages are displayed. GREEN SERVO LO PR YELLOW SERVO LO PR

ACTION	RESULT
	On SERVO CTL section of panel 428VU - JAM legend of Y pushbutton switch goes off
12. On jamming detection control unit - place TEST/RESET switch in RESET position then release.	- STAB 2 magnetic indicator is reset through this action.
13. On SERVO CTL section of panel 428VU - press then release Y pushbutton switch	On SERVO CTL section of panel 471VU - TEST legend of Y pushbutton switch goes off.
14. On SERVO CTL section of panel 428VU - press G and Y pushbutton switches	On SERVO CTL section of panel 428VU - corresponding OFF legends and LO PR warning lights go off. On left ECAM display unit - FLT CTL message disappears. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off.

15. On maintenance panel 472VU
- place ANN LT switch in OFF position.

CAUTION : FAILURE TO CARRY OUT TWO STEPS THAT FOLLOW CAN CAUSE AN ACTIVATION OF THE MECHANICAL TORQUE LIMITER OF THE ELECTRICAL PITCH TRIM ACTUATOR.

16. Make certain that pitch trim levers are in off position.

17. Turn pitch trim control wheel to 5 deg. nose up then to 3 deg. nose down and back to zero.

R (7)Test of pitch trim system

ACTION	RESULT
1. On overhead panel - place **PITCH TRIM** 1(2) lever in **ON** position.	
2. On Captain's control wheel (First Officer's control wheel) - place and hold pitch trim control switch 7CC (8CC) in nose down position.	On center pedestal - pitch trim control wheels rotate to nose down position - **WHOOLER** aural warning sounds during pitch trim control wheel rotation.
3. On First Officer's control wheel (Captain's control wheel) - place and hold pitch trim control switch 8CC (7CC) in nose up position.	Pitch trim control wheels stop rotating.
4. Release both pitch trim control switches 7CC and 8CC.	
5. On Captain's control wheel (First Officer's control wheel) - place and hold pitch trim control switch 7CC (8CC) in nose up position.	On center pedestal - pitch trim control wheels rotate to nose up position - **WHOOLER** aural warning sounds during pitch trim control wheel rotation.
6. On First Officer's control wheel (Captain's control wheel) - place and hold pitch trim control switch 8CC (7CC) in nose down position.	Pitch trim control wheels stop rotating.
7. Release both pitch trim control switches 7CC and 8CC.	
8. Return pitch trim control wheels to 0° position.	
9. On overhead panel - place **PITCH TRIM** 1(2) lever in **OFF** position.	

(8)Test of systems using jamming detection control unit 4CB

ACTION	RESULT
1. On SERVO CTL section of panel 428VU - make certain that B, G and Y push-button switches are pressed	- corresponding OFF legends and LO PR warning lights are off.
2. In electronics rack 90VU, on jamming detection control unit 4CB - place TEST/RESET switch in RESET position then release switch	- Switch automatically returns to neutral position - Magnetic indicators are deactivated.
- place selector switch in position 1 then in 2 and 3, for each position press OVERALL pushbutton switch.	For each position - blue, green and yellow indicator lights come on. - single chime sounds. - STAB 2, RH AIL and RH ELEV magnetic indicators are activated. On SERVO CTL section of panel 428VU - JAM legends of B, G and Y push-button switches come on. On left ECAM display unit following messages appear : FLT CTL YELLOW STAB SERVO JAM YELLOW SERVO CTL..... OFF GREEN STAB SERVO JAM GREEN SERVO CTL..... OFF BLUE R ELEV SERVO JAM BLUE SERVO CTL..... OFF YELLOW R ELEV SERVO JAM YELLOW SERVO CTL..... OFF GREEN R ELEV SERVO JAM GREEN SERVO CTL..... OFF BLUE R AIL SERVO JAM BLUE SERVO CTL..... OFF YELLOW R AIL SERVO JAM YELLOW SERVO CTL..... OFF GREEN R AIL SERVO JAM GREEN SERVO CTL..... OFF On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on
- for each position of selector switch, place TEST/RESET switch in RESET position and then release switch	On control unit 4CB - blue, green and yellow indicator lights go off. - STAB 2, RH AIL and RH ELEV magnetic indicators are deactivated. On SERVO CTL section of panel 428VU

ACTION	RESULT
	- JAM legends of B, G and Y push-button switches go off. On left ECAM display unit, messages disappear. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off
3. Place selector switch in position 4 then in 5 and 6, for each position press OVERALL pushbutton switch.	- blue, green and yellow indicator lights come on. - STAB1, LH AIL and LH ELEV magnetic indicators are activated. On SERVO CTL section of panel 428VU - JAM legends of B, G and Y push-button switches come on. On left ECAM display unit, following messages appear : FLT CTL YELLOW STAB SERVO JAM YELLOW SERVO CTL..... OFF GREEN STAB SERVO JAM GREEN SERVO CTL..... OFF BLUE L ELEV SERVO JAM BLUE SERVO CTL..... OFF YELLOW L ELEV SERVO JAM YELLOW SERVO CTL..... OFF GREEN L ELEV SERVO JAM GREEN SERVO CTL..... OFF BLUE L AIL SERVO JAM BLUE SERVO CTL..... OFF YELLOW L AIL SERVO JAM YELLOW SERVO CTL..... OFF GREEN L AIL SERVO JAM GREEN SERVO CTL..... OFF - Single chime sounds On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on
- for each position of selector switch, place TEST/RESET switch in RESET position then release switch.	On control unit 4CB - blue, green and yellow indicator lights go off. - STAB 1, LH AIL and LH ELEV magnetic indicators are deactivated. On SERVO CTL section of panel 428VU - JAM legends of B, G and Y push-button switches go off.

ACTION	RESULT
	On left ECAM display unit messages disappear. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off
4. Place selector switch in position 7, press OVERALL pushbutton switch	On control unit 4CB - green and white indicator lights come on. After approximately 5 s white indicator light goes off. - RUDDER magnetic indicator is activated. On SERVO CTL section of panel 428VU - JAM legend of G pushbutton switch comes on. On left ECAM display unit, following messages appear : FLT CTL GREEN RUD SERVO JAM GREEN SERVO CTL..... OFF - Single chime sounds On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on
- place TEST/RESET switch in RESET position then release switch.	- green indicator light goes off. - RUDDER magnetic indicator is deactivated. On left ECAM display unit messages disappear. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off.
NOTE : For positions 7 to 15 of selector switch, once OVERALL pushbutton switch has been released wait 3 s. before placing TEST/RESET switch in RESET position	On SERVO CTL section of panel 428VU - JAM legend of G pushbutton switch goes off.
5. Place selector switch in position 8. - press OVERALL pushbutton switch	On control unit 4CB - blue and white indicator lights come on. After approximately 5 s white indicator light goes off. - RUDDER magnetic indicator is activated. On SERVO CTL section of panel 428VU - JAM legend of B pushbutton switch

ACTION	RESULT
	comes on. On left ECAM display unit, following messages appear FLT CTL BLUE RUD SERVO JAM BLUE SERVO CTL..... OFF - Single chime sounds On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on
- place TEST/RESET switch in RESET position then release switch.	- blue indicator light goes off. - RUDDER magnetic indicator is deactivated. On SERVO CTL section of panel 428VU - JAM legend of B pushbutton switch goes off. On left ECAM display unit messages disappear. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off.
6. Place selector switch in position 9, press OVERALL pushbutton switch.	On control unit 4CB - Yellow and White indicator lights come on. After approximately 5 s white indicator light goes off - RUDDER magnetic indicator is activated. On SERVO CTL section of panel 428VU - JAM legend of Y pushbutton switch comes on. On left ECAM display unit, following messages appear FLT CTL YELLOW RUD SERVO JAM YELLOW SERVO CTL..... OFF - Single chime sounds On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on
- place TEST/RESET switch in RESET position then release switch	- Yellow indicator light goes off. - RUDDER magnetic indicator is deactivated. On SERVO CTL section of panel 428VU - JAM legend of Y pushbutton switch goes off. On left ECAM display unit messages

ACTION	RESULT
	disappear. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off.
7. Place selector switch in position 10 then in 12, 14 and 15, for each position press OVERALL pushbutton switch.	- white indicator light comes on, then goes off approximately 3 s after OVERALL pushbutton switch has been released.
- place selector switch in position 11 then 13, press OVERALL pushbutton switch. - return selector switch to position 0.	No indication

(9)Test of roll system (ailerons and spoilers) with individual hydraulic system

ACTION	RESULT
1. On SERVO CTL section of panel 428VU - release G and Y pushbutton switches	On right ECAM display unit FLT CTL page - G and Y symbols are amber - B symbol is green
2. Turn Captain or First Officer control wheel full right	- R aileron moves upward - L aileron moves downward - R spoilers 3 and 7 extend On right ECAM display unit FLT CTL page On AIL scale - bugs reproduce motion On SPLR ROLL scale - green arrows appear representing R wing spoilers 3 and 7 - amber numbers 4, 5 and 6 appear below dashes representing R and L wing spoilers 4, 5 and 6
3. Turn Captain or First Officer control wheel full left	- L aileron moves upward - R aileron moves downward - L spoilers 3 and 7 extend On right ECAM display unit FLT CTL page On AIL scale - bugs reproduce motion On SPLR ROLL scale - green arrows appear representing L wing spoilers 3 and 7 - amber numbers 4, 5 and 6 appear below dashes representing R and L wing spoilers 4, 5 and 6.
4. Return control wheel to zero	
5. On SERVO CTL section of panel 428VU - press G pushbutton switch - release B pushbutton switch	On right ECAM display unit FLT CTL page - G symbol is green - B and Y symbols are amber
6. Turn Captain and First Officer control wheel full right	- R aileron moves upward - L aileron moves downward - R spoiler 5 extends

ACTION	RESULT
	On right ECAM display unit FLT CTL page On AIL scale - bugs reproduce motion On SPLR ROLL scale - one green arrow appears representing R wing spoiler 5 - amber numbers 3, 4, 6 and 7 appear below dashes representing R and L wing spoilers 3, 4, 6 and 7.
7. Turn Captain or First Officer control wheel full left	- L aileron moves upward - R aileron moves downward - L spoiler 5 extends On right ECAM display unit FLT CTL page On AIL scale - bugs reproduce motion On SPLR ROLL scale - one green arrow appears representing L wing spoiler 5 - amber numbers 3, 4, 6 and 7 appear below dashes representing R and L wing spoilers 3, 4, 6 and 7.
8. Return control wheel to zero	
9. On SERVO CTL section of panel 428VU - press Y pushbutton switch - release G pushbutton switch	On right ECAM display unit FLT CTL page - Y symbol is green - B and G symbols are amber
10. Turn Captain or First Officer control wheel full right	- R aileron moves upward - L aileron moves downward - R spoilers 4 and 6 extend On right ECAM display unit FLT CTL page On AIL scale - bugs reproduce motion On SPLR ROLL scale - green arrows appear representing R wing spoilers 4 and 6 - amber numbers 3, 5 and 7 appear below dashes representing R and L wing spoilers 3, 5 and 7

ACTION	RESULT
11. Turn Captains or First Officer control wheel full left	- L aileron moves upward - R aileron moves downward - L spoilers 4 and 6 extend On right ECAM display unit FLT CTL page On AIL scale - bugs reproduce motion On SPLR ROLL scale - green arrows appear representing L wing spoilers 4 and 6 - amber numbers 3, 5 and 7 appear below dashes representing R and L wing spoilers 3, 5 and 7
12. Return control wheel to zero	
13. On SERVO CTL section of panel 428VU - press G and B pushbutton switches	On right ECAM display unit FLT CTL page - B, G and Y symbols are green

(10)Test of rudder system with individual hydraulic system

NOTE : Test using Green hydraulic system only is described.
Repeat this test with Blue, then Yellow hydraulic systems.

ACTION	RESULT
1. On SERVO CTL section of panel 428VU - release B and Y pushbutton switches	On right ECAM display unit FLT CLT page - B and Y symbols are amber - G symbol is green
2. Move right pedal full forward	- Rudder moves to right On right ECAM display unit FLT CTL page, RUD scale - bug reproduces motion.
3. Move left pedal full forward	- Rudder moves to left On right ECAM display unit FLT CTL page, RUD scale - bug reproduces motion
4. Return pedals to neutral position	
5. On SERVO CTL section of panel 428VU - press B and Y pushbutton switches	On right ECAM display unit FLT CTL page - B, G and Y symbols are green

(11)Test of elevator system with individual hydraulic system

NOTE : Test using Green hydraulic system only is described.
Repeat this test with Blue, then Yellow hydraulic systems.

	ACTION	RESULT
R	1. On SERVO CTL section of panel 428VU - release B and Y pushbutton switches	On right ECAM display unit FLT CTL page - B and Y symbols are amber - G symbol is green
R	2. Move control column full aft (nose up)	- Elevators move upward On right ECAM display unit, FLT CTL page, ELEV scale - bug reproduces motion.
R	3. Move control column full forward (nose down)	- Elevators move downward On right ECAM display unit, FLT CTL page, ELEV scale - bug reproduces motion
R	4. Return control column to neutral position	
R	5. On SERVO CTL section of panel 428VU - press B and Y pushbutton switches	On right ECAM display unit FLT CTL page - B, G and Y symbols are green

(12)Test of THS system with individual hydraulic system

NOTE : Test using Green hydraulic system only is described.
Repeat this test with Yellow hydraulic system.

CAUTION : THS DEFLECTION SPEED MUST NOT EXCEED 0.5 DEG/S ON PITCH TRIM CONTROL WHEELS.

ACTION	RESULT
1. On SERVO CTL section of panel 428VU - release Y pushbutton switch	On right ECAM display unit FLT CTL page - Y symbol is amber - G symbol is green
2. On center pedestal - rotate pitch trim control wheel to full NOSE UP position	- Trimmable horizontal stabilizer moves downward On right ECAM display unit, FLT CTL page, STAB scale - bug reproduces motion
3. Rotate pitch trim control wheel to full NOSE DOWN position	- Trimmable horizontal stabilizer moves upward On right ECAM display unit, FLT CTL page, STAB scale - bug reproduces motion
4. Return pitch trim control wheel to zero position	
5. On SERVO CTL section of panel 428VU - press Y pushbutton switch	On right ECAM display unit FLT CTL page - G and Y symbols are green

E. Close-Up

(1)Shut down pressurization of hydraulic systems

(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Restore aircraft to normal operating condition.

2. Functional Test

A. Reason for the Job

R (1)Functional check of yellow priority valve for THS actuator and Yellow
R servo control priority function (flaps PCU).
(2)Functional test of servo control priority function using Green hydraulic system (Ref. 27-54-00, P. Block 501 - Flap Green low hydraulic pressure function ; Ref. 27-84-00, P. Block 501 - Slat Green low hydraulic pressure function).
R (3)Functional test of servo control priority function using Yellow hydraulic system (Ref. 27-54-00, P. Block 501 - Flap Yellow low hydraulic presure function).

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

C. Procedure

(1)Job set-up

(a)Initial conditions
- correct electrical power supply (Ref. 24-41-00, P. Block 301).
- forward services ventilation system in operation.
- overhead and aft panel circuit breakers closed, particularly those associated with FLT CTL (133VU).
- aircraft on ground (L/G PROX DET & RELAYS SYS1 and SYS2 circuit breakers closed on panel 133VU).

(b)Connect hydraulic ground power cart but do not pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU
- make certain that B, G and Y pushbutton switches are pressed (in) and legends off.

(d)Make certain that pitch trim control wheels are in zero position and that no rigging pins or tools prevent movement of the THS.

D. Test

R (1)Functional check of yellow priority valve for THS actuator and Yellow
R servo control priority function (flaps PCU).

ACTION	RESULT
1. On SERVO CTL section of panel 428VU : - release B and G pushbutton switches	OFF legends of these switches come on.
2. On center pedestal - give an input to the pitch trim control wheel in nose down	

ACTION	RESULT
direction and hold the wheel in this position.	
3. Increase Yellow system pressure until THS starts moving.	THS moves when pressure is between 1885 psi (130 bars) and 2400 psi (165 bars).
4. Keep THS moving, if necessary in the opposite direction and reduce Yellow system pressure until THS stops.	THS stops when pressure is between 2400 psi (165 bars) and 1885 psi (130 bars).

E. Close-Up
(1)Shut down pressurization of hydraulic systems.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Restore aircraft to normal operating condition .

SERVO CONTROL SELECTOR VALVE 14CB-15CB-16CB - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

Removal for replacement of each servo control electrohydraulic selector valve

NOTE : Identification and location of selector valves and associated hydraulic systems

Selector Valve	Electrical Ident.	Hydraulic Ident.	Location
Green System	14CB	1150	Zone 147
Blue System	15CB	2150	Zone 571
Yellow System	16CB	3150	Zone 148

Electrohydraulic selector valves **14CB, 15CB** and **16CB** are identical ; therefore, only the removal/installation procedure for green system selector valve **14CB** is described below.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Lockwire Corrosion Resistant Steel, Dia : 1mm (0.041in)
B.	Access Platform 2,60m (8ft. 6in)
C.	Warning Notices
D.	Protective Cap for Electrical Connector
E.	Hydraulic Fluid Container
F.	Circuit Breaker Safety Clips
G. Material No. 02-002	Hydraulic Fluids (Ref. 20-31-00)
H. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
J.	Blanking Plugs
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 27-14-00, P. Block 501	Hydraulic Actuation (Aileron)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/

ITEM	DESIGNATION
	Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

3. Procedure

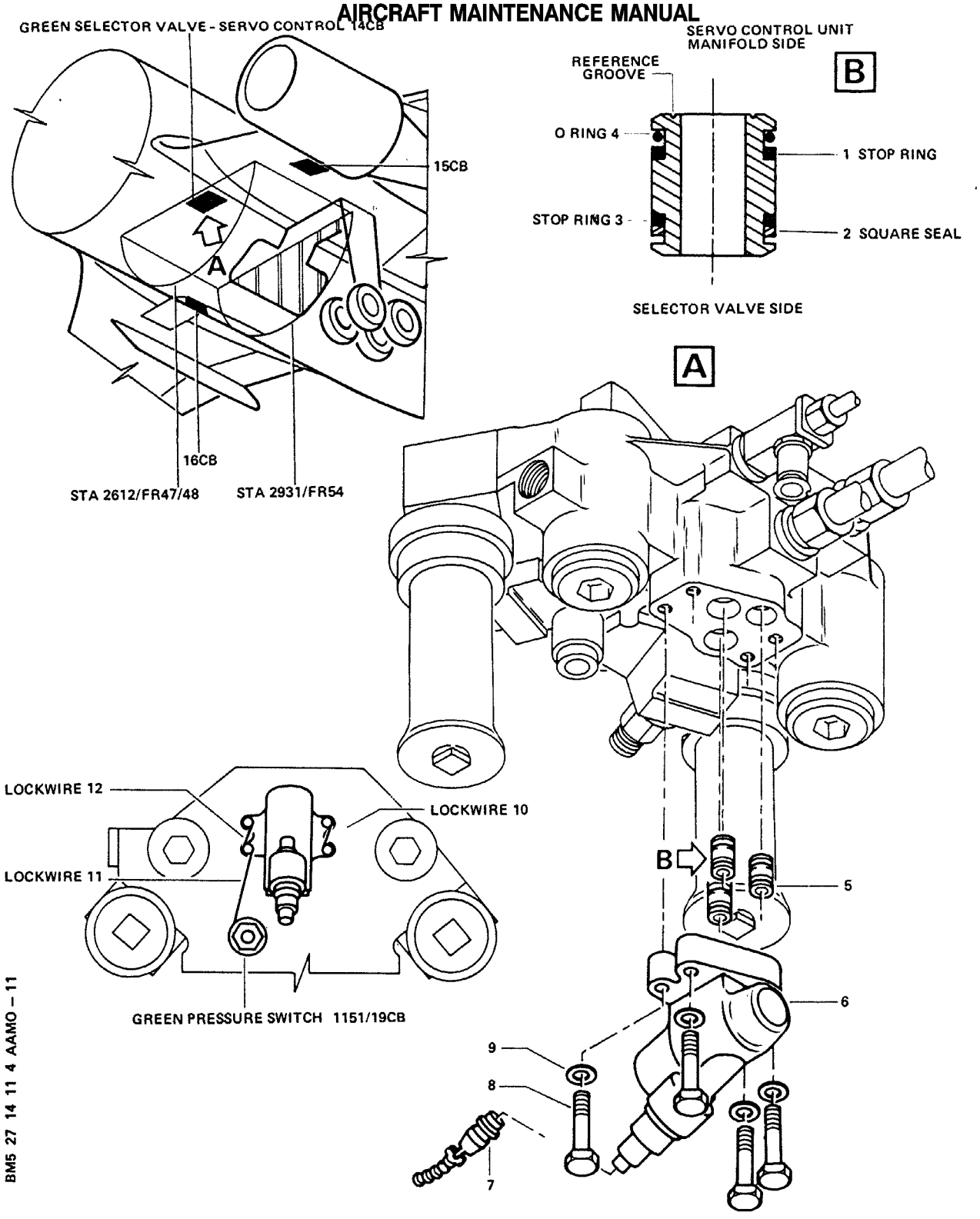
A. Job Set-up
(1)Position access platform
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)On SERVO CTL section of panel 428VU, press JAM/OFF pushbutton switch (OFF legend on) associated with electrohydraulic selector valve to be removed and press one of the two other JAM/OFF pushbutton switches (OFF legend off).
(5)Open safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	SERVO CTL/& THS/JAM/DET	2CB	332/U64

(6)Open main gear door. (Ref. 32-12-11, P. Block 301).
(7)Make certain that hydraulic system associated with selector valve to be removed is depressurized.
(8)Display warning notices on hydraulic panel 427VU in flight compartment and on ground connectors prohibiting pressurization of hydraulic system.
(9)Depressurize hydraulic reservoir associated with system of selector valve to be removed (Ref. 29-14-00, P. Block 301).
(10)Display warning notices on reservoir pressurization ground connector and on panel 429VU in flight compartment prohibiting pressurization of hydraulic system and the starting of APU.
(11)Gain access to electrohydraulic selector valve to be removed.
(12)Install hydraulic fluid container.

B. Removal
(Ref. Fig. 401)
(1)Disconnect connector (7) from selector valve and install protective caps.
(2)Cut and remove lockwire (11).
(3)Cut and remove lockwire (10) and (12) ; remove bolts (8) and retain washers (9).
(4)Remove selector valve (6).
(5)Extract the three bobbins (5).
(6)Remove and discard O-rins (4) and square seals (2).
(7)Check that stop rings (1) and (3) are in good condition. If not, replace.
(8)Protect parts of servo control manifold with blanking plugs.

C. Preparation of Replacement Component
NOTE : The electrohydraulic selector valve is filled with hydraulic



Green System Selector Valve - Servo Control - Removal/Installation
Figure 401

fluid material 02-002.

(1)Clean interfaces of servo control selector valve (6) and manifold with material No. 11-002. Dry with dry compressed air.

(2)Lubricate square seals (2) and O-rings (4) with material 02-002.

(3)Check each bobbin (5) making certain that stop rings (1) are squarely seated.
Install O-ring (4) and square seal (2).
NOTE : O-ring (4) must be installed in recess on bobbin grooved end.

(4)Install replacement bobbins (5) into selector valve (6).
CAUTION : IT IS ESSENTIAL TO INSERT NON-GROOVED END OF BOBBIN INTO SELECTOR VALVE PORT. GROOVED END IS TO BE INSERTED IN SERVO CONTROLS MANIFOLD :

(5)Affix identification placards to replacement selector valves as follows :
14CB and 1150 to green system selector valve
15CB and 2150 to blue system selector valve
16CB and 3150 to yellow system selector valve

D. Installation

(1)Remove blanking plugs from ports of servo control manifold.

(2)Position selector valve (6) on servo control manifold and insert bobbins into their bores.

(3)Install bolts (8) and washers (9).

(4)Tighten bolts (8) and wirelock as shown on drawing (lockwires (10) and (12)).

(5)Install lockwire (11).

(6)Remove protective caps and connect electrical connector (7) to selector valve (6).

(7)Remove safety clips and tags and close circuit breakers 1CB and 2CB

(8)On SERVO CTLS section of panel 428VU, press JAM/OFF pushbutton switch (OFF legend off) associated with replacement electrohydraulic selector valve.

(9)Remove warning notices and pressurize reservoir of system associated with system in which replacement electrohydraulic selector valve is installed (Ref. 29-14-00, P. Block 301).

(10)Remove warning notices. Connect hydraulic ground power cart and pressurize the system in which replacement electrohydraulic selector valve is installed (Ref. 29-10-00, P. Block 301).
CAUTION : ON PRESSURIZATION OF INVOLVED SYSTEM, IMMEDIATELY CHECK THAT REPLACEMENT SELECTOR VALVE IS FREE OF ANY LEAK.

E. Tests

ACTION	RESULT
1. On SERVO CTL section on panel 428VU, release pushbutton switch associated with system in which replacement selector valve is installed and check that on one of the two other JAM/OFF pushbutton switches OFF legend is still off	OFF legend of pushbutton switch comes on On SERVO CTL section on panel 428VU, LO PR warning light comes on

ACTION	RESULT
2. Press pushbutton switch	OFF legend of pushbutton switch goes off LO PR warning light goes off.

F. Close-Up
(1)Repeat leakage check at selector valve.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove hydraulic fluid container.
(4)Close access doors.
(5)Close main gear door (Ref. 32-11-12, P. Block 301).
(6)Depressurize hydraulic system and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(7)Check fluid level in reservoir and tap up as required (Ref. 12-12-29, P. Block 1).
(8)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(9)Remove access platform.

ALL SPEED AILERON SERVOCONTROL - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS, OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT ALL THE CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SURFACES THEY OPERATE.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3.5 m (11 ft.)
	B. 98A27003000000	Extractor, All Speed Aileron Attachment Bolts
	C. 98A27108015800	Holding Tool, All Speed Aileron Actuator Bolts
	D. 98A27108027000	SKT Wrench - ASA Actuator Bolt Nuts
	E. 98A27901000000	Rigging Pin - Aileron Control Wheel
R	F. SL90-303-1-1250	Wrench - Notched, Tightening of Nuts NSA5454
R	G. SL90-309-1-1250	Tool - Installation, Tab Washers STA-LOK NSA5454
R	H. SL90-310-1-1250	Tool - Extraction, Tab Washers STA-LOK NSA5454
		NOTE : The tools listed in items F. thru H. were previously part of tool kit PN 98A27108015000.
	J.	Torque Wrench, 13.4 - 16.1 m.daN (98.8 - 118.7 lbf.ft.)
	K.	Safety Barriers
	L.	Circuit Breaker Safety Clips and Tags
	M.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
	N.	Hydraulic Blanking Caps
R	P.	Electrical Connection Protective Caps
R	Q.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
R	R.	Cotter Pins
R	S. Material No. 04-004	Common Greases (Ref. 20-31-00)
R	T. Material No. 05-005	Special Materials (Ref. 20-31-00)
R	U. Material No. 06-002	Lubricants (Ref. 20-31-00)
R	V. Material No. 09-001	Sealants (Ref. 20-31-00)

Referenced Procedures

- 20-28-11, P. Block 1	Electrical Bonding
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)

2. Procedure

(Ref. Fig. 401)

NOTE : In the following procedures, it is assumed that a BLUE system servo-control is to be changed. Variations for other systems are indicated.

A. Job Set-up

(1)Position safety barriers.

(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Make certain that electronics racks ventilation is correct.

(4)Pressurize GREEN, BLUE or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).

(5)Centralize aileron control wheel.

(6)Set aileron trim to zero.

(7)Install rigging pins PN 98A27901000000 in both control wheels.

(8)Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).

(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(10)Position access platform.

(11)Depressurize hydraulic system pressurized in para. 2.A.(4) (Ref. 29-10-00, P. Block 301) and ensure other two systems are not pressurized.

(12)Display warning notice prohibiting pressurization of hydraulic systems.

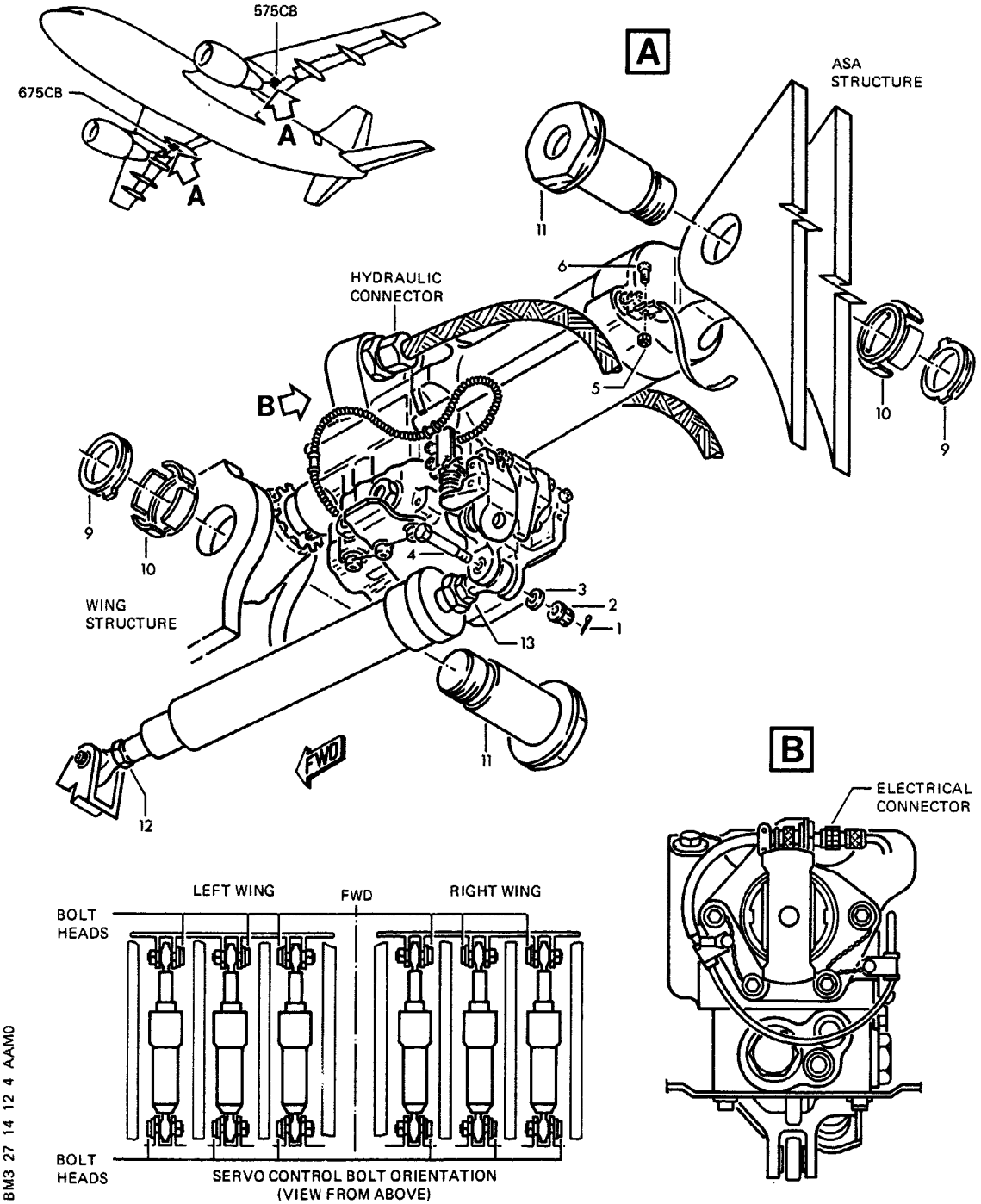
(13)Depressurize BLUE (GREEN or YELLOW) reservoir (Ref. 29-14-00, P. Block 301).

(14)Open access doors 575CB, 575BT (675CB, 675BT).

B. Removal

(1)Disconnect spring strut from servocontrol input lever by removing cotter pin (1), nut (2), washer (3) and bolt (4).

(2)Disconnect bonding lead from servocontrol by removing nut (5) and



All Speed Aileron Servocontrol
Figure 401

bolt (6).
(3)Disconnect electrical connector (21CB left wing or 20CB right wing) from servocontrol (Yellow system 31CB left wing 30CB right wing) (Green system 25CB left wing, 26CB right wing).
(4)Install protective caps on plug and socket.
(5)Disconnect hydraulic hoses.
(6)Blank off servocontrol ports and hydraulic hoses.
(7)Attach holding tool PN 98A27108015800 to head of servocontrol bolt (11) at servocontrol/surface connection.

NOTE : The holding tool prevents turning of ASA servocontrol bolts.

R (8)Using STA-LOK extraction tool PN SL90-310-1-1250 remove tab washers (9).
R (9)Using STA-LOK notched wrench PN SL90-303-1-1250 remove nuts (10).
(10)Support servocontrol, and using extractor PN 98A27003000000, remove attaching bolts (11).
(11)Remove servocontrol from the aircraft.

C. Installation
(1)Lubricate both servocontrol attachment bolts (11) with grease (Material No. 04-004).
(2)Position servocontrol with ram end forward and connect to all speed aileron by installing bolt (11).

(3)Align servo control with wing pivot point and install second bolt (11).

(4)Lubricate threads of bolts (11) and face of nuts (10) with Molykote (Material No. 06-002).
(5)Attach holding tool PN 98A27108015800 to head of bolt (11) at servo-control/surface connection.
R (6)Using STA-LOK notched wrench PN SL90-303-1-1250 and SKT wrench PN 98A27108027000 and secure bolts (11) with nuts (10). TORQUE nut to between 13.4 and 16.1 m.daN (98.8 and 118.7 lbf.ft.).
R (7)Using STA-LOK installation tool PN SL90-309-1-1250 install tab washer (9). Coat assembly with corrosion preventive (Material No. 05-005).
(8)Remove blanking caps and connect hydraulic hoses.
(9)Connect bonding lead, and secure with bolt (6) and nut (5) (Ref. 20-28-11, P. Block 1). After assembly apply sealant (Material No. 09-001).
(10)Remove protective caps and reconnect electrical connector at front upper part of servocontrol (21CB left wing, 20CB right wing). (YELLOW System 31CB left wing, 30CB right wing) (GREEN system 25CB left wing, 26CB right wing).
(11)Connect spring strut to servocontrol input lever, secure with bolt (4), washer (3), nut (2) and safety with cotter pin (1).
(12)Remove safety clips and tags, and close circuit breakers 1CB, 2CB and 3CG.

NOTE : If all three servocontrols have been changed, proceed with Mechanical Control setting of All Speed Aileron to Neutral

(Ref. 27-11-00, P. Block 501).

(13)Pressurize the BLUE (GREEN or YELLOW) hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(14)Remove warning notice prohibiting pressurization of hydraulic systems.
(15)Pressurize GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00 P. Block 301).
(16)On SERVO CTL section of overhead panel 428VU press B pushbutton switch (OFF legend goes out) (Y or G to match system being worked on).
(17)On SERVO CTL section of overhead panel 428VU press and release Y ang G pushbutton switches (B and G for YELLOW system or B and Y for GREEN system) (OFF legend comes on).
(18)Remove control wheel rigging pins.

WARNING : BEFORE OPERATING AILERONS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.

(19)Operate ailerons over full range ten times to remove air.
(20)Check servo control and disturbed hydraulic pipes, make certain there is no fluid leakage.
(21)On SERVO CTL section of overhead panel 428 press G and Y pushbutton switches (OFF legends go out) (B and G for YELLOW system, Y and B for GREEN system).
(22)On SERVO CTL section of overhead panel 428VU press and release B push-button switch (OFF legend comes on) (G or Y pushbutton switch to match system being worked on).
(23)Install rigging pins in both control wheels.
(24)Position clinometer on aileron being worked on and set to 0°.
NOTE : Clinometer must be aligned at 90° to aileron hinge line.
(25) On SERVO CTL section of panel 428VU press B pushbutton switch (OFF legend goes out) (Y and G to match system being worked on).
(26)On SERVO CTL section of panel 428VU press and release G and Y pushbutton switches (OFF legends come on) (B and Y for GREEN system, G and B for YELLOW system).
(27)Check that no aileron movement from 0° occurred on system changeover.
(28)If movement did occur proceed as follows:
(a)Cut and remove lockwire on spring strut locknuts (12) and (13).
(b)Adjust length of spring rod until aileron attains 0° position.

NOTE : When adjusting aileron neutral setting, the spring strut must be lengthened initially (aileron moves down) and then shortened to raise aileron to desired position. This eliminates any chance of "jack fighting" between servo controls.

(c)Tighten locknuts (12) and (13) and safety with lockwire.
(29)On SERVO CTL section of panel 428VU press G and Y pushbutton switches (OFF legends go out) (B and G for YELLOW system, B and Y for GREEN system).
(30)Remove rigging pins from both control wheels.
(31)Check All Speed Ailerons for full and free travel 23° +0° -1° up, 19° +1° -1° down.

(32)Remove clinometer.

D. Test
(1)Make certain that circuit breakers 1CB, 2CB and 3CG are closed.
(2)Perform test procedure detailed below:

ACTION	RESULT
1. On SERVO CTL section of panel 428VU - Press and release B pushbutton switch (G or Y to correspond with system being tested)	- OFF legend comes on - LO PR legend for that system comes on
2. On SERVO CTL section of panel 471VU - Press B pushbutton switch (G or Y to correspond with system being tested)	- TEST legend comes on - Pushbutton switch latches in
3. Rapidly turn Captain or First Officer control wheel to left and right several times	On SERVO CTL section of panel 428VU - JAM legend associated with system being tested comes on and then goes off
4. On SERVO CTL section of panel 428VU - Press B pushbutton switch (G or Y to correspond with system being tested)	On SERVO CTL section of panel 428VU - OFF legend goes off - LO PR legend goes out On SERVO CTL section of panel 471VU - Pushbutton switch "unlatches" and TEST legend goes out
5. Operate Captain or First Officer control wheel at normal speed over entire range	On SERVO CTL section of panel 428VU - No jam indications appear

E. Close-Up
(1)Depressurize GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(2)Shut down and disconnect hydraulic ground power cart.
(3)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(4)Remove safety clips and tags and close circuit breakers 5CV, 6CV, 10CV and 45CV.
(5)Make certain that work area is clean and clear of tools and miscellaneous items of equipment and close access doors 575BT, 575CB (675BT, 675CB).
(6)Remove access platform and safety barriers.

ALL SPEED AILERON SERVOCONTROL - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS, OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT ALL THE CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SURFACES THEY OPERATE.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B.	Safety Barriers
C.	Circuit Breaker Safety Clips and Tags
D.	Warning Notice Prohibiting Pressurization of Hydraulic Systems

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-12, P. Block 401	All Speed Aileron Servo Control

2. Procedure

(Ref. Fig. 601)

A. Job Set-up

(1)Position safety barriers.

(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Make certain that electronics racks ventilation is correct.

(4)Pressurize GREEN, BLUE or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).

(5)Install rigging pins PN 98A27901000000 in both control wheels.

(6)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	1OCV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(7)Position access platform.
(8)Depressurize hydraulic system pressurized in para. 2.A.(4) (Ref. 29-10-00, P. Block 301) and ensure other two systems are not pressurized.
(9)Open access doors 575CB, 575BT (675CB, 675BT).

B. Inspection

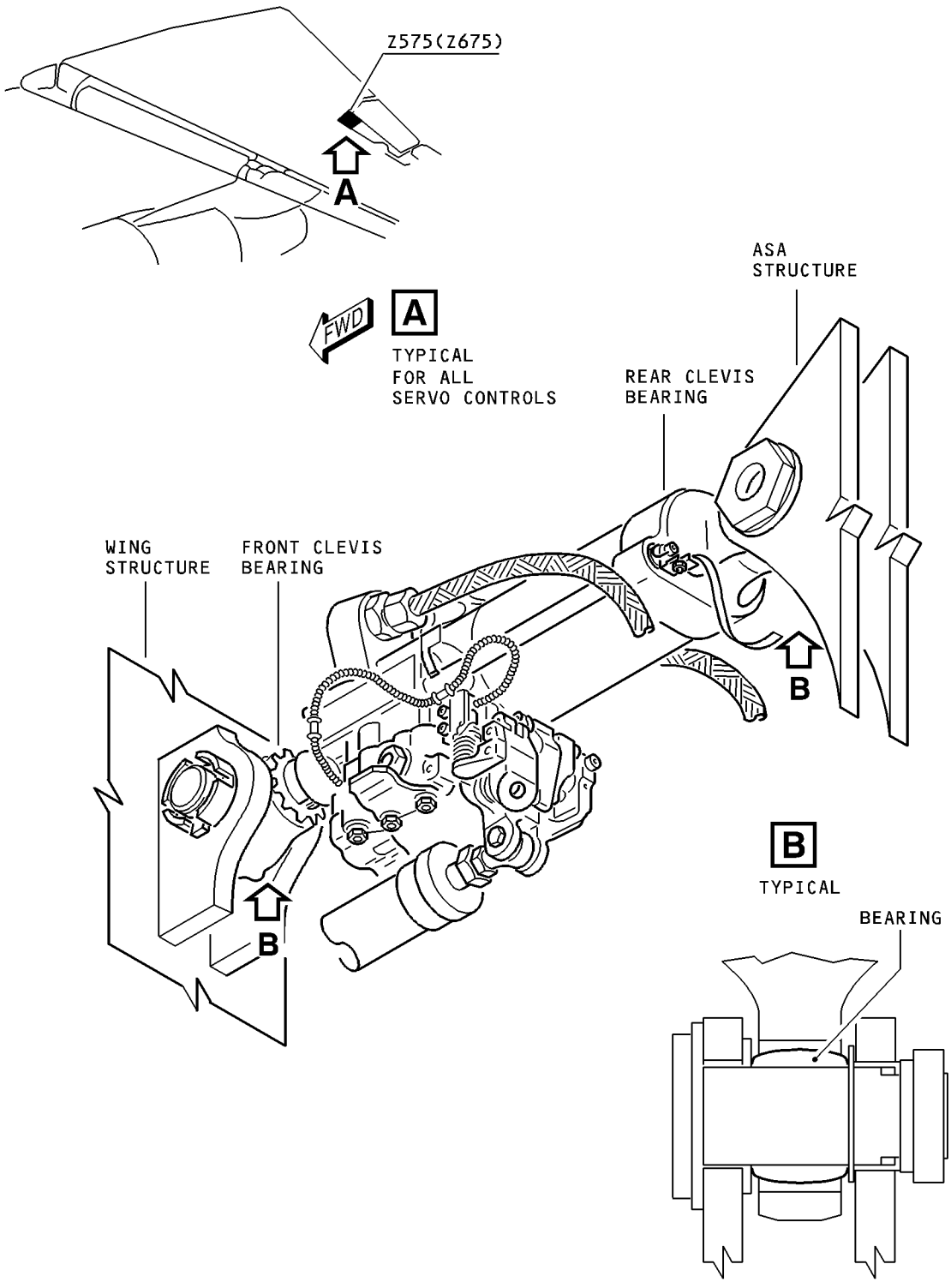
R (1)Visual Inspection
R (a)Make a detailed visual inspection of the servo control bearings for
R evidence of extrusion of the self lubrication coating and for
R general condition.
R - If excessive play has been found, refer Para. 2.C.(5)
R - If corrosion and/or extrusion has been found, refer Para. 2.C.(6)
R - If damage has been found, refer Para. 2.C.(7).

R C. Test

R WARNING : MAKE CERTAIN THAT TRAVEL RANGES OF CONTROL SURFACES ARE CLEAR.

NOTE : Pressurize the BLUE hydraulic system at first. Then pressurize the GREEN and then the YELLOW hydraulic system to make sure that only one hydraulic system is pressurized at a time.

(1)Pressurize BLUE (GREEN or YELLOW) hydraulic system (Ref. 29-10-00, P. Block 301).
(2)On SERVO CTL section of overhead panel 428VU press B pushbutton switch (OFF legend goes out) (Y or G to match system being worked on).
(3)On SERVO CTL section of overhead panel 428VU press and release Y ang G pushbutton switches (B and G for YELLOW system or B and Y for GREEN system) (OFF legend comes on).
(4)Manually move trailing edge of all speed aileron surface up and down. to check play in front and rear clevis bearings of servo control.
(5)If exessive play has been found:
(a)Remove the servo control (Ref. 27-14-12, P. Block 401) and replace the defective bearing (Ref. AIR EQUIPMENT Service Bulletin 31055-27-06).
(b)Install the servo control (Ref. 27-14-12, P. Block 401).
R (6)If corrosion and/or extrusion has been found:
R (a)Remove the servo control (Ref. 27-14-12, P. Block 401) and
R replace the defective bearing (Ref. AIR EQUIPMENT Service Bulletin
R 31055-27-06).
R (b)Install the servo control (Ref. 27-14-12, P. Block 401).
R (7)If damage has been found:
R (a)Remove the servo control (Ref. 27-14-12, P. Block 401) and



BM6 27 14 12 6 DAMO 00

All Speed Aileron Servocontrol
Figure 601

R replace the defective bearing (Ref. AIR EQUIPMENT Service Bulletin
R 31055-27-06).
R (b)Install the servo control (Ref. 27-14-12, P. Block 401).
R (8)On SERVO CTL section of overhead panel 428VU press and release B push-button switch (OFF legend comes on)
R (9)On SERVO CTL section of overhead panel 428VU press G pushbutton switch (OFF legend is not on).
R (10)Do the inspection again at the trailing edge for the GREEN servo control (Refer to steps (4) and (5)).
R (11)On SERVO CTL section of overhead panel 428VU press and release G push-button switch (OFF legend comes on).
R (12)On SERVO CTL section of panel 428VU press Y pushbutton switch (OFF legend is not on).
R (13)Do the inspection again at the trailing edge for the YELLOW servo control (Refer to steps (4) and (5)).
R (14)On SERVO CTL section of panel 428VU press and release Y pushbutton switch (OFF legends come on).
R (15)Remove rigging pins from both control wheels.

E. Close-Up
(1)Depressurize GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(2)Shut down and disconnect hydraulic ground power cart.
(3)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(4)Remove safety clips and tags and close circuit breakers 5CV, 6CV, 10CV and 45CV.
(5)Make certain that work area is clean and clear of tools and miscellaneous items of equipment and close access doors 575BT, 575CB (675BT, 675CB).
(6)Remove access platform and safety barriers.

PRIORITY VALVE 1064-2064-3064 - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

Removal for replacement of each priority valve.

NOTE : Identification and location of priority valves and associated hydraulic systems.

Priority Valve	Hydraulic System	Location
1064	Green	Zone 147
2064	Blue	Zone 571
3064	Yellow	Zone 148

Priority valves 1064, 2064 and 3064 are identical ; therefore, only the removal/installation procedure for Green system priority valve is described below.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.60 m (8 ft. 8 in.)
B.	Hydraulic Fluid Container
C.	Warning Notices
D.	Circuit Breaker Safety Clips
E.	Blanking Plugs
F.	Lockwire - Corrosion Resistant Steel, Dia. 1 mm (0.041 in.)
G. Material No. 02-002	Hydraulic Fluids (Ref. 20-31-00)
H. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

ITEM	DESIGNATION
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

3. Procedure
(Ref. Fig. 401)

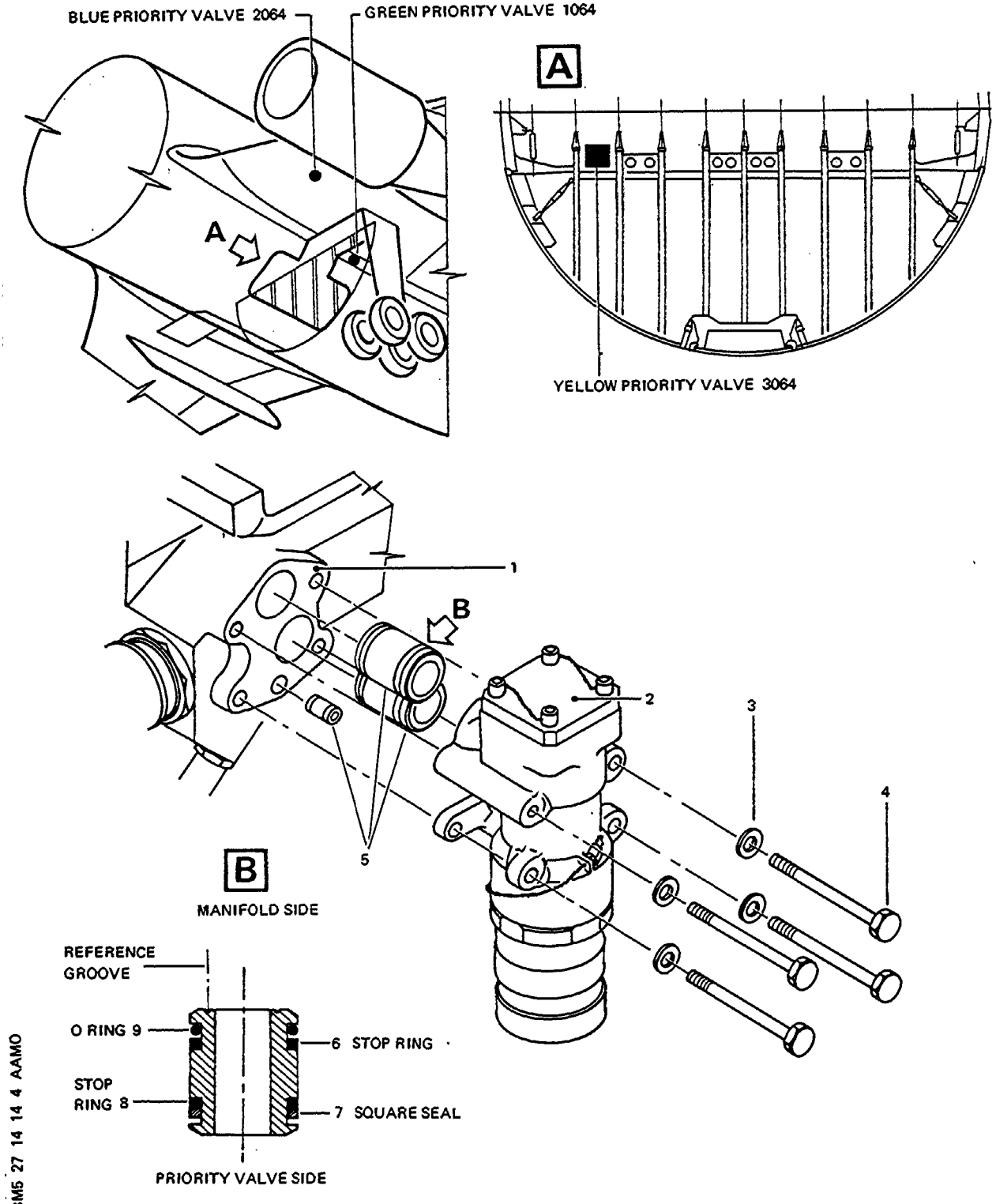
A. Job Set-Up
(1)Open main gear door (Ref. 32-12-11, P. Block 301)
(2)On panel 427VU
(a)Make certain that HYD PWR/ELEC PUMPS pushbutton switch is released
(b)Make certain that HYD PWR/PTU pushbutton switches are released
(c)Display a warning notice prohibiting use of Green, Blue and Yellow hydraulic systems.
(3)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	HYD/PUMP	1GE	GEN1/B08
101VU	HYD/PUMP	2GE	GEN2/B10
133VU	PTU CLT/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60

(4)Make certain that hydraulic system associated with priority valve to be removed is not pressurized. Display warning notices on ground connectors prohibiting pressurization of involved hydraulic system.
(5)Depressurize hydraulic reservoir associated with priority valve to be removed (Ref. 29-14-00, P. Block 301).
(6)Display a warning notice on reservoir pressurization ground connector.
(7)Position access platform.
(8)Gain access to priority valve to be removed.
(9)Install hydraulic fluid container under priority valve to be removed.

B. Removal
(1)Cut and remove lockwire of the four bolts (4) securing priority valve (2) to manifold (1).
(2)Support priority valve (2), remove the four bolts (4) and retain washers (3).
(3) Remove priority valve (2).
(4)Remove the three equipped bobbins (5).
(5)Remove and discard o-rings (9) and square seals (7).
(6)Check that stop rings (6) and (8) are in good condition. If not, replace.
(7)Protect ports of manifold (1) with blanking plugs.

C. Preparation of Replacement Component
(1)Clean interface of priority valve (2) and manifold (1) with Material No.11-002. Dry with dry compressed air.
(2)Lubricate square seals (7) and o-rings (9) with Material No.02-002.
(3)Check each bobbin (5) making certain that stop rings (6) and (8) are squarely seated. Install o-ring (9) and square seal (7).



Priority Valves
Figure 401

NOTE : O-ring must be installed in recess on bobbin grooved end.

(4)Install replacement bobbins (5) into priority valve (2).

CAUTION : IT IS ESSENTIAL TO INSERT NON GROOVED END OF BOBBIN INTO PRIORITY VALVE BORE. GROOVED END IS TO BE INSERTED IN MANIFOLD BORE.

(5)Affix identification placards to replacement priority valve as follows :
1064 to green system priority valve
2064 to blue system priority valve
3064 to yellow system priority valve.

D. Installation

(1)Remove blanking plugs from ports of manifold (1)

(2)Position priority valve (2) on manifold (1) and insert bobbins (5) into their bores.

(3)Install bolts (4) and washers (3)

(4)Wirelock bolts (4) per pair.

E. Tests

(1)Remove safety clips and tags and close circuit breakers 1GE, 2GE, 1GL and 6GL.

(2)Remove warning notices and pressurize reservoir of system associated with replacement priority valve (Ref. 29-14-00, P. Block 301).

(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(4)Make certain that electronics racks ventilation is correct.

(5)Remove warning notices. Connect hydraulic ground power cart and pressurize the system associated with replacement priority valve (Ref. 29-10-00, P. Block 301).

CAUTION : ON PRESSURIZATION OF INVOLVED SYSTEM, IMMEDIATELY CHECK THAT PRIORITY VALVE IS FREE OF ANY LEAK.

(6)Perform test described below :

ACTION	RESULT
1. Upon replacement of priority valve 1064, place Slats/Flaps control lever in the second position.	Slats extend
2. Upon replacement of priority valve 2064, place Slats/Flaps control lever in the second position.	Slats extend
3. Upon replacement of priority valve 3064, place Slats/Flaps control lever in the third position.	Flaps extend
4. Place Slats/Flaps control lever in the first notch position.	Slats and flaps retract.

F. Close-Up

(1)Repeat leakage test at priority valve.

(2)Make certain that working area is clean and clear of tools and mis-

cellaneous items of equipment.
(3)Remove hydraulic fluid container.
(4)Close access doors.
(5)Close main landing gear door (Ref. 32-12-11, P. Block 301).
(6)Depressurize hydraulic system and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(7)Check fluid level in reservoir and top up as required (Ref. 12-12-29, P. Block 1).
(8)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(9)Remove access platform.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.60 m (8 ft. 6 in.)
B.	Circuit Breaker Safety Clips
Referenced Procedure - 27-14-00, P. Block 501	Hydraulic Actuation (Aileron)

2. Procedure

(Ref. Fig. 201)

A. Job Set-up

(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL/& THS/JAM/DET	2CB	332/U64

(2)Position the adjustable access platform below access door 121BL.
(3)Open access door 121BL.
(4)Gain access to front panel of jamming detection control unit 4CB, in avionics compartment.

B. Replacement of Indication Lamps

NOTE : It is not necessary to remove the front panel to replace the indication lamps.
NOTE : The procedure is the same for all the indication lamps.

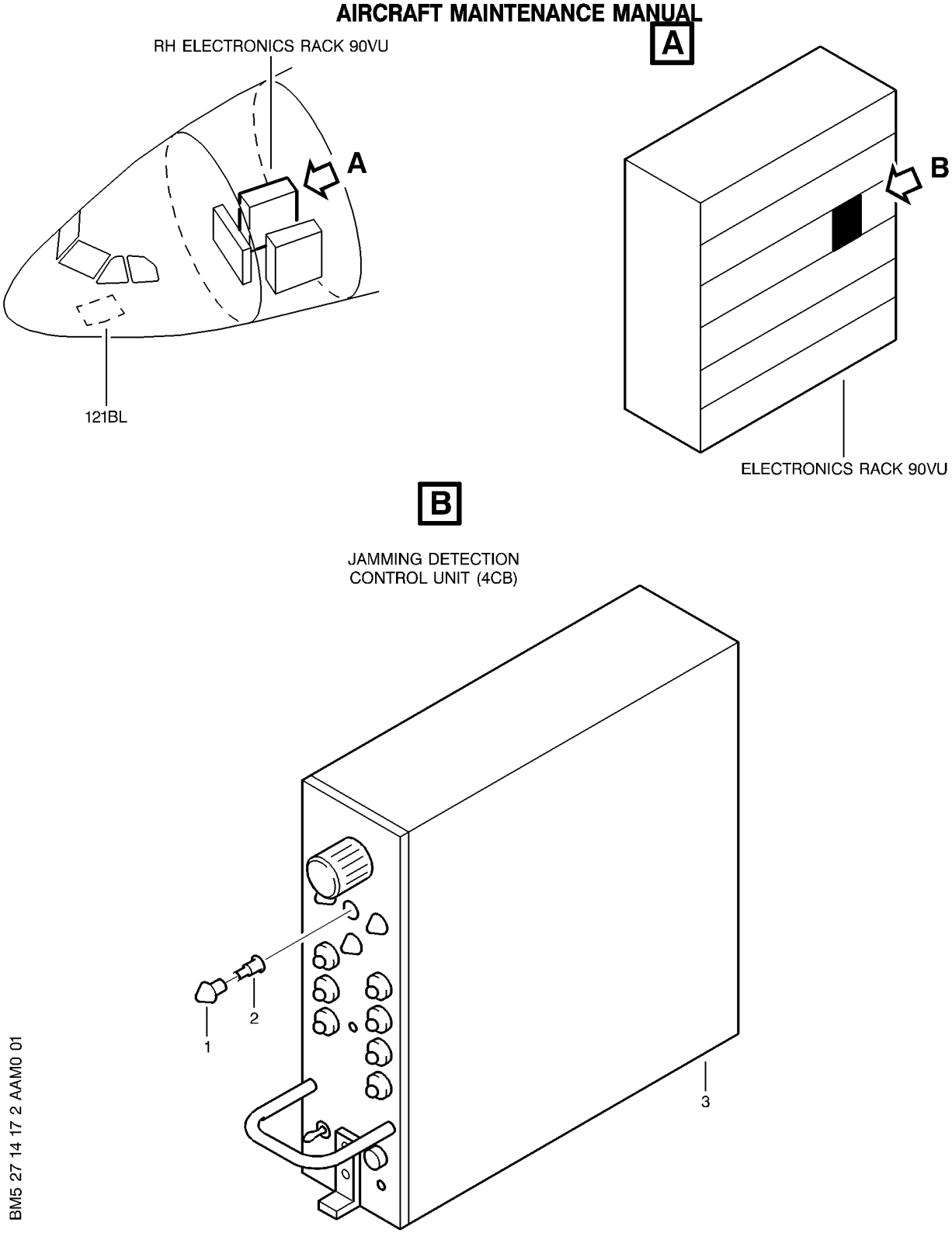
(1)Loosen cap (1) with indication lamp (2) from front panel of control unit (3).
(2)Remove indication lamp (2) from cap (1).
(3)Put a new indication lamp (2) into cap (1).
(4)Tighten cap (1) together with the new indication lamp (2) on front panel of control unit (3).

C. Test

(1)Remove safety clips and tags and close circuit breakers 1CB and 2CB.
(2)Carry out operational test described in 27-14-00, P. Block 501, Para. 1.D(8).

D. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.
(3)Remove access platform.



Lamps - Jamming Detection Control Unit
Figure 201

JAMMING DETECTION CONTROL UNIT (4CB) - REMOVAL/INSTALLATION

WARNING :
CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.60 m (8 ft. 6 in.)
B.	Circuit Breaker Safety Clips
C.	Warning Notices
D.	Blanking Plugs/Caps
Referenced Procedure - 27-14-00, P. Block 501	Hydraulic Actuation (Aileron)

2. Procedure
(Ref. Fig. 401)

A. Job Set-up
(1)Open, safety and tag the following circuit breakers.

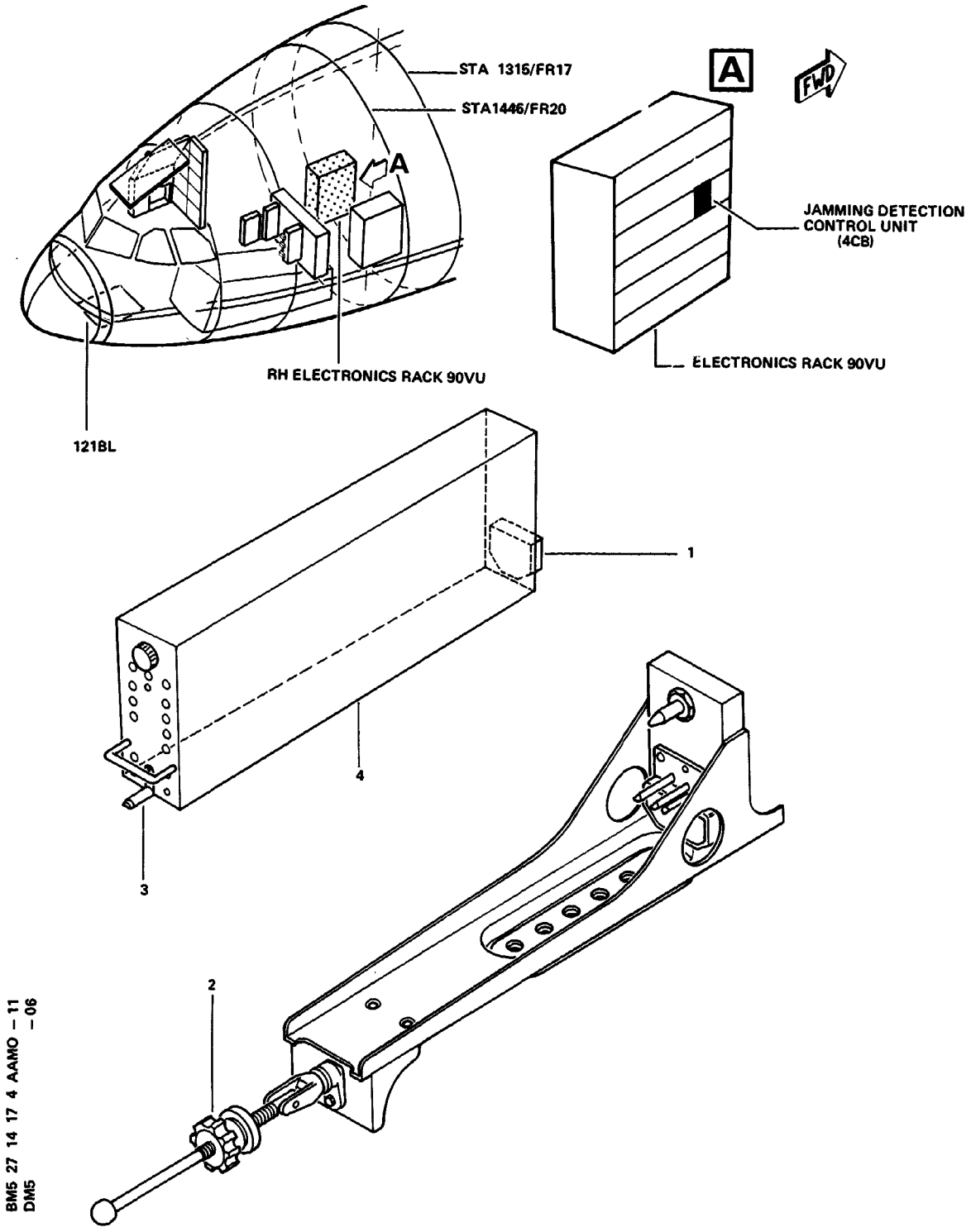
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL/& THS/JAM/DET	2CB	332/U64

(2)Display warning notices prohibiting pressurization of hydraulic systems :
- on ground connectors
- in flight compartment on HYD PWR panel 427VU.

(3)Open access door 121BL.
(4)Gain access to unit 4CB to be removed, in avionics compartment.

B. Removal
(1)Loosen knurled retaining nut (2) until stud (3) is released.
(2)Withdraw control unit (4) from mount by lightly pulling handle so as to release rear connector (1).
(3)Remove control unit (4).
(4)Protect electrical connector (4CB) (1) with blanking cap.

C. Installation
(1)Clean and inspect control unit interface and mount.
(2)Remove blanking cap from connector (1).



Jamming Detection Control Unit
Figure 401

(3)Check electrical connector and locating pins for correct condition.
(4)Push in control unit (4) slowly on mount, making certain that connector and locating pins insert correctly.
(5)Lift knurled retaining nut into position on stud (3).
Tighten knurled retaining nut (2).

D. Test
(1)Remove warning notices prohibiting pressurization of hydraulic systems.
(2)Remove safety clips and tags and close circuit breakers 1CB and 2CB.
(3)Perform operational test described in 27-14-00, P. Block 501,
R Para. 1.D(8).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.
(3)Remove access platform.

SERVO CONTROL PRESSURE SWITCH 17CB - 18CB - 19CB
REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

Removal for replacement of each servo control pressure switch.

NOTE : Identification and location of pressure switches and associated hydraulic systems.

PRESSURE SWITCH	ELECTRICAL IDENT.	HYDRAULIC IDENT.	LOCATION
Green System	19CB	1151	147
Blue System	17CB	2151	571
Yellow System	18CB	3151	148

Pressure switches 17CB, 18CB and 19CB are identical, therefore, only the removal/installation procedure for green system pressure switch 19CB is described below.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Lockwire - Corrosion Resistant Steel, Dia. 1 mm (0.041 in.)
B.	Access Platform 2.6 m (8 ft. in.)
C.	Protective Caps for Electrical Connectors
D.	Hydraulic Fluid Container
E.	Circuit Breaker Safety Clips
F.	Blanking Plugs
G. Material No. 02-002	Hydraulic Fluids (Ref. 20-31-00)
H. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

3. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)On SERVO CTL section of panel 428VU, release JAM/OFF pushbutton switch (OFF legend on) associated with pressure switch to be removed and press the two other JAM/OFF pushbutton switches (OFF legend off).
(5)Open, safety and tag the following circuit breakers :

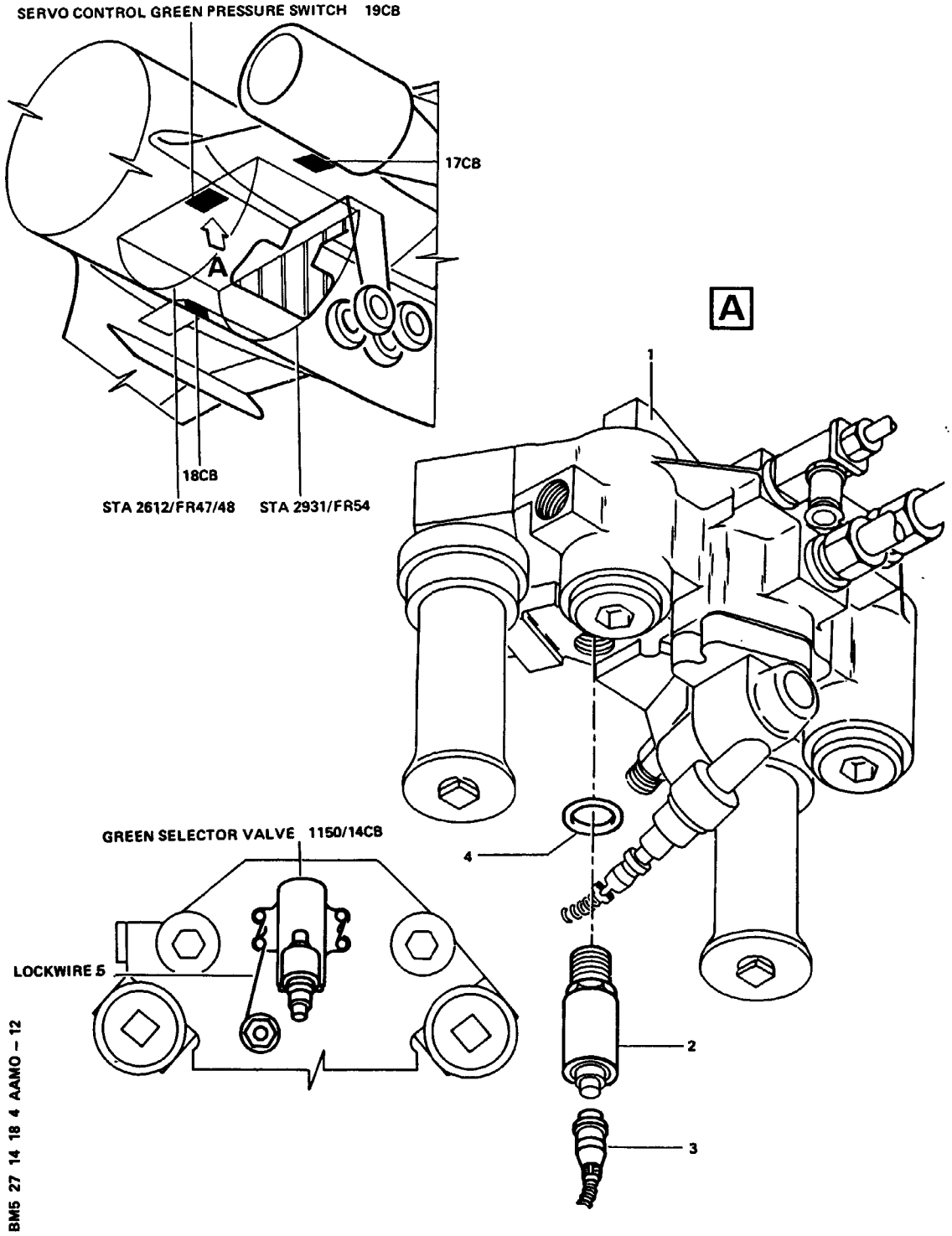
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL/& THS/JAM/DET	2CB	332/U64

(6)Make certain that hydraulic system associated with pressure switch to be removed is depressurized.
(7)Display warning notices on hydraulic panel 427VU in flight compartment and on ground connectors prohibiting pressurization of hydraulic system.
(8)Depressurize hydraulic reservoir associated with pressure switch to be removed (Ref. 29-14-00, P. Block 301).
(9)Display warning notices on reservoir pressurization ground connector and on panel 429VU in flight compartment prohibiting pressurization of hydraulic system and the starting of APU.
(10)Open main gear door (Ref. 32-12-11, P. Block 301).
(11)Gain access to pressure switch to be removed.
(12)Install hydraulic fluid container under pressure switch to be removed.

B. Removal
(Ref. Fig. 401).
(1)Remove electrical connector (3) from pressure switch and install protective caps.
(2)Cut and remove lockwire (5).
(3)Remove pressure switch (2) from manifold (1).
(4)Remove O-ring (4).
(5)Protect port of manifold (1) with a blanking plug.

C. Preparation of Replacement Component
(1)Clean interface of pressure switch (2) and manifold (1) with material No. 11-002. Dry with dry compressed air.
(2)Lubricate O-ring (4) with material No. 02-002.

D. Installation
(1)Remove blanking plug from servo control manifold (1).
(2)Position pressure switch (2) on manifold (1) making certain that O-ring (4) is squarely seated.
(3)Tighten pressure switch. Torque value : 0.090 to 0.135 m.daN (0.66 to 0.97 lbf.ft.). Safety with lockwire (5).
(4)Remove protective caps and connect electrical connector (3).



Servo Control Pressure Switch
Figure 401

E. Tests

(1)Remove safety clips and tags and close circuit breakers 1CB and 2CB.

(2)On SERVO CTL section of panel 428VU, press JAM/OFF pushbutton switch (OFF legend off) associated with pressure switch to be removed.

(3)Remove warning notices and pressurize reservoir of system associated with system in which replacement pressure switch is installed (Ref. 29-14-00, P. Block 301).

(4)Remove warning notices. Connect hydraulic ground power cart and pressurize the system associated to replaced pressure switch (Ref. 29-10-00, P. Block 301).

CAUTION : ON PRESSURIZATION OF INVOLVED SYSTEM, IMMEDIATELY CHECK THAT REPLACEMENT PRESSURE SWITCH IS FREE OF ANY LEAK.

(5)Perform the following functional tests :

ACTION	RESULT
1. On SERVO CTL section of panel 428VU release pushbutton switch associated with system in which replacement pressure switch is installed and check that on the two other JAM/OFF pushbutton switches OFF legends are still off.	OFF legend of pushbutton switch comes on On SERVO CTL section of panel 428VU LO PR warning light comes on
2. Press pushbutton switch	OFF legend of pushbutton switch goes off LO PR warning light goes off.

F. Close-Up

(1)Repeat leakage test at replacement pressure switch.

(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3)Remove hydraulic fluid container.

(4)Close access doors.

(5)Close main gear door (Ref. 32-12-11, P. Block 301).

(6)Depressurize hydraulic system and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).

(7)Check fluid level in reservoir and top up as required (Ref. 12-12-29, P. Block 1).

(8)De-energize the aircraft network (Ref. 24-41-00, P. Block 301).

(9)Remove access platform.

LEAKAGE MEASUREMENT ISOLATION VALVE BLOCK 1135 - 2135 - 3135
REMOVAL/INSTALLATION

WARNING :
CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job
Removal for replacement of each isolation valve block.
NOTE : Identification of isolation valve blocks, correspondence with hydraulic systems and location.

ISOLATION VALVE BLOCKS	HYDRAULIC SYSTEMS	LOCATION
1135	Green	147
2135	Blue	571
3135	Yellow	148

As the three isolation valve blocks are identical, only the removal/installation procedure of the Green isolation valve block 1135 is described.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Lockwire - Corrosion - Resistant Steel Dia. 1 mm (0.041 in.)
B.	Access Platform 2.60 m (8 ft. 6 in.)
C.	Hydraulic Fluid Container
D.	Warning Notices
E.	Circuit Breaker Safety Clips
F.	Blanking Plugs/Caps
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

3. Procedure

A. Job Set-Up

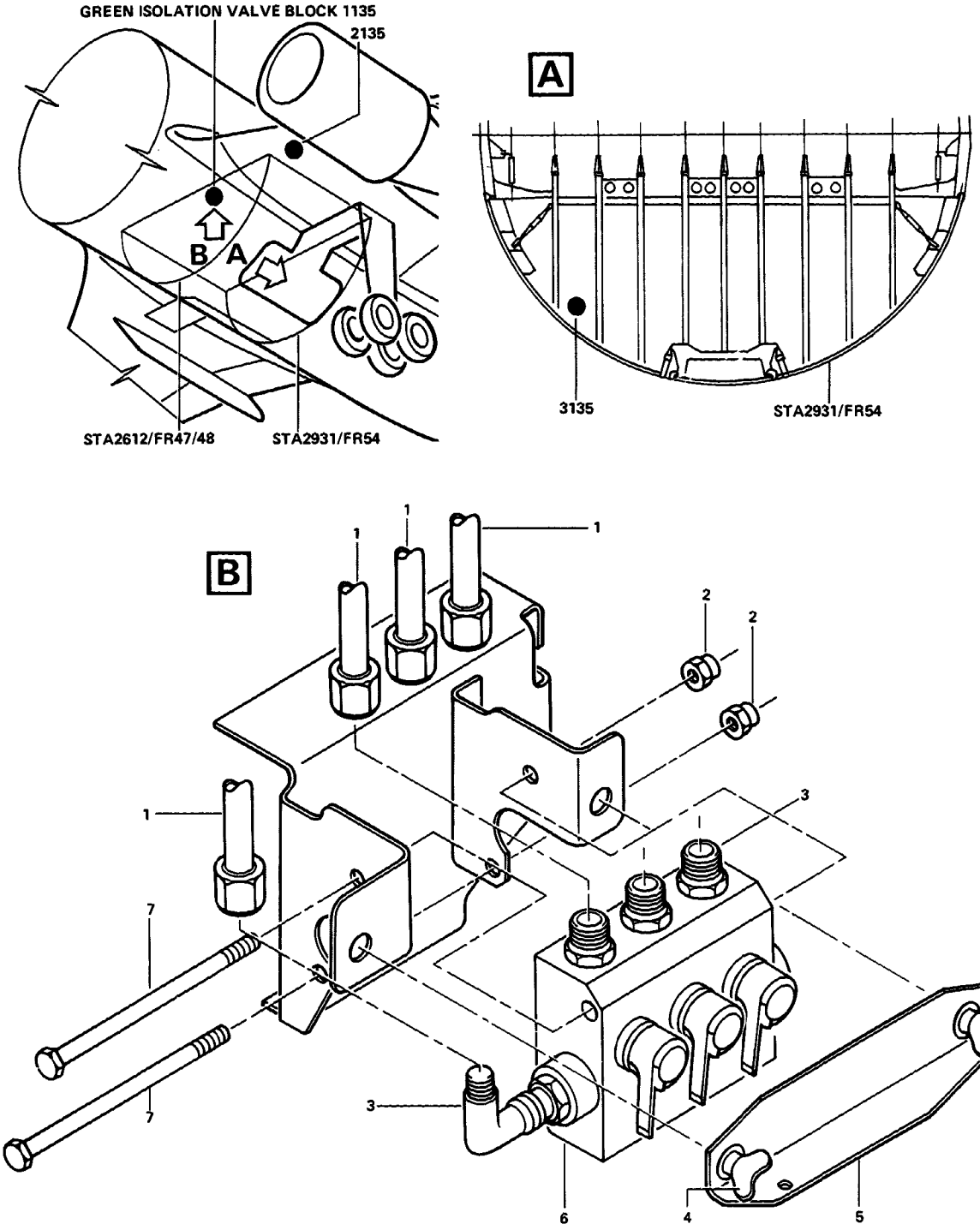
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)On panel 427VU :
(a)Make certain that HYD PWR/PTU pushbutton switches are released (out) (ON legends off).
(b)Make certain that HYD PWR/ELEC PUMPS pushbutton switch is released (out) (ON legend off).
(c)Display a warning notice prohibiting pressurization of Green, Blue and Yellow hydraulic systems.
(4)On SERVO CTL section of panel 428VU, release SERVO CTL/B or G or Y pushbutton switch (OFF legends on) corresponding to the isolation valve block to be removed and press the two other pushbutton switches (OFF legends off).
(5)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	ELEC PUMP	1GE	ALT1/E65
101VU	ELEC PUMP	2GE	ALT1/E65
133VU	FLT CTL/SERVO CTL/& THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL/& THS/JAM DET	2CB	332/U64
133VU	PTU CTL/G/B	1GL	332/U59
133VU	PTU CTL/G/Y	6GL	332/U60

(6)Depressurize hydraulic reservoir corresponding to isolation valve block to be removed (Ref. 29-14-00, P. Block 301).
(7)Display warning notices prohibiting pressurization of this reservoir :
- on the reservoir pressurization connection
- in flight compartment, on panel 429VU (APU start prohibited).
(8)Open one main gear main door (Ref. 32-12-11, P. Block 301).
(9)Gain access to isolation valve to be removed and install a hydraulic fluid recovery container.
(10)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

B. Removal
(Ref. Fig. 401)
(1)Disengage quich attach/detach fasteners (4).
(2)Remove cover plate (5).
(3)Remove pipes (1) and install blanking caps/plugs.
(4)Remove and discard the two locknuts (2).
(5)Support isolation valve block (6).
(6)Remove bolts (7).
(7)Remove isolation valve block (6).

C. Installation
(1)Position isolation valve block (6) equipped with adapters (3).
(2)Engage bolts (7).
(3)Install and tighten new lock nuts (2) on bolts (7).
(4)Remove blanking plugs from pipes (1).
(5)Screw pipes (1) in adapters (3).
(6)Position cover plate (5).



Green Isolation Valve Block
Figure 401

(7)Engage and lock quick attach/detach fasteners (4).

D. Test

(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)Remove safety clips and tags and close the following circuit breakers : 1CB, 2CB, 1GE, 2GE, 1GL and 6GL.
(4)Remove warning notices.
(5)Pressurize hydraulic reservoir of system associated with replaced isolation valve block (Ref. 29-14-00, P. Block 301).
(6)Connect hydraulic ground power cart and pressurize system associated with replaced isolation valve block (Ref. 29-10-00, P. Block 301).
WARNING : UPON PRESSURIZATION OF SYSTEM CHECK REPLACED ISOLATION VALVE BLOCK FOR EXTERNAL LEAKS.
(7)Make certain that circuit breakers associated with flight controls are closed.
(8)On panel 428VU, check that SPLR & SPD BRK pushbutton switches are pressed (in).
(9)Make certain that pitch control can be operated.
(10)Perform the following functional test :
NOTE : In roll control, only spoilers/surfaces No. 3 to 7 are considered.
(a)Functional test of Green isolation valve block :

ACTION	RESULT
1. On SERVO CTL section of panel 428VU, check that G pushbutton switch is released (OFF legend on) and that B and Y pushbutton switches are pressed (OFF legends off).	Green servo control selector valve (14CB) is energized and prohibits passage of hydraulic fluid.
2. Rotate Captain's control wheel in left turn configuration.	On wings, no control surface deflects.
3. Return Captain's control wheel to zero.	
4. Open left isolation valve and rotate Captain's control wheel in left turn configuration.	On left wing, spoiler No. 5 extends.
5. Return Captain's control wheel to zero and close left isolation valve.	On left wing, spoiler No. 5 retracts.
6. Move Captain's control column in nose down direction then return control column to neutral.	Elevators do not deflect.
7. Open center isolation valve and move Captain's control column in nose down direction.	Elevators deflect downwards.

ACTION	RESULT
8. Return Captain's control column to neutral. Close center isolation valve.	Elevators return to neutral.
9. Rotate Captain's control wheel in right turn configuration.	On wings, no control surface deflects.
10. Return Captain's control wheel to neutral.	
11. Open right isolation valve and rotate Captain's control wheel in right turn configuration.	On right wing, spoiler No. 5 extends.
12. Return Captain's control wheel to neutral. Close right isolation valve.	On right wing, spoiler No. 5 retracts.

(b)Functional test of Blue isolation valve block :

ACTION	RESULT
1. On SERVO CTL section of panel 428VU, check that B pushbutton swith (8CB) is released (OFF legend on) and that pushbutton switches (9CB) and (10CB) are pressed (OFF legends off).	BLue servo control selector valve (15CB) is energized and prohibits passage of hydraulic fluid.
2. Rotate Captain's control wheel in left turn configuration.	On wings, no control surface deflects.
3. Return Captain's control wheel to zero.	
4. Open left isolation valve and rotate Captain's control wheel in left turn configuration.	On left wing, spoilers No. 3 and 7 extend.
5. Return Captain's control wheel to zero and close left isolation valve.	On left wing, spoilers No. 3 and 7 retract.
6. Move Captain's control column in nose down direction then return control column to zero.	Elevators do not deflect.
7. Open center isolation valve and move Captain's control column in	Elevators deflect downwards.

ACTION	RESULT
nose down direction.	
8. Return Captain's control column to neutral. Close center isolation valve.	Elevators return to neutral.
9. Rotate Captain's control wheel in right turn configuration.	On the wings, no control surface deflects.
10. Return Captain's control wheel to neutral.	
11. Open right isolation valve and rotate Captain's control wheel in right turn configuration.	On right wing, spoilers No. 3 and 7 extend.
12. Return Captain's control wheel to neutral. Close right isolation valve.	On right wing, spoilers No. 3 and 7 retract.

(c)Functional test of Yellow isolation valve block :

ACTION	RESULT
1. On SERVO CTL section of panel 428VU, check that Y pushbutton switch (10CB) is released (OFF legend on) and that pushbutton switches (8CB) and (9CB) are pressed (OFF legends off).	Yellow servo control selector valve (16CB) is energized and prohibits passage of hydraulic fluid.
2. Rotate Captain's control wheel in left turn configuration.	On wings, no control surface deflects.
3. Return Captain's control wheel to zero.	
4. Open left isolation valve and rotate Captain's control wheel in left turn configuration.	On left wing, spoilers No. 4 and 6 extend.
5. Return Captain's control wheel to zero and close left isolation valve.	On left wing, spoilers No. 4 and 6 retract.
6. Move Captain's control column in nose down direction then return control column to zero.	Elevators do not deflect.

ACTION	RESULT
7. Open center isolation valve and move Captain's control column in nose down direction.	Elevators deflect downwards.
8. Return Captain's control column to neutral. Close center isolation valve.	Elevators return to neutral.
9. Rotate Captain's control wheel in right turn configuration.	On wings, no control surface deflects.
10. Return Captain's control wheel to zero.	
11. Open right isolation valve and rotate Captain's control wheel in right turn configuration.	On right wing, spoilers No. 4 and 6 extend.
12. Return Captain's control wheel to zero. Close right isolation valve.	On right wing, spoilers No. 4 and 6 retract.

E. Close-Up
(1)Check isolation valve blocks for leakage.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove hydraulic fluid recovery container.
(4)Close main gear main door (Ref. 32-12-11, P. Block 301).
(5)Depressurize hydraulic system and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(6)Check level of hydraulic tank and top up if required (Ref. 12-12-29, P. Block 1).
(7)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(8)Remove access platform.

ALL SPEED AILERON SERVOCONTROL JAMMING DETECTION MICROSWITCH - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/ OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
C.	Circuit Breaker Safety Clips and Tags
D.	Blanking Plugs for Electrical Connector
E. Material No. 05-005	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers:

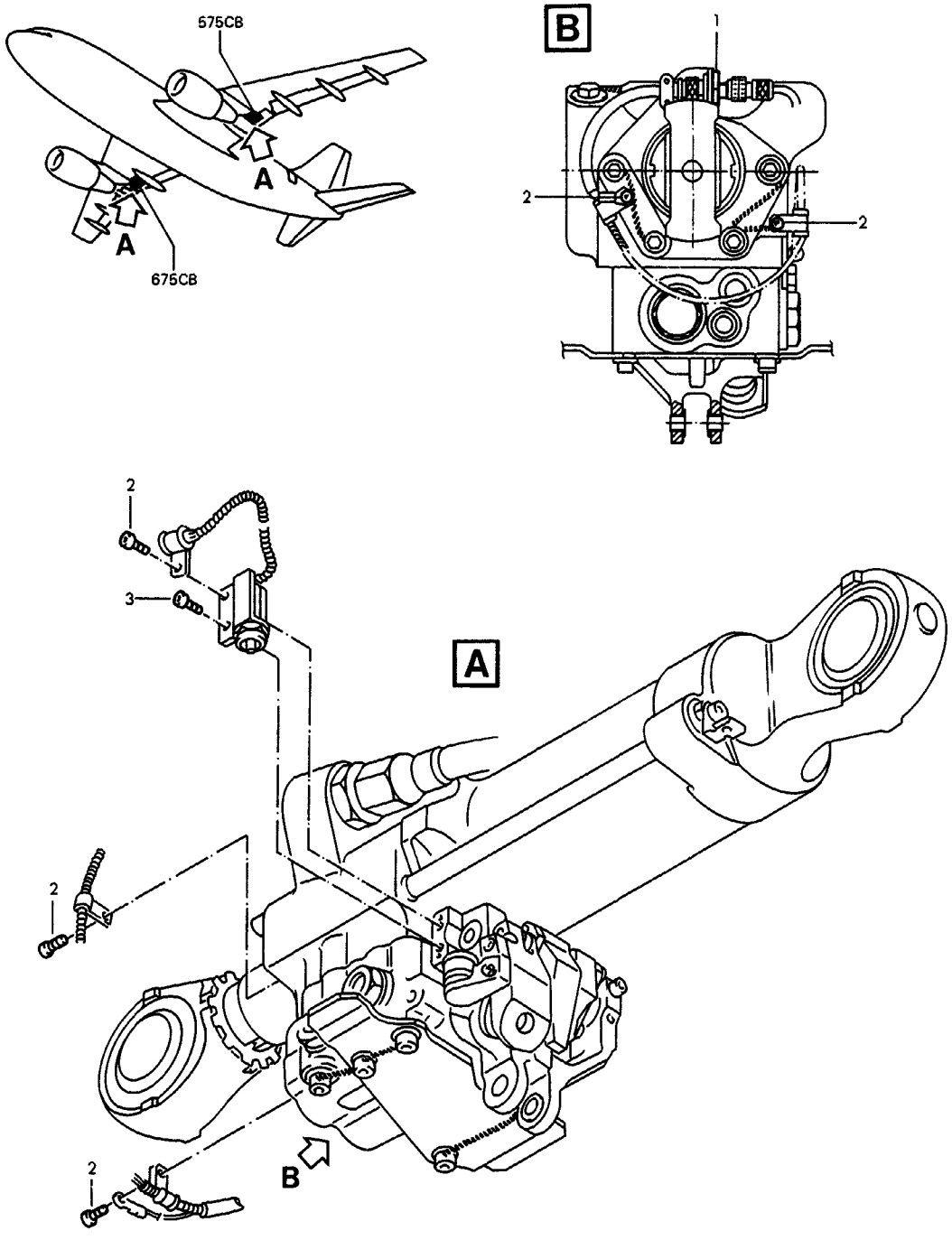
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM/DET	2CB	332/U64

(2)Position access platform.

(3)Open access panels 575BT, 575CB (675BT, 675CB).

B. Removal

(1)Disconnect electrical connector as detailed below:



Jamming Detection Microswitch
Figure 401

SERVOCONTROL	HYD. SYSTEM	CONNECTOR	
		LEFT WING	RIGHT WING
INNER	BLUE	21CBA	20CBA
CENTER	GREEN	25CBA	26CBA
OUTER	YELLOW	31CBA	30CBA

(2)Install blanking plug in connector.
(3)Cut and discard lockwire, remove nut (1) and extract connector receptacle from mounting bracket.
(4)Install nut (1) on receptacle, install blanking plug.
(5)Cut and discard lockwire, remove screws (2) securing 'P' clips to servocontrol body.
(6)Remove remaining screw (3) securing microswitch bracket.
(7)Remove microswitch assembly complete with bracket and cable from aircraft.

C. Installation
(1)Position microswitch assembly complete with bracket on servocontrol. Secure with screw (3), making certain that bracket is correctly positioned on locating spigots.
NOTE : Microswitch assembly is supplied pre-set on bracket, no further adjustment is necessary.
(2)Remove nut (1) from electrical receptacle.
(3)Install receptacle in mounting bracket, secure with nut (1) and safety nut (1) with lockwire.
(4)Install 'P' clips, secure with screws (2).
(5)Safety screws (2),(3) with lockwire.
(6)Remove blanking plugs from electrical connector and receptacle, connect connector removed at step B.(1) above.
(7)Apply corrosion preventive (Material No. 05-005) to screws (2),(3).

D. Test
NOTE : Test is described for a BLUE system microswitch, variations for other systems are indicated.
(1)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)Pressurize GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(4)Remove safety clips and tags and close circuit breakers 1CB, 2CB and 3CG.
(5)Perform test procedure detailed below:
WARNING : BEFORE OPERATING AILERONS, MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACES IS CLEAR.

ACTION	RESULT
1. On SERVO CTL section of panel 428VU	
- Press and release B pushbutton switch (G or Y to correspond	- OFF legend comes on - LO PR legend for that system

ACTION	RESULT
with system being tested).	comes on.
2. On SERVO CTL section of panel 471VU - Press B pushbutton switch (G or Y to correspond with system being tested).	 - TEST legend comes on - Pushbutton switch latches in.
3. Rapidly turn aileron control wheel to left and right several times.	On panel 428VU - JAM legend associated with system being tested comes on.
4. On SERVO CTL section of panel 428VU - Press B pushbutton switch (G or Y to correspond with system being tested).	 - OFF legend goes off - LO PR legend goes out On panel 471VU - Pushbutton switch "unlatches" and TEST legend goes out.
6. Operate aileron control wheel at normal speed over entire range.	- No jam indications appear.

(6)Depressurize GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(7)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

E. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access panels 575BT, 575CB (675BT, 675CB).
(3)Remove access platform.

ALL SPEED AILERON SERVOCONTROL JAMMING DETECTION MICROSWITCH - DEACTIVATION/REACTIVATION

Ref. MMEL Sect. 1-27, Item 3

CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MMEL.

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Deactivation

A. Reason for the Job

(1) One or more detectors on servocontrols may be inoperative.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.5 m (11 ft.)
(2)	Electrical Connector Protective Caps/Plugs
(3)	Circuit Breaker Safety Clips and Tags
(4)	Tie-Wraps
(5)	Warning Notices
Referenced Procedures	
- 27-14-00, P. Block 501	Hydraulic Actuation (Aileron)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

C. Procedure

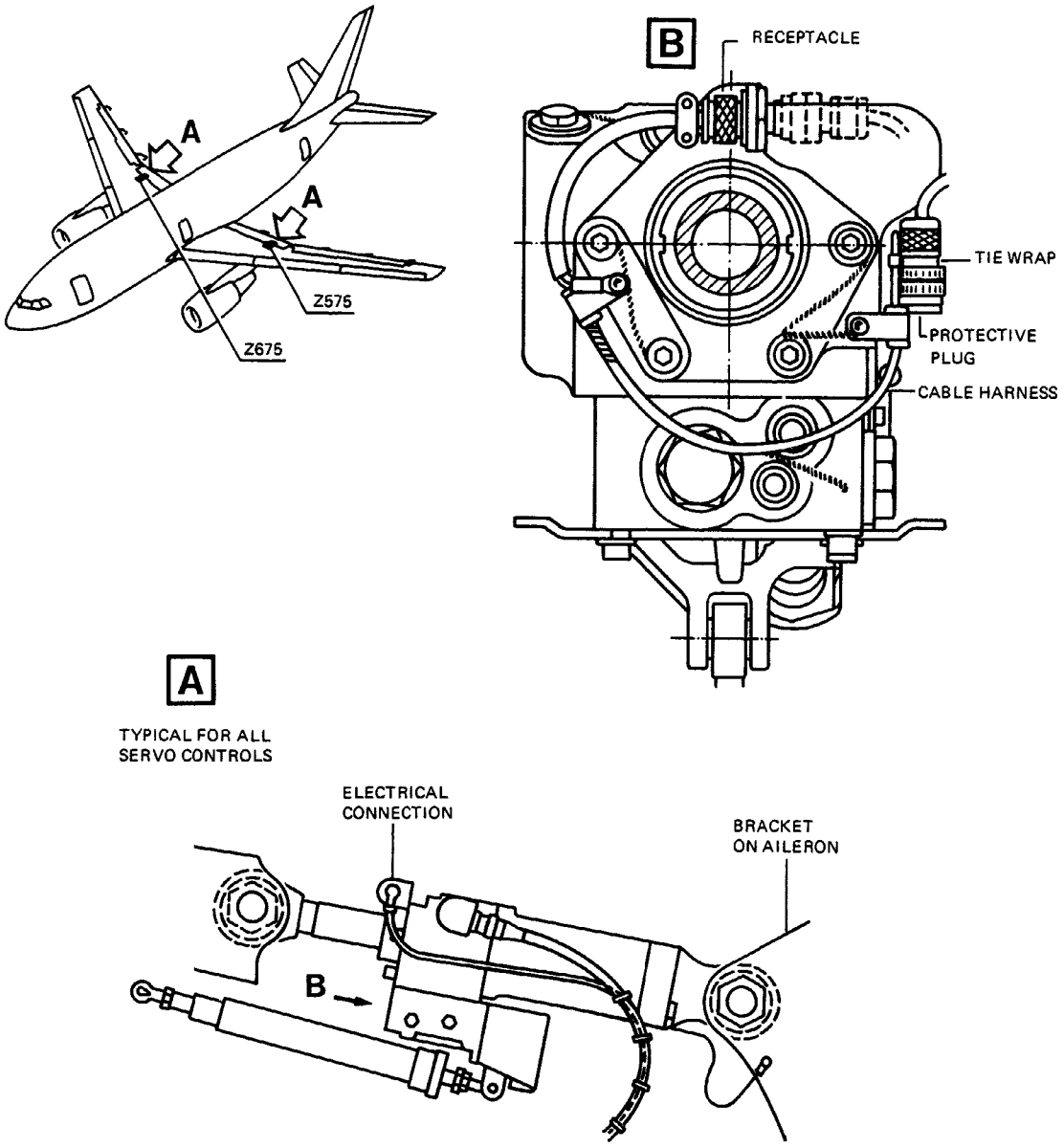
(Ref. Fig. 901)

(1) Job Set-Up

(a) Position access platform.

(b) Depressurize the GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).

(c) Display a warning notice prohibiting pressurization of hydraulic systems and operation of aileron controls.



Jamming Detection Microswitch
Figure 901

(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM/DET	2CB	332/U64

(e)Remove access panel 575BT (675BT).

(2)Deactivation (Ref. Fig. 901)

(a)Disconnect electrical connector and install protective plug.

WARNING : MAKE CERTAIN THAT ELECTRICAL PLUG CANNOT CAUSE FOULING OF MOVING PARTS.

(b)Stow electrical connector and secure with red tie-wraps at cable harness close to clamp.

(c)Install protective cap on receptacle.

(d)Remove safety clips and tags and close circuit breakers 1CB and 2CB.

(3)Test

R (a)Do the test of roll system (ailerons and spoilers) with individual
R hydraulic system (Ref. 27-14-00, P. Block 501).

(4)Close-Up

(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(b)Install access panel 575BT (675BT).

(c)Remove access platform and warning notices.

(d)Install a temporary warning notice in the flight compartment to warn the flight crew that aileron GREEN (BLUE, YELLOW) servocontrol jamming detection microswitch is deactivated.

(e)Make an entry in the aircraft technical log.

2. Reactivation

A. Reason for the Job
Reconnection of the electrical plug of the jamming detection microswitch on the aileron servocontrols in order that trouble shooting procedure and the ensuing corrective action be performed.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.5 m (11 ft.)
(2)	Circuit Breaker Safety Clips and Tags
(3)	Warning Notices
Referenced Procedures	
- 27-14-00, P. Block 501	Hydraulic Actuation (Aileron)
- 27-14-24, P. Block 401	All Speed Aileron Servo Control Jamming Detection Microswitch
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

C. Procedure
(1)Job Set-Up
(a)Position access platform.
(b)Depressurize GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(c)Display warning notices prohibiting pressurization of hydraulic systems
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM/DET	2CB	332/U64

(e)Remove access panel 575BT (675BT).
(2)Reactivation (Ref. Fig. 901)
(a)Remove tie-wraps and protective plug and cap.
(b)Connect electrical connector to receptacle.
(c)Remove safety clips and tags and close circuit breakers 1CB and 2CB.
(3)Trouble Shooting/Corrective Action
(a)Perform aileron servocontrol jamming detection microswitch trouble shooting and carry out the ensuing corrective action.
(4)Test
R (a)Do the test of servo control jamming detection (roll, yaw, pitch)
R (Ref. 27-14-00, P. Block 501),
(5)Close-Up
(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(b)Install access panel 575BT (675BT).
(c)Remove access platform and warning notices.

(d)Remove the temporary deactivation warning notice from flight compartment.
(e)Record reactivation in aircraft technical log.

CONTROL SURFACE POSITION INDICATING (AILERON) - DESCRIPTION AND OPERATION

1. General

Position of the roll control surfaces is indicated on the right ECAM display unit, together with the hydraulic systems available for the servo controls and actuators.

Control surface position indicating for the ailerons, rudder, elevators and THS is described in para. 2 below.

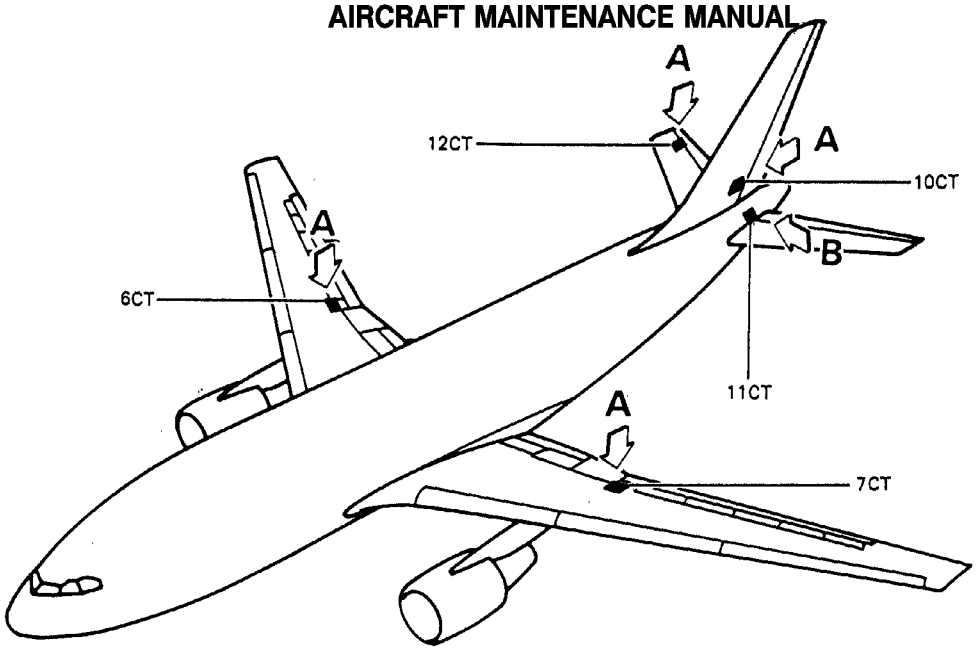
An indicating scale is engraved and painted on the top of the control columns for aileron trim indication (Ref. 27-12).

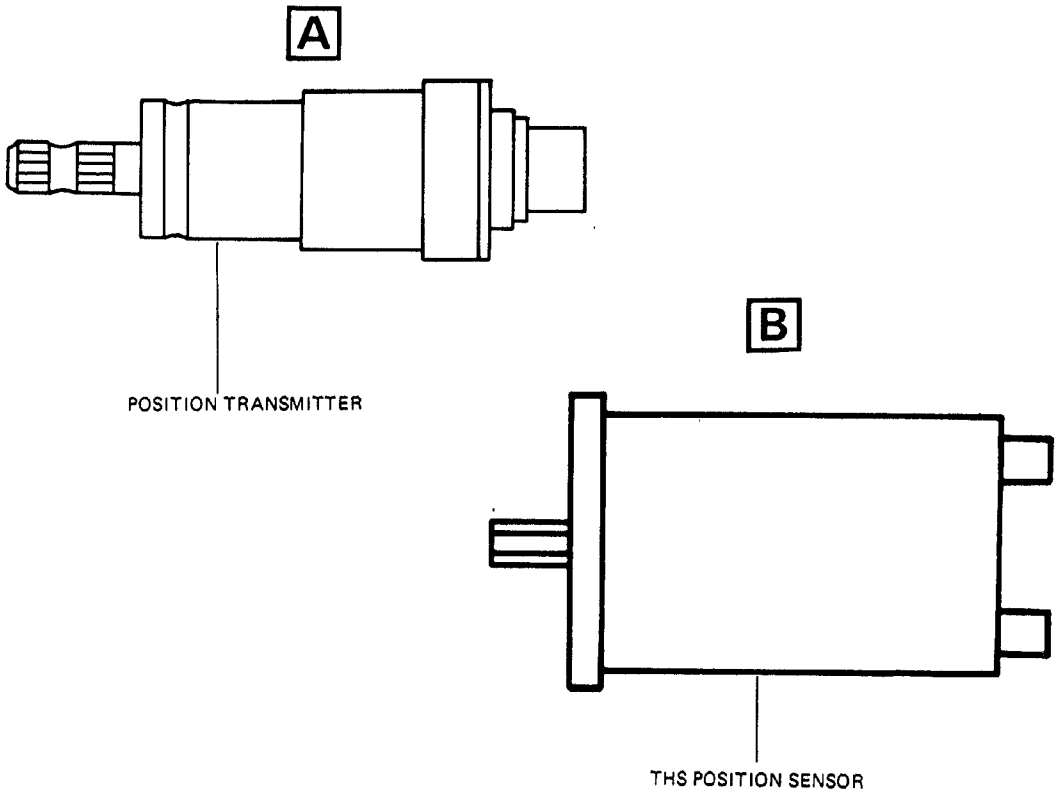
There are no special reference marks painted on the ailerons or on the adjacent structure.

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
6CT	BMTR-ASA POSITION, R		675	675CB	27-15-15
7CT	BMTR-ASA POSITION, L		575	575CB	27-15-15
10CT	BMTR-RUDDER POSITION		325	325BL	27-25-11
11CT	SENSOR-THS POSITION		313	313AL	27-45-11
12CT	BMTR-ELEV POSITION		344	344DB	27-35-11





BM5 27 15 00 0 BTM0 — 00

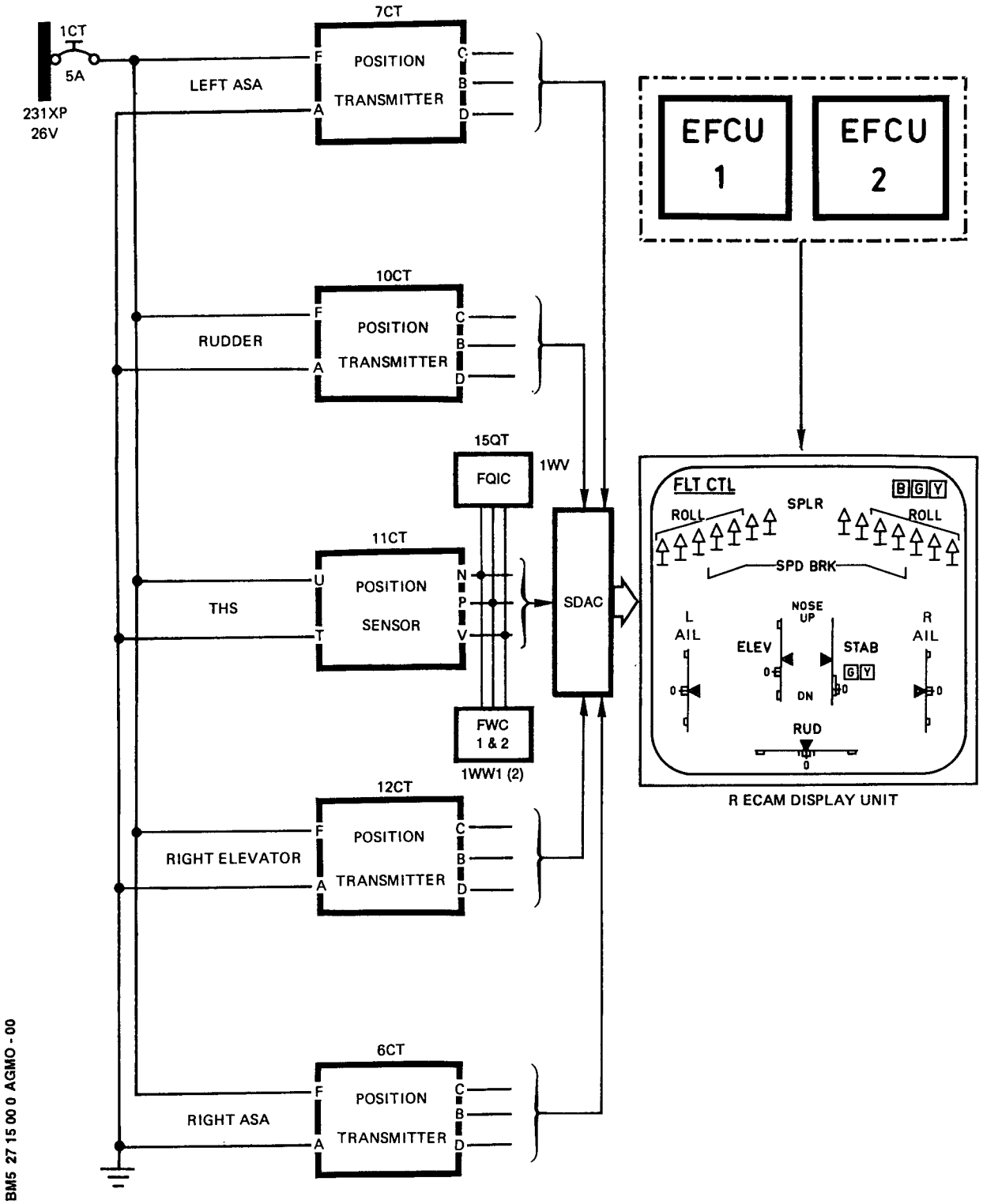
Component Location
Figure 001

3. Description of Control Surface Position Indicating for the Three Axes
(Ref. Fig. 002)

On all three axes synchro transmitters send control surface position signals
R to the right ECAM display unit :
- Right all speed aileron : 6CT
- Left all speed aileron : 7CT
- Rudder : 10CT
- Trimmable horizontal stabilizer : synchro in position sensor 11CT
- Elevator (right) : 12CT

Travel of the above surfaces is indicated by displacement of an index, symmetrically in the case of the ailerons.

For the spoilers, pulses from the EFCU are displayed on the right ECAM
R display unit by illumination of the relevant spoiler arrows.



Control Surface Position Indicating
Figure 002

CONTROL SURFACE POSITION INDICATING (AILERON) - ADJUSTMENT/TEST

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Adjustment of Position Transmitters with Zeroing Equipment

A. Reason for the Job
(1)Adjustment of ASA position transmitter 7CT (6CT)

B. Equipment and Materials

ITEM	DESIGNATION
(1)31-590-100	Zeroing Equipment - Synchro-Resolvers, Synchro-Transmitters and Wiring
(2)98A27108014000	Rigging Pin - Cable Drum differential Droop Unit
(3)98A27901000000	Pin - Rigging, Aileron Control Wheel
(4)98A27508034000	Rigging Pin - Command Sensor Unit
(5)	Access Platform, 5 to 6 m (16 ft. 5 in. to 19 ft. 8 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

C. Procedure
(1)Job set-Up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Connect hydraulic ground power unit and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU
- make certain that G (JAM/OFF) pushbutton switch is pressed (in) and legends are off.
(d)Make certain that roll trim control is at zero.
(e)Make certain that flap and slat control lever is in 1st notch position. Under flight compartment floor, immobilize command sensor unit 51CV with rigging pin 98A27508034000.
(f)Make certain that SPEED BRAKE control lever is in RET notch position,

ground spoiler function not preselected.

(g)Immobilize Captain's and First Officer's control wheels with rigging pins 98A27901000000.

(h)Open doors 575AB and 675AB. Immobilize differential and droop unit with rigging pins 98A27108014000.

(j)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/TRIM/AIL	3CG	331/V63
133VU	CTL/SURF/POS	1CT	334/S61

(k)Install access platform

(l)Make certain that selector switch on equipment 31-590-100 is in STAND BY position and that sensitivity selector switch is in position 0.

(m)Supply equipment with 28VDC.

(n)Open access doors 575DB and 675DB.

(p)Remove connector of position transmitter (6CT R side, 7CT L side) to be adjusted and connect bundle between transmitter and equipment connector ; make certain connectors are correctly positioned.

D. Adjustment
(1)Adjustment of position transmitter 7CT (6CT) with zeroing equipment
(a)Place selector of equipment 31-590-100 in position **ON**
- **AIRCRAFT/28VDC** and **INT/26V 400 Hz** indicator lights come on
(b)Place selector switch in **CONT SURF/POS TRANS** position
(c)Loosen transmitter body attachment nut
(d)Place sensitivity selector switch in 30° position
(e)Rotate transmitter body to position galvanometer pointer to zero
CAUTION : ROTATE TRANSMITTER GENTLY, USE OF EXCESSIVE FORCE WILL CAUSE BREAKAGE OF THE STOP PIN ON THE SPLINED SHAFT.
(f)Successively increase sensitivity by placing selector switch in positions 15°, 3° and 15' and for each position improve transmitter zero adjustment.
At end of adjustment, pointer must remain in a ±15' range.
(g)Tighten position transmitter clamp attaching nut.
(h)Place sensitivity selector to zero and selector switch in **STAND BY** position.
(j)Place selector switch in **OFF** position.
(k)Disconnect equipment bundle connector from transmitter and connect aircraft connector.

E. Close-Up
(1)De-energize equipment 31-590-100
(2)Close circuit breakers 3CG and 1CT
(3)Remove all rigging pins and locking tools
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(5)Close access doors
(6)Remove safety barriers and access platforms
(7)Shut down and disconnect hydraulic ground power cart
(8)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301)

2. Adjustment of Position Transmitters Without Zeroing Equipment

A. Reason for the Job
(1)Adjustment of ASA position transmitters 7CT (6CT).

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27901000000	Pin - Rigging, Aileron Control Wheel
(2)98A27508034000	Rigging Pin - Command Sensor Unit
(3)98A27108014000	Rigging Pin - Cable Drum Differential Droop Unit
(4)	Access Platform, 5 to 6 m (16 ft. 5 in. to 19 ft. 8 in.)
(5)	Digital Voltmeter
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

C. Procedure
(1)Job set-Up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Connect hydraulic ground power unit and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU
- make certain that G (JAM/OFF) pushbutton switch is pressed (in) and legends are off.
(d)Make certain that roll trim control is at zero.
(e)Make certain that flap and slat control lever is in 1st notch position. Under flight compartment floor, immobilize command sensor unit 51CV with rigging pin 98A27508034000.
(f)Make certain that SPEED BRAKE control lever is in RET notch position, ground spoiler function not preselected.
(g)Immobilize Captain's and First Officer's control wheels with rigging pins 98A27901000000.
(h)Open doors 575AB and 675AB. Immobilize differential and droop unit with rigging pins 98A27108014000.
(j)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/TRIM/AIL	3CG	331/V63
133VU	CTL/SURF/POS	1CT	334/S61

(k)Install access platform.
(l)Open access doors 575DB and 675DB.

D. Adjustment
(1)Adjustment of position transmitter 7CT (6CT) without zeroing equipment.

NOTE : Before connecting or disconnecting System Data Analog Converter 1WV, rack 90VU.

(a)Loosen attaching device and slowly turn transmitter body to set L and R AIL pointers, on ECAM scales to zero.

(b)Immobilize transmitter by tightening attaching device.

(c)Remove System Data Analog Converter 1WV, rack 90VU.

(d)Using 15VAC voltmeter (1/100 reading) measure voltage across contacts of connectors at rear of rack as per table below :

TRANSMITTER	CONNECTOR	VAC.A	VAC.B
6CT	AE	9G and 9J	9H and 9J
7CT	AB	9H and 9J	9G and 9J

(e)When VAC.A = VAC.B with a difference ≤ 6/100 VAC, transmitter is considered as adjusted.
If necessary, adjust position transmitter as follows :
- loosen screw securing transmitter
- gradually turn transmitter until VAC.A = VAC.B with a difference ≤ 6/100 VAC
- tighten screw securing transmitter
- repeat test to check values.

(f)Connect System Data Analog Converter 1WV, rack 90VU

(g)Carry out functional test (Ref. Para.3)

R (h)To avoid incorrect pick off installation (180°), check of the
R adjustment using equipment 31-590-100 must be done at next A-check
R (Ref. Para. 1).

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Close circuit breakers 3CG and 1CT.

(3)Close access doors.

(4)Remove access platform.

(5)Remove all rigging pins.

(6)Shut down and disconnect hydraulic ground power cart.

(7)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

3. Functional/Operational Test

A. Reason for the Job
(1)Check correct operation of position transmitters and right ECAM display unit.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job set-Up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Pressurize hydraulic systems either :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c)Make certain that flap and slat control lever is in first notch position.
(d)Make certain that SPEED BRAKE control lever is in RET position, Ground spoiler function not preselected.
(e)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/2 & 3	5CP	335/R63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/6 & 7	7CP	335/R62
133VU	EFCU/NORM/SUPPLY/SPLR 2 & 3	8CP	333/T62
133VU	EFCU/LAND RECOVERY/NORM SUPPLY/SPLR/ 2 & 3	9CP	333/T66
133VU	EFCU/NORM/SUPPLY/SPLR/6 & 7	10CP	332/U62
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/6 & 7	53CP	334/S63
133VU	LAND/RECOVERY/SUPPLY/SPLR/1 & 4 & 6 & 7	54CP	334/S67
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/5	55CP	334/S64
133VU	EFCU/NORM/SUPPLY/SPLR/5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM/SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	EFCU/LAND RECOVERY/SUPPLY/SPLR/1 & 4	72CP	333/T67

(f)Make certain that control surface travel ranges are clear.
(g)On ECAM control panel
- press F/CTL pushbutton switch ; FLT CTL page appears on the ECAM display unit.

D. Test
(1)Roll test

ACTION	RESULT
1. On SERVO CTL section of panel 428VU - make certain that SERVO CTL (B, G and Y (JAM/OFF) pushbutton switches are pressed.	
2. On SPLR & SPD BRK section of panel 428VU - make certain that SPLR & SPD BRK pushbutton switches 3 & 2, 4 & 1, 5, 6, 7 are pressed.	
3. Fully turn Captain's or First Officer's aileron control wheel to the left.	On R ECAM display unit, left of SPLR, green arrows appear representing L wing spoilers 3 to 7. On L AIL scale, pointer moves to the upper mark. On R AIL scale, pointer moves to the lower mark.
4. Fully turn Captain's or First Officer's aileron control wheel to the right.	On R ECAM display unit right of SPLR, green arrows appear, representing R wing spoilers 3 to 7. On L AIL scale, pointer moves to the lower mark. On R AIL scale, pointer moves to the upper mark.
5. Return control wheel to zero.	On R ECAM display unit, below SPLR, only green arrow horizontal dashes remain visible. On L and R AIL scales, pointers return to zero.
6. Shut down pressurization of hydraulic systems. Where applicable disconnect hydraulic ground power cart.	
7. De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).	

ALL SPEED AILERON POSITION TRANSMITTER (6CT, 7CT) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS, OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT ALL THE CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SURFACES THEY OPERATE.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27901000000	Rigging Pin - Aileron Control Wheel
C.	Safety Barriers
D.	Circuit Breaker Safety Clips and Tags
E.	Cotter Pins
F. Material No. 05-005	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 27-15-00, P. Block 501	Control Surface Position Indicating (Aileron)
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1) Position safety barriers.

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3) Make certain that electronics racks ventilation is correct.

(4) Pressurize GREEN, BLUE or YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).

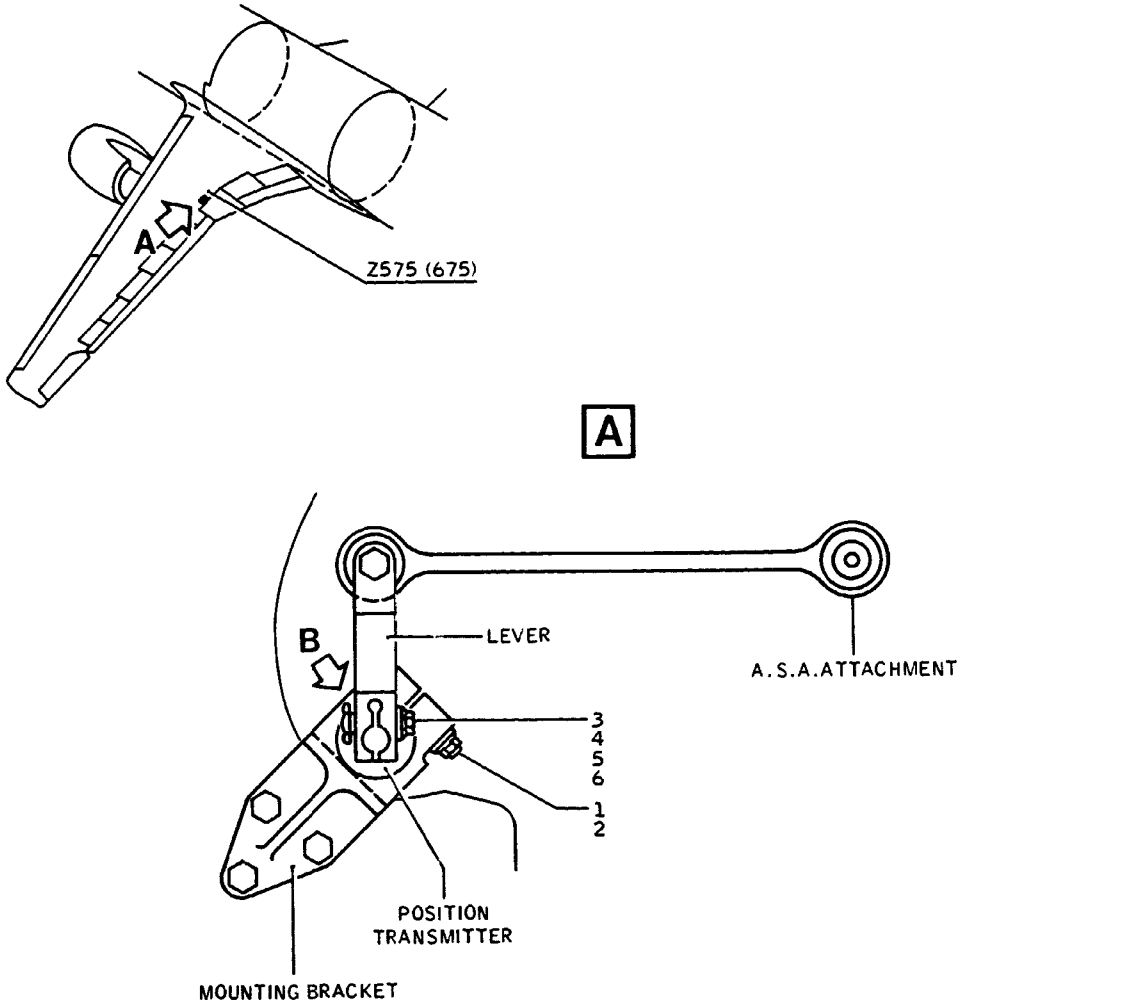
(5) Centralize aileron control wheel.

(6) Set aileron trim to zero.

(7) Install rigging pins in both control wheels.

(8) Make certain that ailerons are undrooped, if necessary retract slats and Krueger flaps to remove droop input (Ref. 27-80-00, P. Block 301).

(9) Open, safety and tag the following circuit breakers:



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All Speed Aileron Position Transmitter
Figure 401

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(10)Position access platform.
(11)Depressurize hydraulic system pressurized in para.2.A.(4) (Ref. 29-10-00, P. Block 301).
(12)Open access door 575DB, (675DB).

B. Removal
(1)Disconnect electrical connector (7CT-A left wing, 6CT-A right wing) from position transmitter.
(2)Remove and discard cotter pin (3), and remove nut (4) washer (5) and bolt (6) and disconnect lever from splined shaft.
(3)Remove and discard cotter pin (1) and slacken nut (2).
(4)Withdraw position transmitter from mounting bracket.

C. Preparation for Installation
(1)Apply corrosion preventive (Material No. 05-005) to bolt (6).

D. Installation
(1)Install position transmitter in mounting bracket, and tighten nut (2) sufficiently to retain position transmitter in position, while allowing adjustment by hand.
(2)Make certain that index marks on transmitter body and shaft are aligned.
(3)While keeping index marks aligned, position lever on splined shaft.
(4)Secure lever to splined shaft with bolt (6), washer (5), nut (4) and safety with cotter pin (3).
(5)Reconnect electrical connector (7CT-A left wing, 6CT-A right wing) to position transmitter.

E. Test
(1)Remove rigging pins from control wheels.
(2)Remove safety clips and tags, and close circuit breakers 1CT, 1CB and 3CG.
(3)Perform adjustment and test procedure (Ref. 27-15-00, Page Block 501).

F. Close-Up
(1)Make certain that nut (2) is tight and safety with cotter pin (1).
(2)Apply corrosion preventive (Material No. 05-005) to all disturbed nuts, bolts.
(3)Close access door 575DB (675DB).
(4)Remove access platform and safety barriers.
(5)Remove safety clips and tags, close circuit breakers 5CV, 6CV, 10CV,

45CV.

(6) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

1. General

R **ON A/C 004-200,

(Ref. Fig. 001)

**ON A/C 001-003,

(Ref. Fig. 002)

**ON A/C ALL

Yaw control is provided by one rudder surface.
Main control is mechanical (Ref. 27-21).
Trim control is electrically signalled (Ref. 27-22).
Artificial feel (Ref. 27-23) is achieved by means of a spring rod, stiffness of which is independent of flight conditions.
At high speeds, to avoid excessive loads being transmitted by the rudder to the structure, a variable stop lever and actuator limit rudder travel in relation to airspeed (Ref. 27-23).
Hydraulic actuation (Ref. 27-24) is achieved by three mechanical input servo controls.
Position of the rudder is indicated on the right ECAM display unit (Ref. 27-25).

2. Interface With Autopilot System (Ref. Chap. 22)
An autopilot actuator is mounted adjacent to the artificial feel and trim unit upstream of the variable stop lever ; it drives the complete control via a detent lever which can be overridden by the pilots.
A yaw damper actuator, mounted between the artificial feel and trim unit and the variable stop lever, drives the rear control via a differential linkage. The yaw damper actuator signals are added to those of the pilots, up to the maximum travel allowed by the variable stop lever. The yaw damper actuator is fail-safe, so that disconnection of the control is extremely improbable.

3. Interface With Braking System (Ref. Chap. 32)
Levers are attached to each pedal, to provide braking inputs, when the pedals rotate about their axis.

4. Interface With Nose Wheel Steering (Ref. Chap. 32)
The nose wheel steering control is connected to the rudder control through a mechanical steering control coupler (engaged when the landing gear is extended) and a spring rod, the threshold of which is lower than the threshold of the rudder artificial feel and trim unit spring rod.
The spring rod prevents the nose wheel steering control from transmitting inputs to the rudder control.

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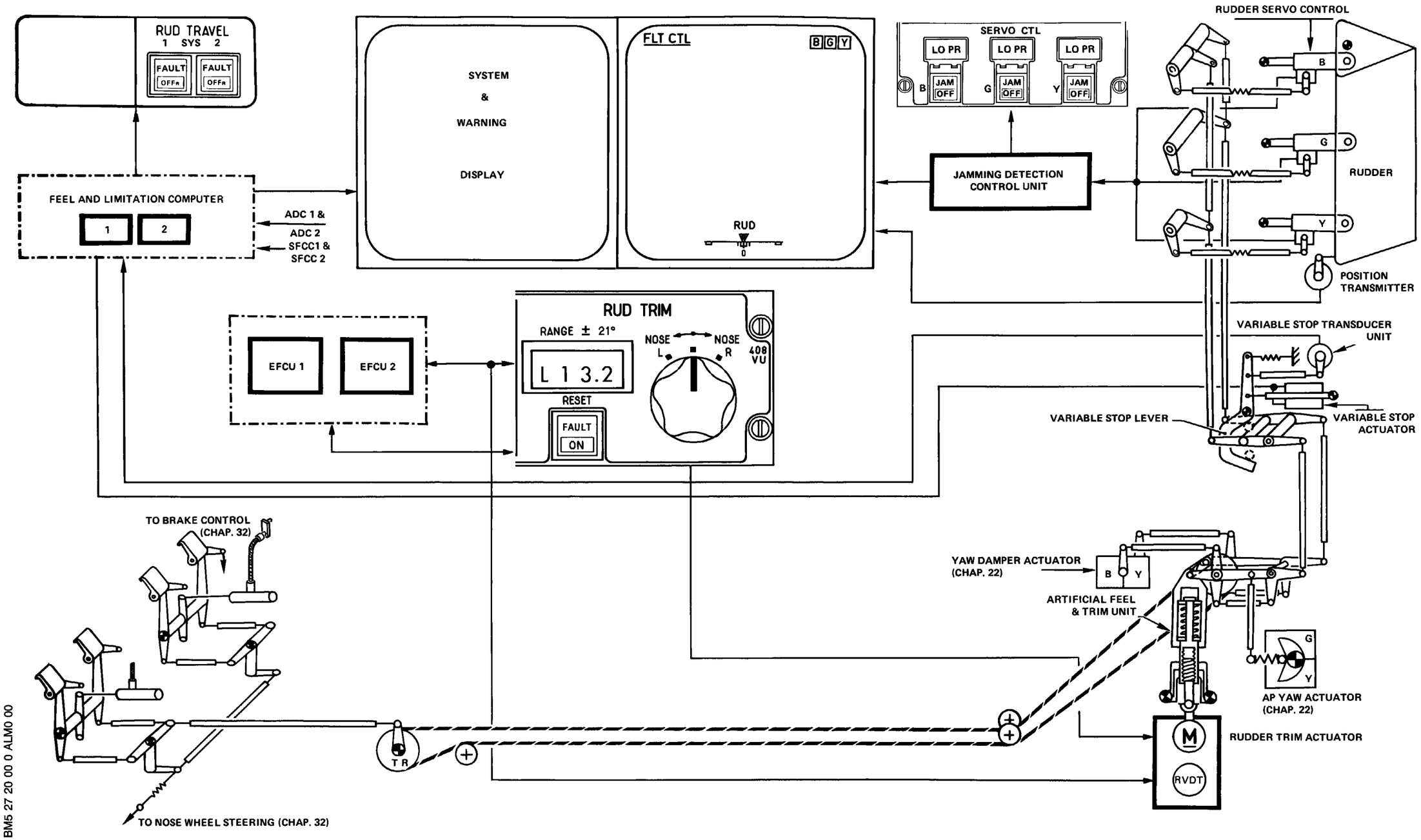

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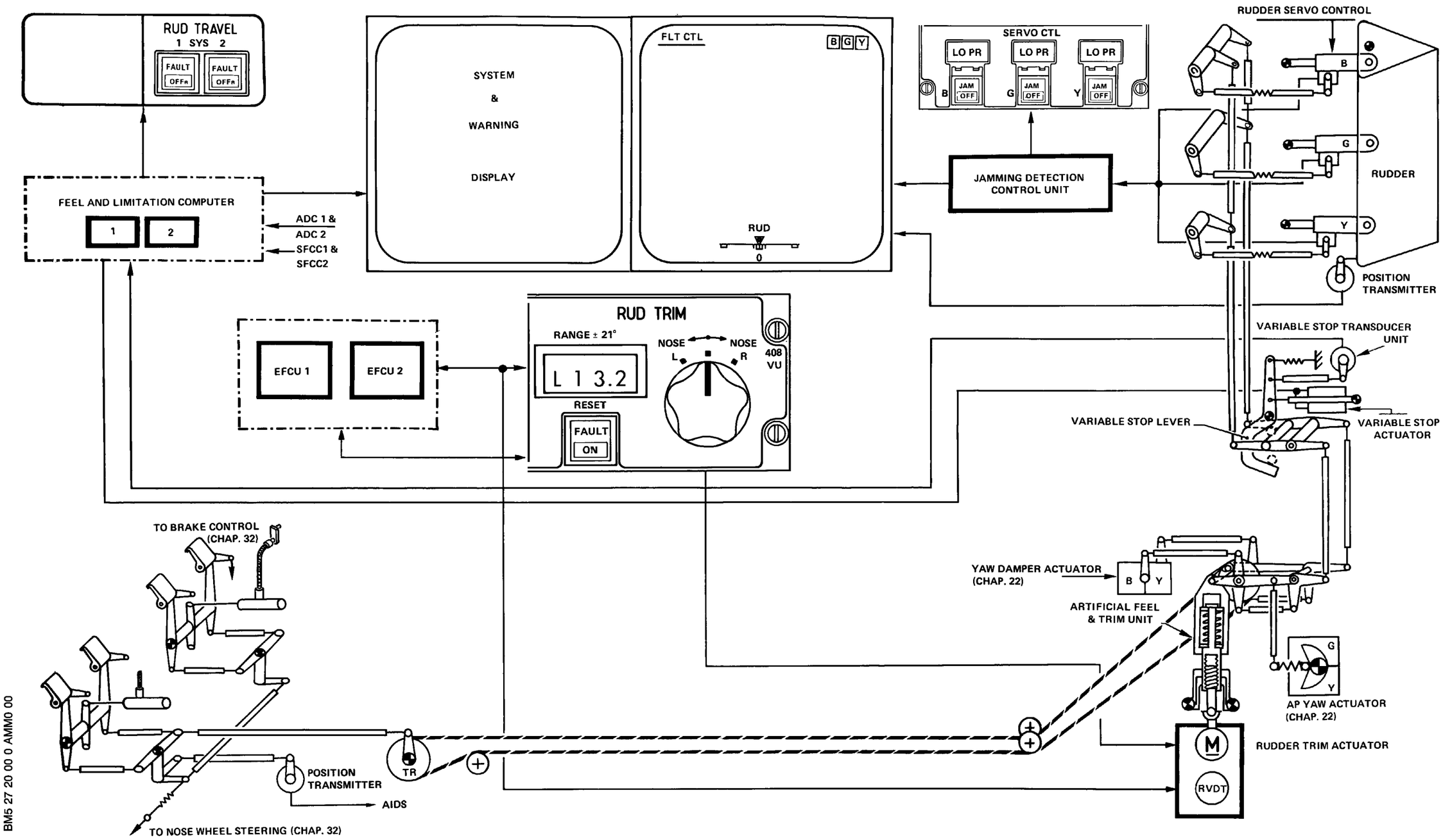
Rudder
Figure 001



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Rudder
Figure 002

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Cables

A. Equipment and Materials

ITEM	DESIGNATION
(1)98A27901002000	Pin - Rigging, Rudder Control
(2)98A27307545000	Rigging Pin - Cable Quadrant, Rudder Mechanical Controls
R (3)FE214901 or FE101901	Locking Equipment - Cable Tension Regulator
(4)	Access Platform 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
(5)	Lockwire - Corrosion - Resistant Steel dia. 0.8 mm (0.032 in.)
(6)	Circuit Breaker Safety Clips
Referenced Procedures	
- 27-21-14, P. Block 401	Cable Tension Regulator
- 27-20-00, P. Block 501	Rudder
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

B. Procedure

(1)Job set-up

R (Ref. Fig. 401)
(Ref. Fig. 402)

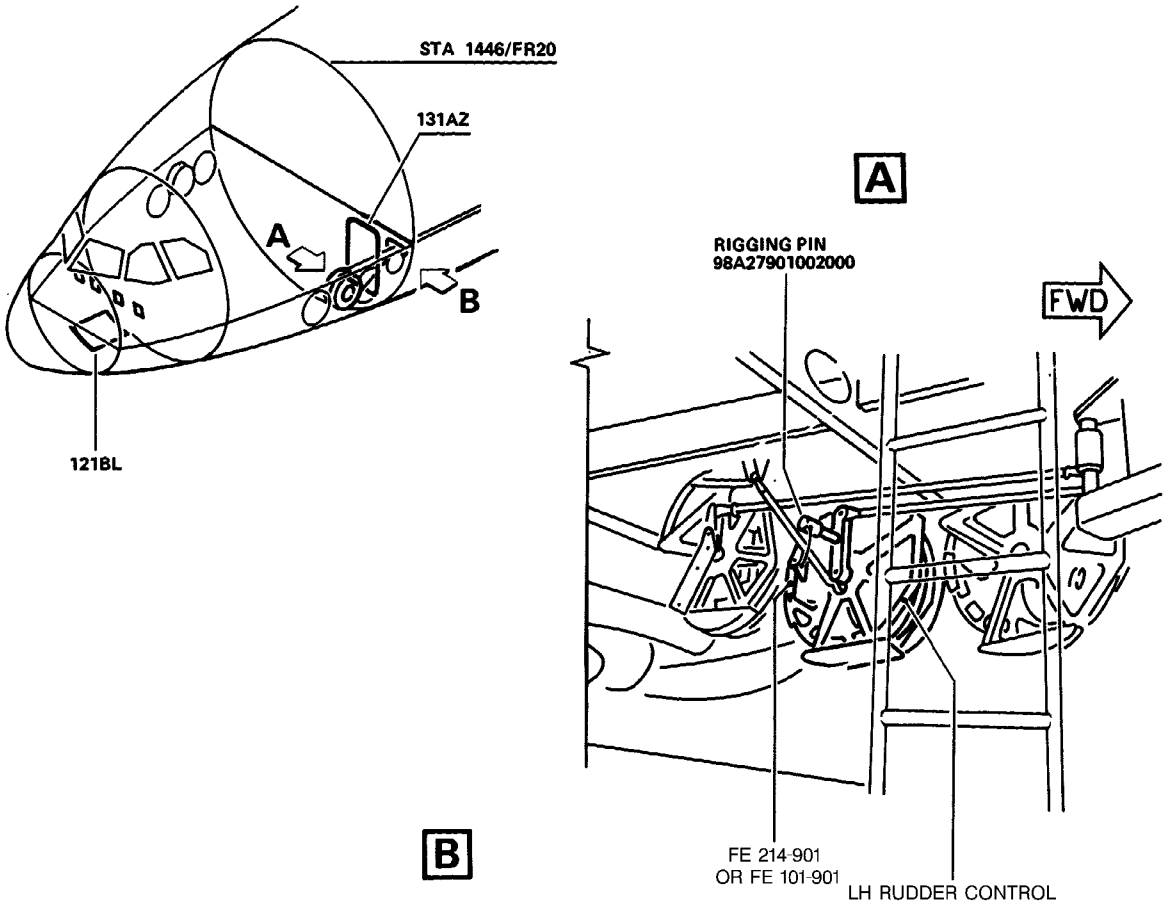
(a)Open access doors 121BL, 131AZ, 812.

(b)Make certain that rudder pedals are at neutral

(c)On panel 408VU
On RUD TRIM indicator, make certain that rudder trim is at zero.

(d)On panel 22VU
Open, safety and tag RUD/TRIM/SLOW circuit breaker 1CG, position 201/J27

(e)Make certain that the three hydraulic systems are depressurized (Ref.



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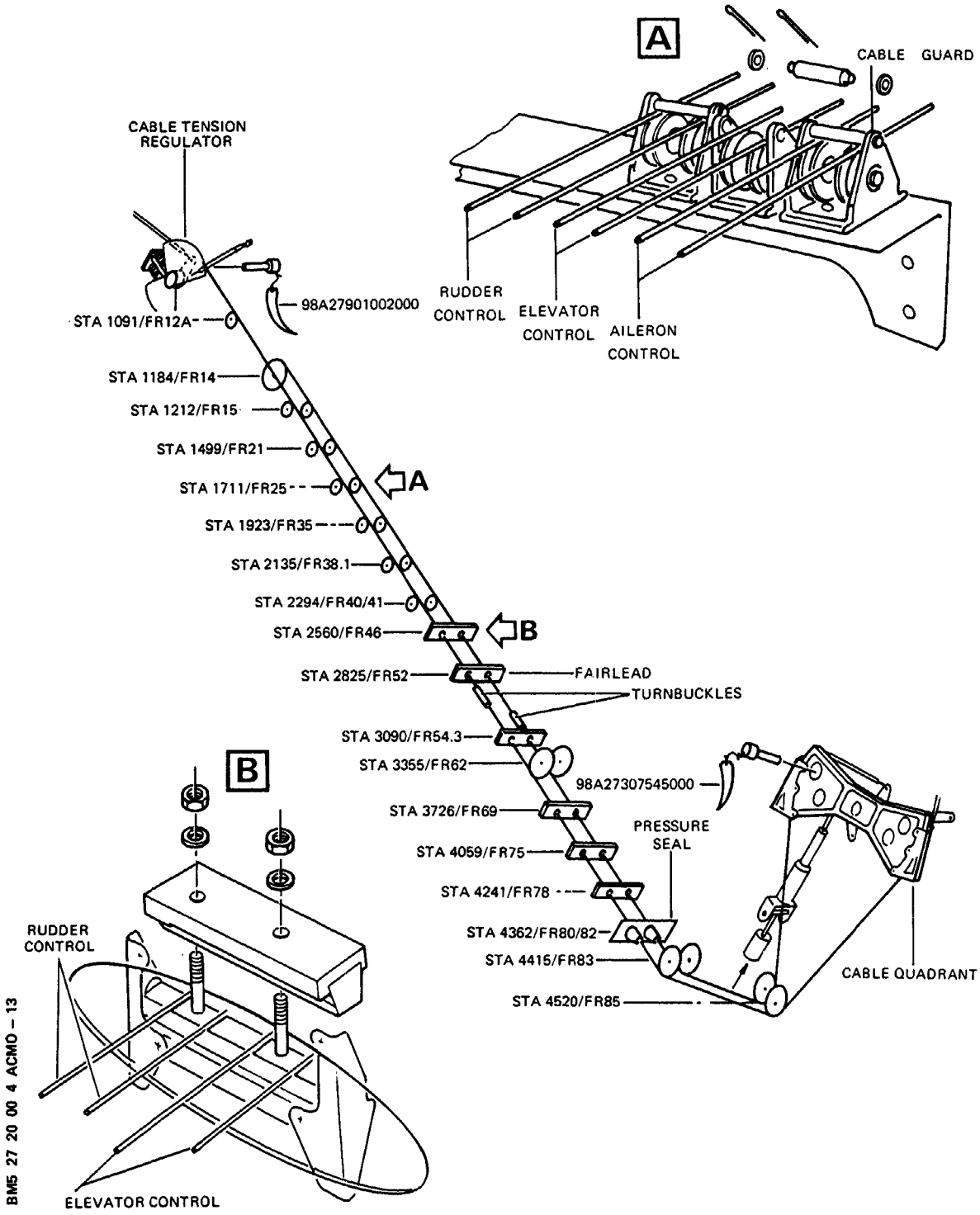
Rigging Pin Installation
Figure 401

R



Cable Routing in Fuselage
Figure 402

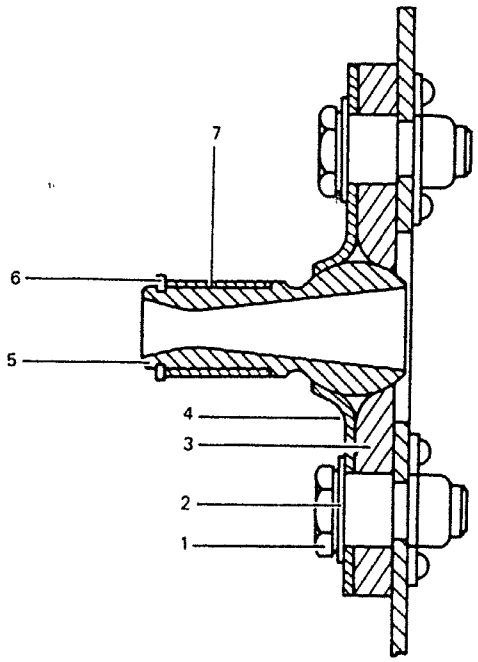
29-10-00, P. Block 301).
(f)Immobilize rudder cable tension regulator with rigging pin 98A27901002000.
(g)Install access platform. Open door 312AR
(h)Immobilize cable quadrant with rigging pin 98A27307545000.
(j)Depending on which cable run is to be removed, remove floor panels between STA2294/FR40/41 and STA3090/FR54-3.
(k)Depending on which cable run is to be removed, remove ceiling panels in forward (and Aft) cargo compartment(s), along cable routing.
(l)Display a warning notice prohibiting operation of rudder control.
(m)Remove safety clips from cable turnbuckles and slowly reduce cable
R tension until cable tension regulator locking equipment FE101901 or
R FE214901, immobilizing the two quadrants of the regulator, can be
R engaged.
R NOTE : For cable tension regulator FE103, use cable tension regulator
R locking equipment FE101901.
R For cable tension regulator FE214, use cable tension regulator
R locking equipment FE214901.

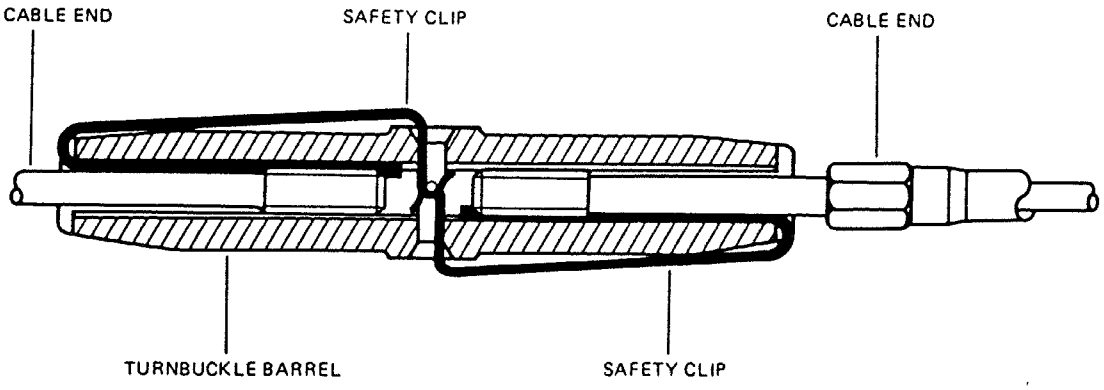
(2)Removal of forward cable run
(a)Unscrew turnbuckles at ends of forward cable run and disengage end fitting of section to be removed.
(b)Disassemble upper sections of fairleads
(c)Disassemble cable guards mounted on pulleys ; if required disassemble pulleys.
(d)Remove tension regulator cable guards (Ref. 27-21-14, P. Block 401).
(e)Remove cable end fitting from retaining notch on cable tension regulator quadrant.
(f)Remove forward cable run.

(3)Installation of forward cable run.
NOTE : If you cannot adjust the control cables, do a visual inspection on the pulleys and the tension regulator. If they are in good condition, replace the control cables.
(a)Engage cable on pulleys, cable guards and insert cable end fitting in retaining notch on cable tension regulator quadrant.
(b)Install cable guards on cable tension regulator (Ref. 27-21-14, P. Block 401).
(c)Install cable guards on pulleys mounts or assemble pulleys if required.

(d)Assemble upper sections of fairleads. Tighten nuts.
(e)Insert threaded end fittings into turnbuckle barrels and progressively and simultaneously tighten turnbuckles until locking equipment on tension regulator quadrants can be disengaged.
(f)Proceed with cable tension adjustment (Ref. 27-20-00, P. Block 501).

(4)Removal of aft cable run (Ref. Fig. 403)
(a)Between STA2825/FR52 and STA3090/FR54.3. Unscrew turnbuckles and disengage end fitting of section to be removed.
(b)Disassemble upper sections of fairleads.
(c)Remove cable guards attached on pulley mounts.
(d)At pressure seal, STA4362/FR80/82.
1 Cut lockwire remove bolts (1). Retain washers (2).
2 Separate flange (4) from flange (3)





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Pressure Seal and Turnbuckle Safetying
Figure 403

NOTE : Flange (3) remains on structure.

3 Remove circlip (6), sleeve (7) and separate the two halves of cable guide (5) .

(e)In zone 312, on cable quadrant, remove cable end fitting from retaining notch.

(f)Remove aft cable run.

(g)Retain sleeve (7) and flange (4).

(5)Installation of aft cable run.

NOTE : If you cannot adjust the control cables, do a visual inspection on the pulleys and the cable quadrant. If they are in good condition, replace the control cables.

(a)Insert cable end fitting in retaining notch on cable quadrant (zone 312).

(b)Engage cable over pulleys.

(c)At pressure seal, STA4362/FR80/82)

- insert cable

CAUTION : DO NOT FORGET TO PLACE FLANGE (4) AND SLEEVE (7). FLANGE (3) REMAINS ON STRUCTURE. MAKE CERTAIN THAT FLANGE (4) AND SLEEVE (7) ARE CORRECTLY POSITIONED.

(d)Engage cable on cable guards and over pulleys.

(e)Install upper sections of fairleads. Tighten nuts.

(f)Secure cable guards on pulleys mounts.

(g)On pressure seal at STA4362/FR80/82.

1 Equip cable with guide cable halves (5) maintained by sleeve (7) and circlip (6).

NOTE : Flange (3) is in position on structure.

2 Install flange (4) and washers (2). Tighten bolts (1). Safety with lockwire.

NOTE : If you install a new aft control cable, cut the aft control cable of the rudder (Ref. 27-20-00, P. Block 501, Para. 3.), before you continue this procedure.

(h)Insert threaded end fittings into turnbuckle barrel and progressively and simultaneously tighten turnbuckles until locking equipment on tension regulator quadrants can be disengaged.

NOTE : Make certain that fairlead ball ends of pressure seals are free to rotate and that cables freely slide in cable pressure seals. If not replace pressure seal by a new one.

(j)Proceed with cable tension adjustment (Ref. 27-20-00, P. Block 501).

(6)Close-Up

(a)Remove rigging pin and equipment.

(b)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(c)Install floor panels and ceiling panels in cargo compartments.

(d)Remove access platform.

(e)Remove safety clip and tag and close circuit breaker 1CG.

(f)Close access doors.

R CAUTION : THIS PROCEDURE MUST BE PERFORMED IN A HANGAR.

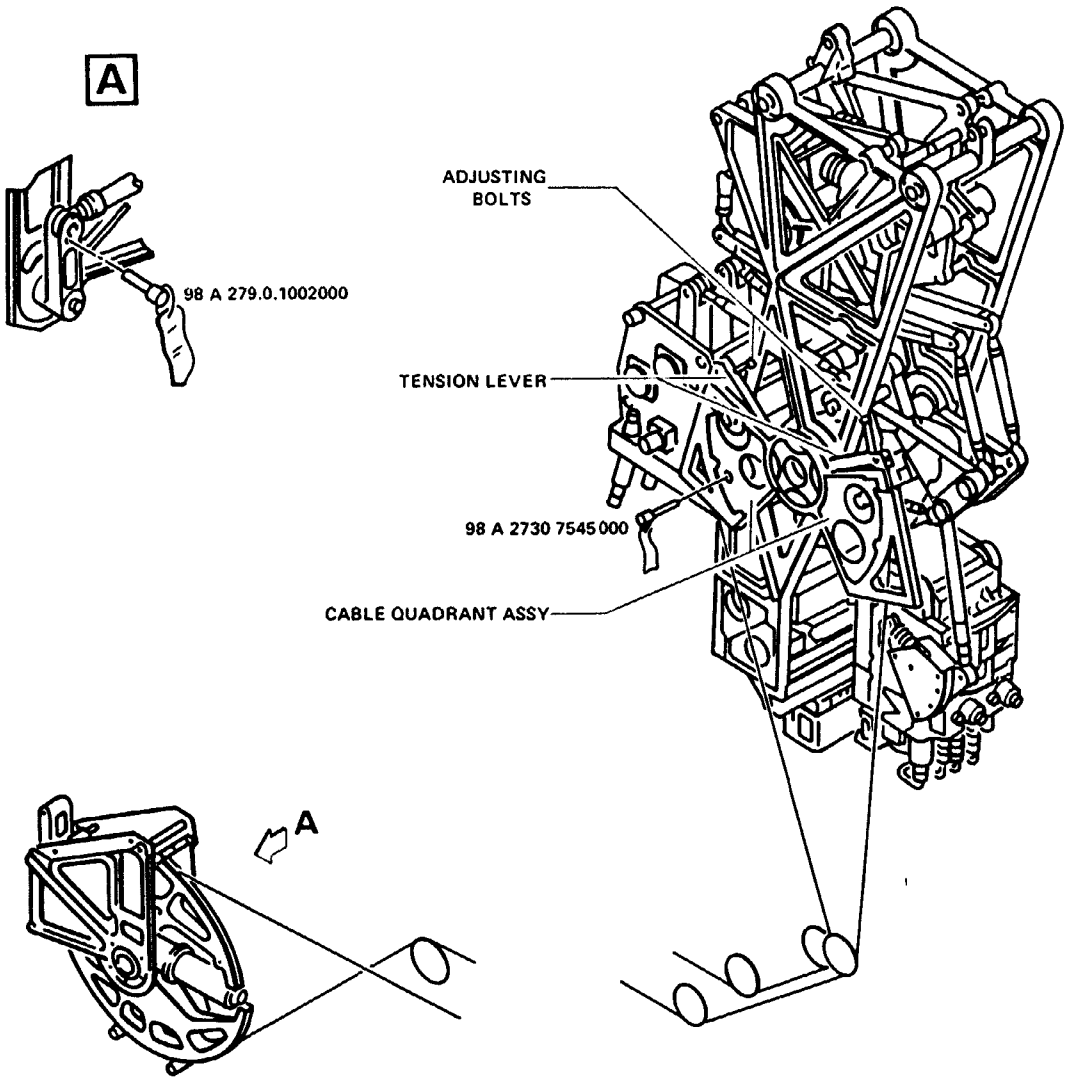
WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Check of Cable Tension on Rudder Control Linkage

A. Equipment and Materials

ITEM	DESIGNATION
(1)98A27901002000	Pin-Rigging, Rudder Control
(2)98A27307545000	Rigging Pin - Cable Quadrant, Rudder Mechanical Controls
(3)	Access Platform 2 to 5,50 m (6 ft. 6 in. to 18 ft.)
(4)	Warning Notice Prohibiting Operation of Rudder Control
(5)	Thermometer
(6)	Circuit Breaker Safety Clips
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
R - 27-20-00, P. Block 401	Rudder
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 29-21-00, P. Block 301	Green Auxiliary Power

B. Procedure
(Ref. Fig. 501)
(1)Job set-up
(a)Pressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).
(b)On panel 408VU,
On RUD TRIM indicator, make certain that rudder trim is at zero.
(c)On panel 22VU,
Open safety and tag RUD/TRIM/SLOW circuit breaker 1CG, line 201.
(d)In flight compartment, display a warning notice prohibiting operation of rudder control.
(e)Install access platform
Open access door 121BL.
(f)Open access door 312AR.



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Tension Regulator/Rudder Control Unit
Figure 501

(g)Move control linkage slowly and let it return to neutral position.
Check that rigging pin 98A27307545000 can be freely installed.
(h)Make certain that rigging pin 98A27901002000 can be freely inserted in tension regulator. If not, pull on one cable to see which one has to be adjusted to allow rigging pin free insertion.
Adjust the corresponding cable to allow rigging pin free insertion.
Remove rigging pins. Slowly move rudder pedal and let it return to neutral position.
Check correct pin insertion.

(2)Adjustment of cable tension
(Ref. Fig. 502)
(a)Record ambient temperature

R NOTE : Prior to taking readings, make sure that the cable area
R temperature and the external temperature are the same at
R ± 2 deg. C (± 3.6 deg. F).

It is necessary to wait three hours before you start the adjustment in order to get a uniform stabilized temperature in the aircraft.
(b)Gradually adjust cable tension using tension levers of rear cable quadrant assy until the pointer on the tension regulator is opposite the relevant compensation scale graduation determined against the ambient temperature by means of the cable tension adjustment graph.

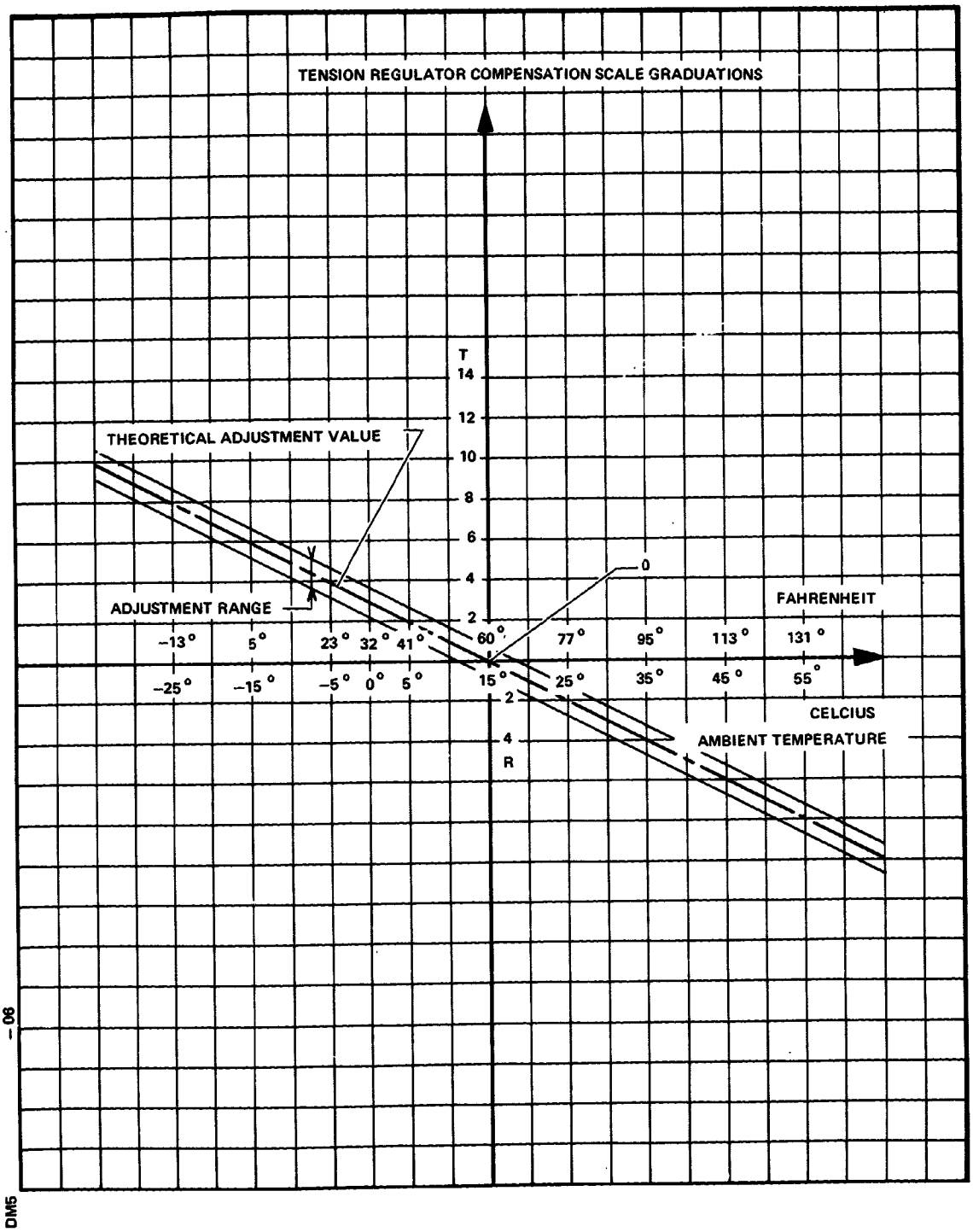
NOTE : Select the nearest graduation value below the lower line of adjustment range (towards letter R).

NOTE : During and after tensioning operation, flex the two cables equally and release sharply. When releasing cables, check that tension regulator locking cross beam slides freely.

NOTE : Slowly move rudder pedal and let it return to neutral position. Check correct insertion of pins.

NOTE : If you cannot adjust control cables :
- do a visual inspection of the rudder mechanical control for correct cable routing
- if the visual inspection is correct, shorten the length of the rudder control cables.

R (c)If you cannot adjust control cables, do a visual inspection of the
R pulleys and the tension regulator.
R 1 If they are in good condition :
R a Make a mark on each front cable.
R b Pull cables to the rear until the position of the index agrees
R with the value found on the graph.
R c Keep cables pulled and make a new mark on each front cable then
R release cables.
R d Measure the length between the two marks of each cable :
R - if the length is more than 40 mm (1.5748 in.), shorten control
R cables (Ref. Paragraph 2.)
R - if the length is less than 40 mm (1.5748 in.), replace control
R cables (Ref. 27-20-00, P. Block 401).
R (d)Tighten nut on tension lever adjusting bolts. Safety nuts with
R lockwire.
R (e)Remove all rigging pins and equipment.
R (f)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.



Cable Tension Adjustment Graph
Figure 502

(3)Test
(a)Do the operational test of the rudder deflection (Ref. 27-21-00, P. Block 501).
(b)Check that pointer is still opposite the same graduation on compensation scale.
(c)Immobilize cable tension regulator with rigging pin 98A27901002000.
(d)Make certain that rigging pin 98A27307545000 can be inserted/removed freely into/from cable quadrant.

(4)Close-up
(a)Remove rigging pins.
(b)Close access doors.
(c)Remove access platform.
(d)Remove safety clip and tag, and close circuit breaker 1CG
(e)Shut down pressurization of green hydraulic system
(f)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Shortening of the Rudder Cable Length

CAUTION : THIS PROCEDURE MUST BE PERFORMED IN A HANGAR.

WARNING : MAKE SURE THAT THE SAFETY DEVICES AND THE WARNING NOTICES ARE IN POSITION BEFORE YOU START A TASK ON OR NEAR :
- THE FLIGHT CONTROLS
- THE FLIGHT CONTROL SURFACES
- THE LANDING GEAR AND THE RELATED DOORS
- COMPONENTS THAT MOVE.
MOVEMENT OF COMPONENTS CAN KILL OR INJURE PERSONS.

CAUTION : MAKE SURE THAT THE AIRCRAFT IS IN THE TEMPERATURE CONDITIONS (STABLE AMBIENT TEMPERATURE) SPECIFIED IN THE MAINTENANCE CONFIGURATION PARAGRAPH.
CHANGES IN THE TEMPERATURE CAN CAUSE INCORRECT MEASUREMENTS.

A. Reason for the Job
Do this procedure when it is no longer possible to adjust the length of the
R rudder control cable (turnbuckles and cable quadrant on the stops).

B. Job Set-up Information
(1)Equipment and Materials

ITEM	DESIGNATION
(a)	Thermometer
(b)	Warning notice
(c)	Access platform 2.5 m (8 ft. 2 in.)
(d)	Access platform 5.0 m (16 ft. 5 in.)
(e)98A27307545000	Rigging-Pin-Cable Quadrant, Rudder Mechanical Controls
R (f)FE214901	Locking Equipment - Cable Tension Regulator
(g)98A27901002000	Pin - Rigging, Rudder Control

ITEM	DESIGNATION
Referenced Procedures	
- 12-33-21, P. Block 001	Ground Air Pre-conditioning
- 24-41-00, P. Block 301	AC External Power Control
- 27-20-00, P. Block 501	Rudder Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 52-30-00, P. Block 301	Green Cargo-Compartment Doors Cable Fabrication Manual

C. Job Set-up

(1)Get access

(a)Put the access platform in position below the access door 811.

(b)Open the access door 811.

(c)Put the access platform in position below the access door 312AR.

(d)Open the access door 312AR.

(e)Open the FWD and AFT cargo-compartment doors (Ref. 52-30-00, P. Block 301).

(f)Put the access platform in position at the FWD and AFT cargo-compartment door.

(g)In the zone 151, remove the cargo-compartment ceiling panel 151HC.

(2)Aircraft maintenance configuration

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b)Make sure that the air conditioning is de-energized (Ref. 12-33-21, P. Block 001).

(c)The aircraft must stay in a hangar for 3 hours at least with all its doors open.

(d)The ambient temperature should be withing a range of between 0 deg. C (32.00 deg. F) and 30 deg. C (86.00 deg. F).

NOTE : The cable routing area must not be lit by neon located close to the cable itself.

(e)Energize the aircraft electrical circuits (Ref. 24-41-00, P. Block 301).

(f)Pressurize the Green Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).

(g)Move the rudder to the right stop and measure and record the
R clearances between the two turnbuckles and their static fairleads.

(h)Move the rudder to the left stop and measure and record the clearances
R between the two turnbuckles and their static fairleads.

(j)Operate the rudder fully more than ten times and set it to the zero position.

(k)On RUD TRIM indicator, make sure that the rudder/trim is at zero.

(l)Put the warning notice in position in the flight compartment to tell persons not to operate the rudder pedals.

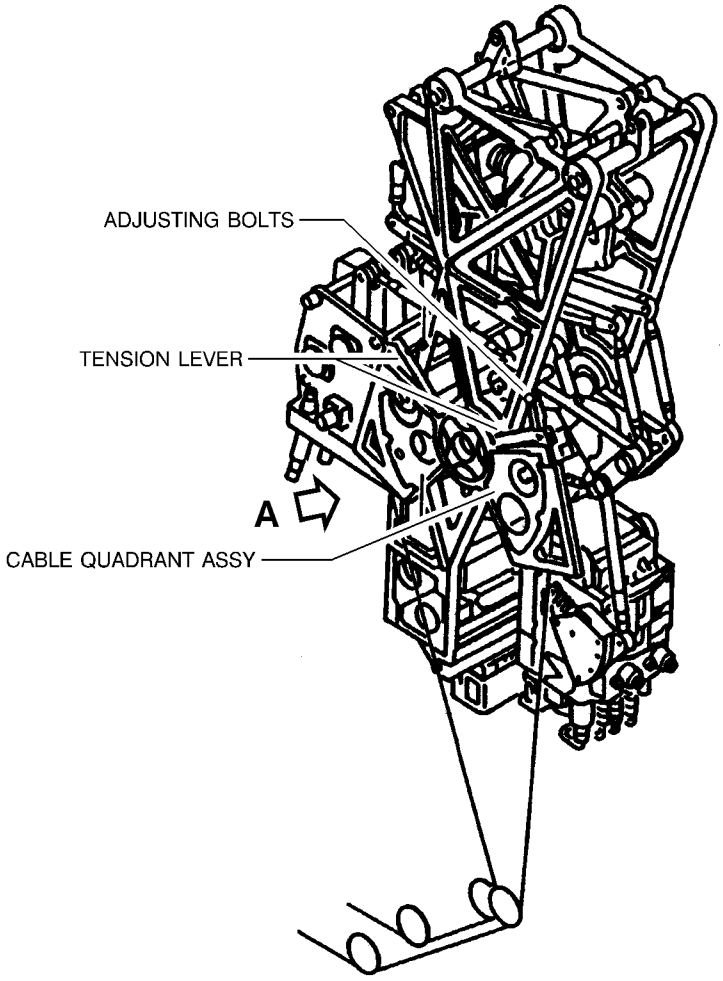
(m)Install the rigging pin 98A27307545000 on the cable quadrant.

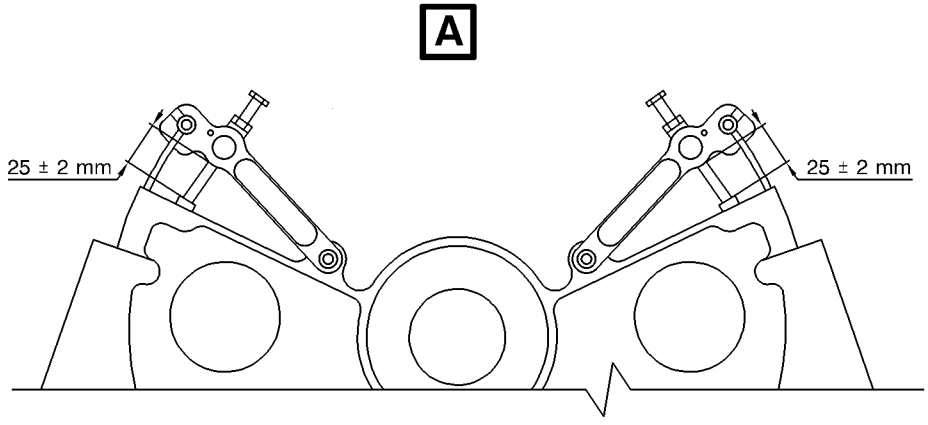
(n)In the avionics compartment, insert the rigging pin 98A27901002000 in the rudder cable tension regulator input lever.

R (p)Make sure that the locking equipment FE214901 is not installed on the

R cable tension regulator.
R (q)Make sure that the dimension between the tension lever and the cable
R quadrant assy is 25 mm ± 2 mm (0.98 in. ± 0.079 in.) (Ref. Fig. 503).
R (r)Depressurize the Green, Blue and Yellow hydraulic systems
(Ref. 29-10-00, P. Block 301).
R (s)De-energize the aircraft electrical circuits (Ref. 24-41-00,
P. Block 301).

D. Procedure
(Ref. Fig. 504)
(Ref. Fig. 505)
(1)Shortening of the Rudder cable length
(a)Measure and record the cable zone temperature and the external temperature with a thermometer. Make sure that the temperature is the
R same at ± 2 deg. C (± 3.6 deg. F).
(b)Adjust the two turnbuckles to the dimension 'Z' = 30 mm (1.1811 in.).
(c)Define the value to shorten the cable length.
NOTE : Cut both cables by the same value.
1 Put marks on both cables where the cable routing is straight and nearby the structure.
2 In the fuselage between two static fairleads, pull simultaneously on both cables until the index of the tension regulator reaches the position related to the recorded ambient temperature.
NOTE : Pull the cables downwards to get the necessary force and measure the cable stroke 'Y' on the aircraft axis.
3 Measure with the marks (on the cables and on the structure) the cable stroke 'Y' on each cable to get the necessary cable length.
R 4 Subtract 40 mm (1.5748 in.) for each cable side from the value measured before.
R NOTE : 40 mm (1.5748 in.) is the cable penetration into the terminal stud of one turnbuckle.
5 The value 'X' (to shorten the cable length) = 'Y' (cable stroke) -
R 40 mm (1.5748 in.).
R Example : Measured cable stroke 'Y' for each cable = 110 mm
R cable penetration into the terminal stud = 40 mm
R Value 'X' to shorten the cable length = 110 mm - 40 mm
R = 70 mm
R Cut the cable on each side by 70 mm (2.7559 in.)
(d)Use the measured clearance between the turnbuckles and the static fairleads to decide to cut the front or the rear cable junction by the calculated value.
NOTE : After cutting, the clearances 'A' between the turnbuckles and
R the static fairleads must be minimum 40 mm (1.5748 in.)
during full deflection of the rudder control.
R (e)Install the locking equipment FE214901 on the cable tension regulator.
R NOTE : Cut both cables by the same value.
R (f)Install the new turnbuckles on the cable (Ref. Cable Fabrication Manual).
R (g)Do the adjustment of the rudder control cable tension (Ref. 27-20-00, P. Block 501).
R (h)Make sure that the clearance 'A' between the 2 turnbuckles and the





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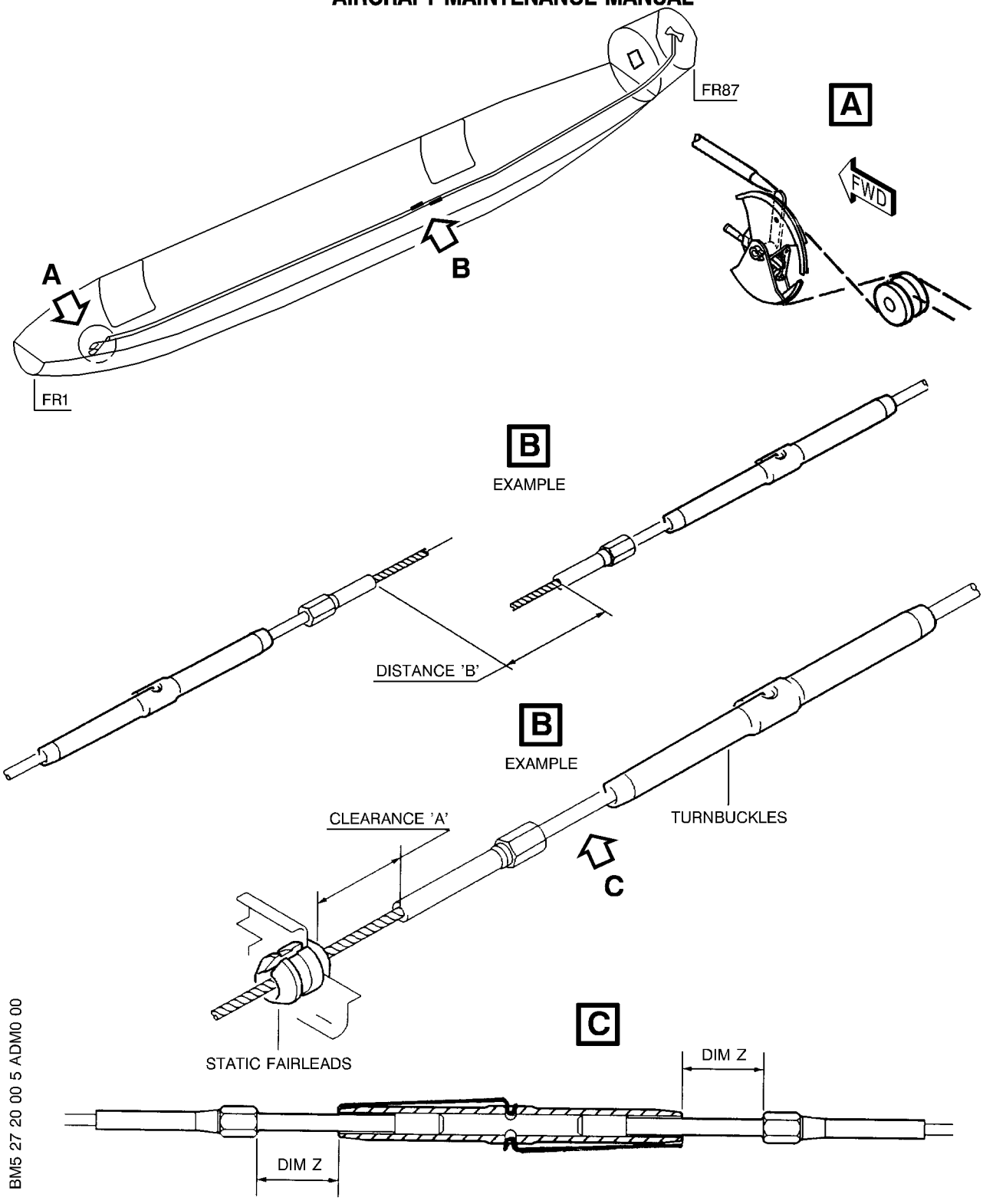
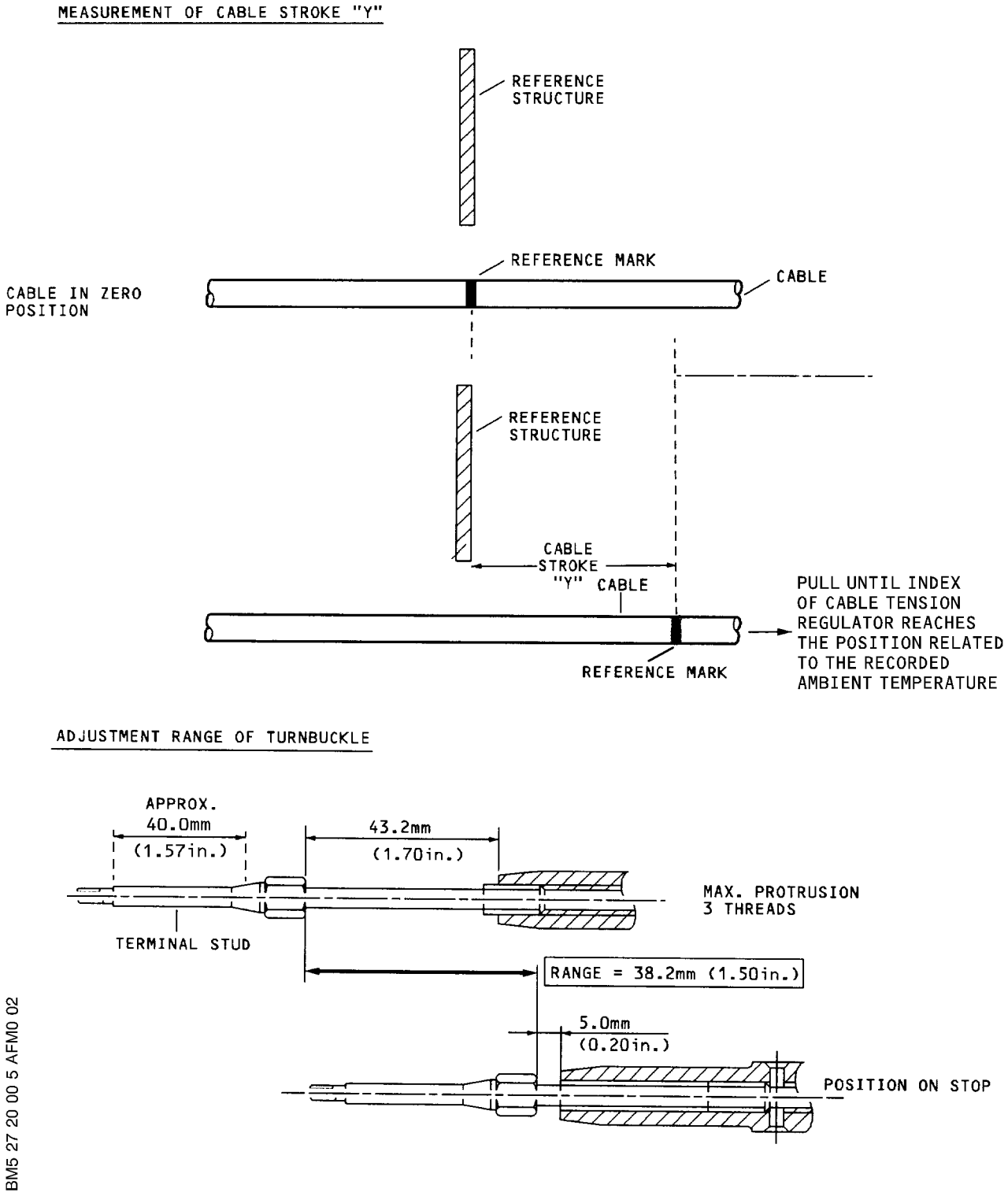
Cable Quadrant Adjustment
Figure 503

R



Rudder Cable Turnbuckles
Figure 504



Cable Stroke 'Y'
Figure 505

R

fairleads is minimum 40 mm (1.5748 in.) over the full travel range of the rudder control
R (Ref. Fig. 504).

(j)Make sure that the distance 'B' between the ends of the turnbuckles in each rudder control cable is more than 0 mm (0 in.) in any position
R (Ref. Fig. 504).

(k)Make sure that the turnbuckles are in the adjustment range of 38.2 mm (1.5039 in.)
(Ref. Fig. 505).

E. Close-up

(1)Close access

(a)Make sure that the work area is clean and clear of tools and other items.

(b)In the avionics compartment, remove the rigging pin 98A27901002000 in the rudder cable tension regulator input lever.

(c)Remove the locking equipment FE214901 from the cable tension regulator.

(d)Close the access door 312AR.

(e)Close the access door 811.

(f)Remove the access platform(s).

(g)In the zone 151, install the cargo-compartment ceiling panel 151HC.

(h)Close the FWD and AFT cargo-compartment doors (Ref. 52-30-00, P. Block 301).

(j)Remove the ground support and maintenance equipment, the special and standard tools and all other items.

(2)Put the aircraft back to its initial configuration

(a)Remove the rigging pin 98A27307545000 from the cable quadrant.

(b)Remove the warning notice(s).

3. Cutting of a New Aft Control Rudder Cable

CAUTION : THIS PROCEDURE MUST BE PERFORMED IN A HANGAR.

WARNING : MAKE SURE THAT THE SAFETY DEVICES AND THE WARNING NOTICES ARE IN POSITION BEFORE YOU START A TASK ON OR NEAR :
- THE FLIGHT CONTROLS
- THE FLIGHT CONTROL SURFACES
- THE LANDING GEAR AND THE RELATED DOORS
- COMPONENTS THAT MOVE.

WARNING : MAKE SURE THAT THE TRAVEL RANGES OF THE FLIGHT CONTROLS ARE CLEAR. MOVEMENT OF FLIGHT CONTROLS CAN CAUSE INJURY TO PERSONS AND/OR DAMAGE.

CAUTION : MAKE SURE THAT THE AIRCRAFT IS IN THE TEMPERATURE CONDITIONS (STABLE AMBIENT TEMPERATURE) SPECIFIED IN THE MAINTENANCE CONFIGURATION PARAGRAPH.
CHANGES IN THE TEMPERATURE CAN CAUSE INCORRECT MEASUREMENTS.

A. Reason for the Job

Do this procedure when you install a new aft control cable on the rudder.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Thermometer
(2)	Warning Notice
(3)	Access Platform 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
(4)98A27307545000	Rigging-Pin-Cable Quadrant, Rudder Mechanical Controls
(5)FE214901	Locking Equipment - Cable Tension Regulator
(6)98A27901002000	Pin - Rigging, Rudder Control
Referenced Procedures	
- 12-33-21, P. Block 001	Ground Air Pre-conditioning
- 24-41-00, P. Block 301	AC External Power Control
- 27-20-00, P. Block 401	Rudder
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	Cable Fabrication Manual

C. Procedure

(1)Job set-up

(a)Get access

1 Make sure that access platform is in position below the access door 812.

2 Make sure that the access door 812 is open.

3 Make sure that, in zone 151, the cargo-compartment ceiling panel 151HC is removed.

(b)Aircraft maintenance configuration

NOTE : Let the temperature in the aircraft become stable for three hours before you start this procedure.

1 Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

2 Make sure that the air conditioning is de-energized (Ref. 12-33-21, P. Block 001).

3 Make sure that the Green, Blue and Yellow hydraulic systems are depressurized (Ref. 29-10-00, P Block 301).

4 The ambient temperature should be within a range of between 0 deg. C (32 deg. F) and 30 deg. C (86 deg. F).

NOTE : The cable routing area must not be lit by neon located close to the cable itself.

5 On RUD TRIM indicator, make sure that the rudder/trim is at zero.

6 Put the warning notice in position in the flight compartment to tell persons not to operate the rudder pedals.

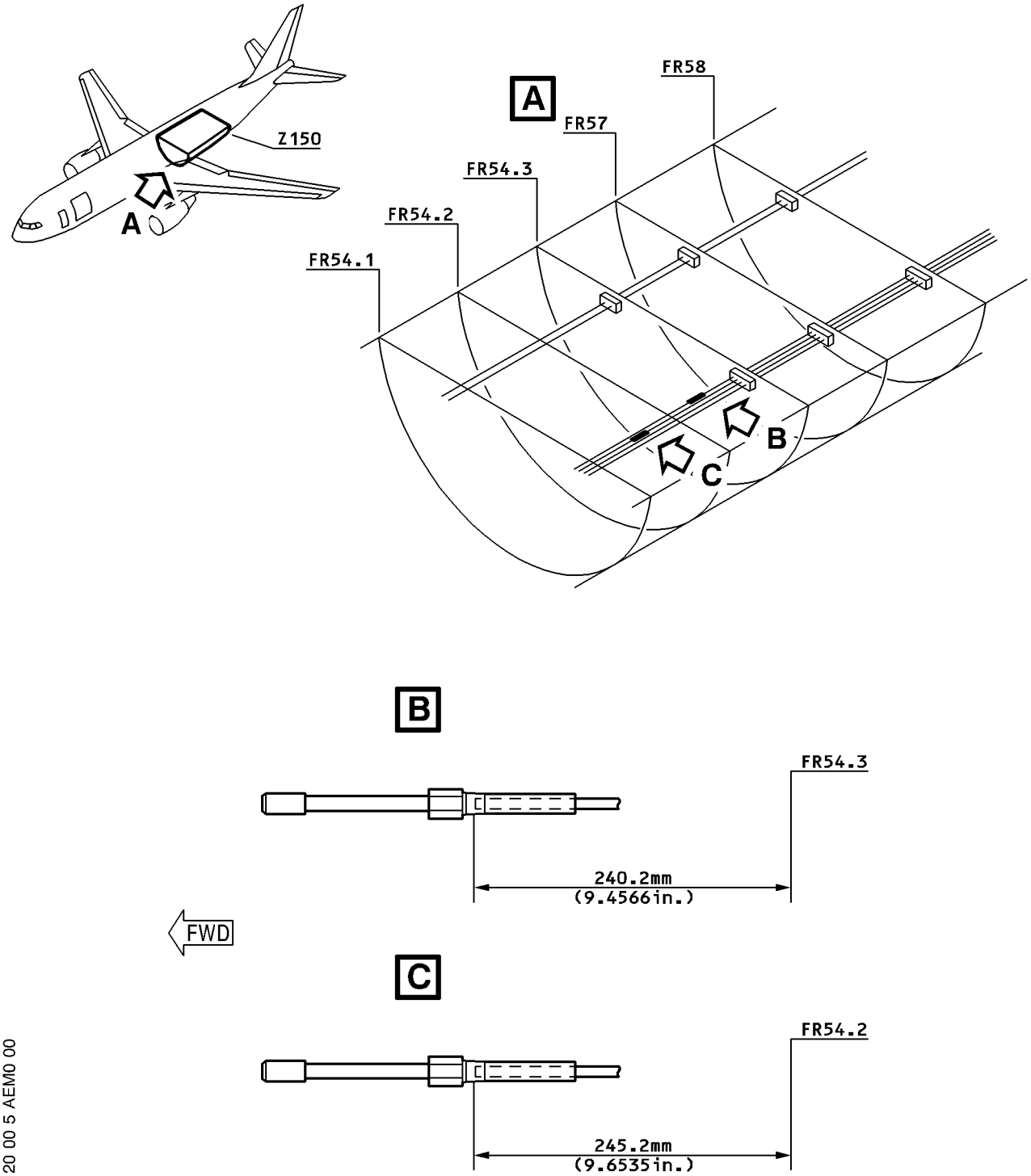
7 Make sure that rigging pin 98A27307545000 is in position on the cable quadrant.

8 Make sure that rigging pin 98A27901002000 is in position on the rudder cable tension regulator input lever.

9 Make sure that locking equipment FE214901 is in position on the cable tension regulator.

(Ref. Fig. 506)

(2)Measurement



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Rudder Cable Cutting Measurement
Figure 506

R

R (a)Measure and record the cable zone temperature and the external temperature with a thermometer. Make sure that the temperature is the same at ± 2 deg. C (± 3.6 deg. F).

R (3)Cutting of the aft control cable of the rudder

R (a)Pre-stretch cable to a value of 32 daN (71.94 lbf) using tensiometer.

R (b)Measure the distance between FR54.3 (FR54.2) and the right (left) aft control cable of the rudder.

R (c)Make a mark on each cable :

R - for the right cable : at 240.2 mm (9.4566 in.).

R - for the left cable : at 245.2 mm (9.6535 in.).

R (d)Cut the cables at the marks you did before.

R (e)Install a new stud terminal on the cable (Ref. CFM Cable Fabrication Manual).

R (f)Continue installation of cables (Ref. 27-20-00, P. Block 401).

RUDDER - INSPECTION/CHECK

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

A. Check of Cable Tension on Rudder Linkage
R B. General Visual Inspection of Actuators and Hydraulic Lines

2. Procedure

A. Check of Cable Tension on Rudder Linkage
(1)Equipment and materials

ITEM	DESIGNATION
(a)	Tensiometer
(b)	Thermometer
Referenced Procedure - 27-20-00, P. Block 501	Rudder

(2)Job Set-Up
(a)Open access door 121BL.
(b)Make certain that Captain's and First Officer's rudder pedals are in neutral position.
(3)Check
(a)Record ambient temperature.
NOTE : Prior to take readings, allow cable tension regulator area temperature to equalize outside temperature.
(b)Make certain that pointer located on one of the quadrants of the regulator is opposite the relevant compensation scale graduation determined against the ambient temperature by means of the cable tension adjustment graph (Ref. 27-20-00, P. Block 501).
(c)Position a tensiometer on each of the two cables near tension cable regulator at least 200 mm (7.87 in.) from junction or terminal. Check that tension of each cable is between 26 daN and 38 daN (59 lbf and 88 lbf).
(4)Close-Up

R (a)Make certain that working area is clean and clear of tools and
R miscellaneous items of equipment.
R (b)Close access door.

R B. General Visual Inspection of Actuators and Hydraulic Lines

(1)Equipment and materials

ITEM	DESIGNATION
(a)	Access Platform 2 to 12 meters (6 ft. 7 in. to 39 ft. 4 in.)
(b)	Warning Notice Prohibiting Operation of Rudder Pedals and Rudder Trim
Referenced Procedures	
- 20-29-12, P. Block 1	Control Cable Check
- 20-29-14, P. Block 1	Control Cable Rejection Criteria
- 27-21-00, P. Block 601	Mechanical Control

**ON A/C 001-005, 101-200,

(2)Job set-up
(Ref. Fig. 601, 602).
(a)Open access doors 811, 812, 121BL and 312AR.
(b)Remove access panels 311AZ, 311BZ, 325AL thru 325DL and 325AR thru 325ER.
(c)Remove cargo compartment ceiling panels located below cable run.
(d)Remove floor panels in zones 241 and 242 located below cable run in the zones 145 and 146.

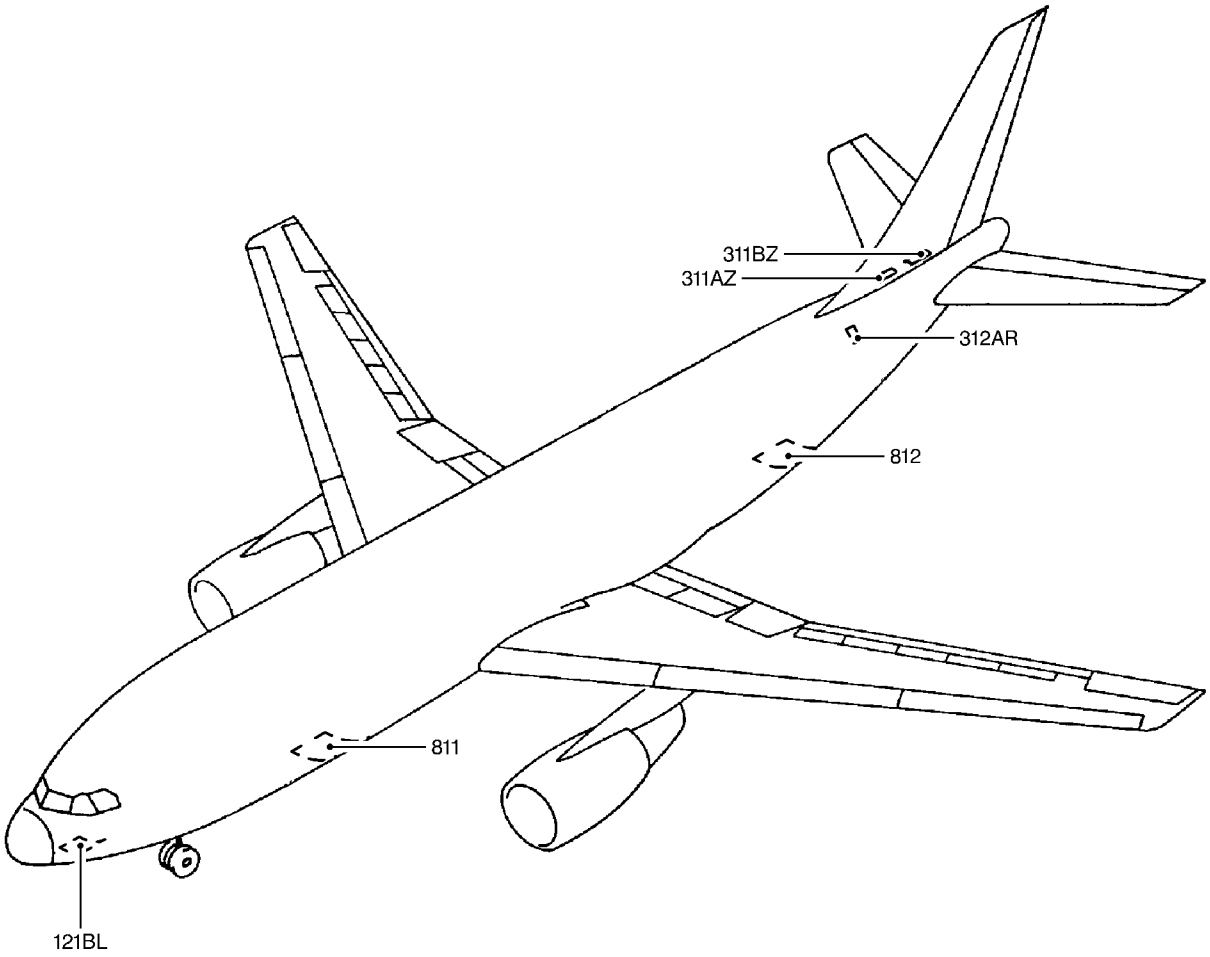
**ON A/C 006-100,

(2)Job set-up
(Ref. Fig. 601, 603).
(a)Open access doors 811, 812, 121BL and 312AR.
(b)Remove access panels 311AZ, 311BZ, 325AL thru 325DL and 325AR thru 325ER.
(c)Remove cargo compartment ceiling panels located below cable run.
(d)Remove floor panels in zones 241 and 242 located below cable run in the zones 145 and 146.

**ON A/C ALL

(3)Check
(a)At all attachment and hinge fittings, check that :
- all nuts and bolts are fully tightened
- all safetying devices (cotter pins, lock plates, lockwire) are correctly installed.

(b)Check that pins, bolts, washers, nuts are in satisfactory condition (no oxidation).
(c)Make certain that identification placards are correctly fixed.
(d)Make certain that bonding jumpers are in fully satisfactory condition.
(e)Check hose clamps for correct diameter, satisfactory condition, and correct installation. Check that there are no signs of wear on hoses at any attachment points due to vibration, pressure surges, etc.



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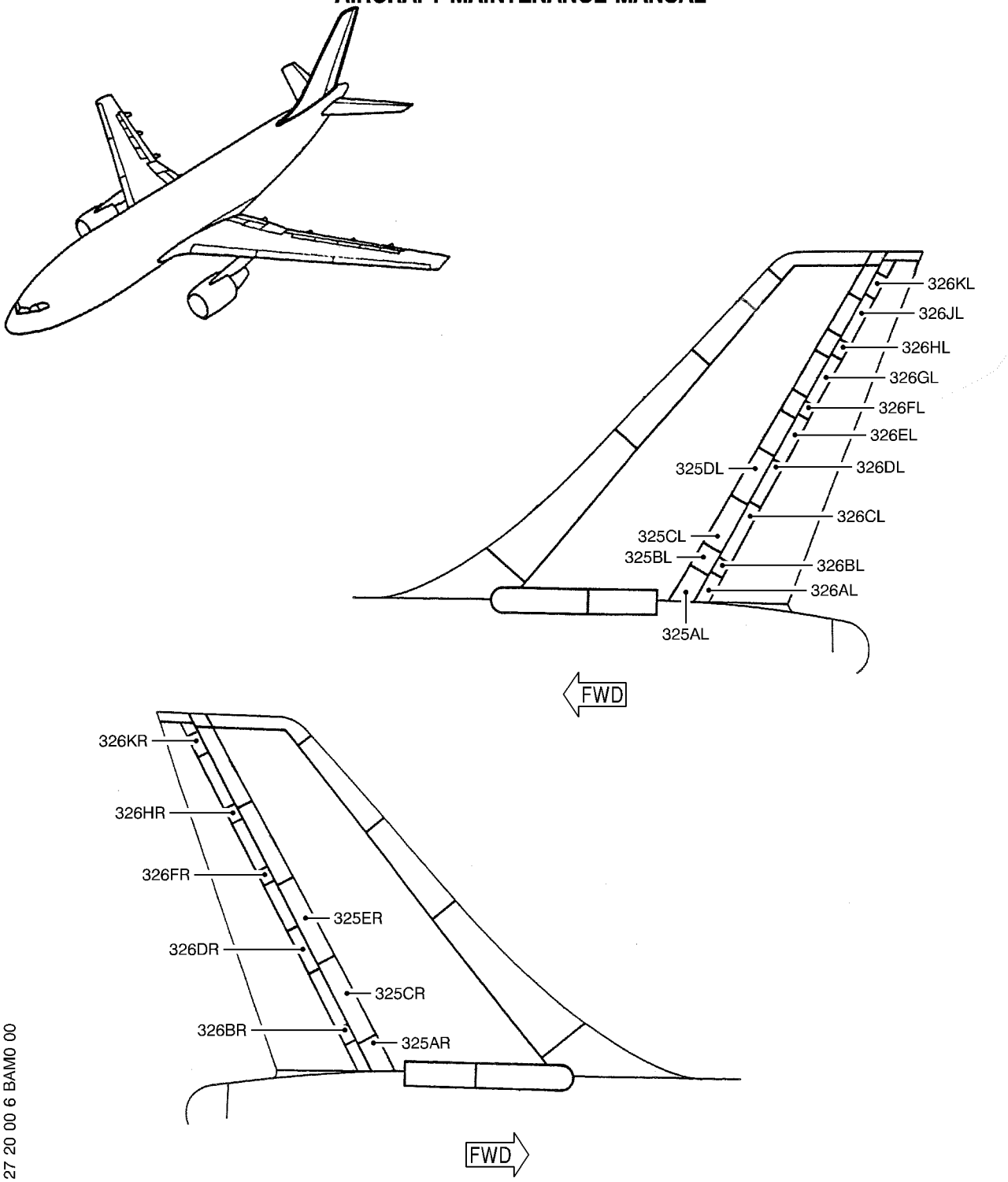
Access Doors
Figure 601



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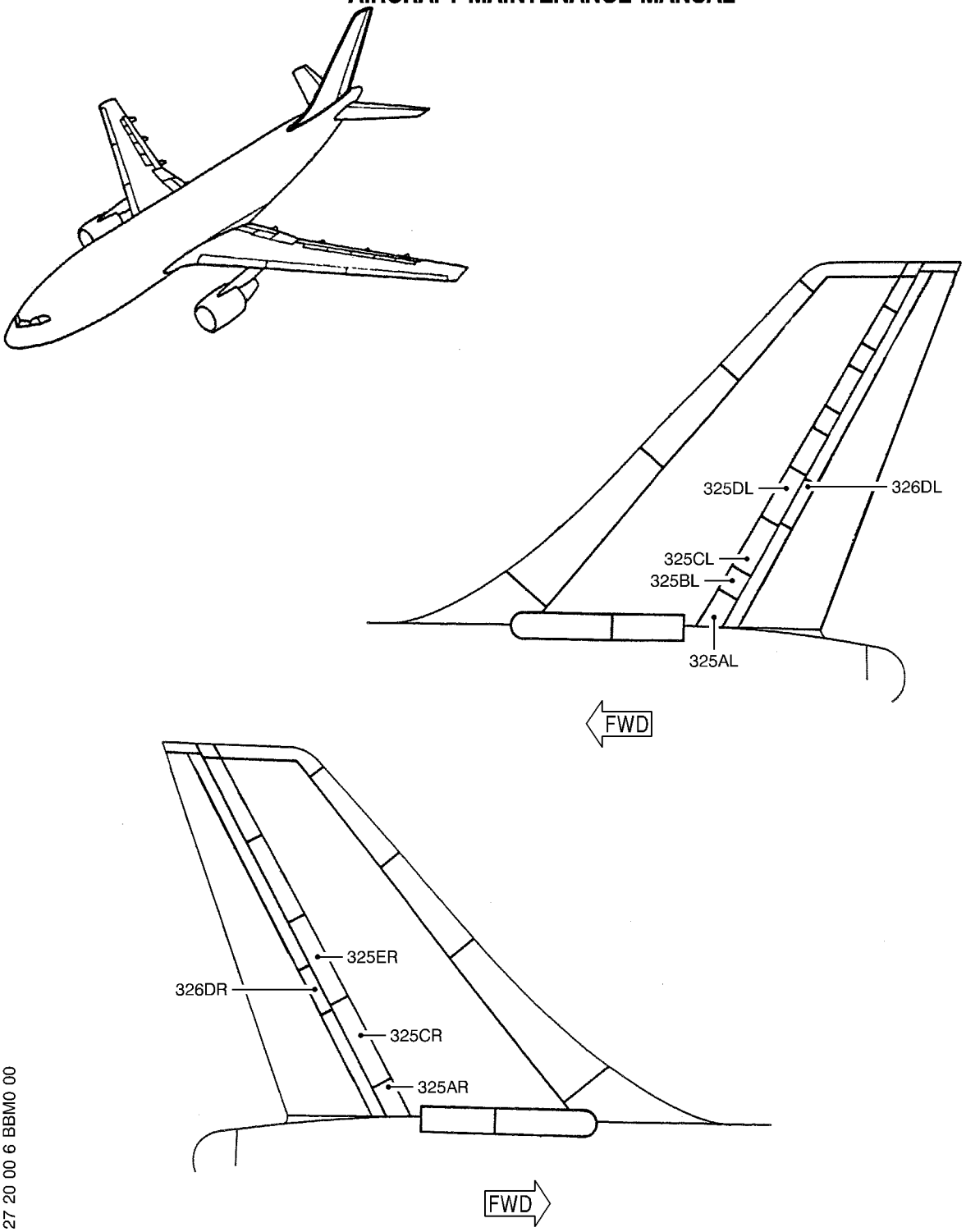
Vertical Stabilizer - Access Panels
Figure 602

R



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Vertical Stabilizer - Access Panels
Figure 603

R

(f)Check that hoses are correctly positioned :
- that there is no friction with other lines, bulkheads or components
- that hoses are not twisted.

(g)Check pipes for deformation, incipient cracks, and dents especially at elbows and at unions connecting pipes to components.

(h)Check that there is no possibility of metal parts, clamps or rails causing damage to pipes at attachment points.

(j)Make certain that pipe supports and clamps are correctly tightened.

(k)Check condition of hydraulic equipment attach fittings and of safety devices.

(l)Check for fluid leakage in the areas where hydraulic equipment is installed.

(m)Check condition of fork and eye joints on components actuated mechanically.

R (n)Check condition of pulleys (Ref. 20-29-14, P. Block 1). Check cables for wear (Ref. 20-29-12, P. Block 1).

R (p)Check bellcranks for corrosion or damage.

R (q)Carry out thorough visual inspection of duplex control linkage for integrity. Make certain that :
- rods, bellcranks, rod safety devices and all attachments are in the correct condition, with no corrosion and damage.
- nuts and bolts are fully tightened and cotter pins are correctly installed.
- rod end bearings have no extruded seals, damaged shields and corrosion on rod end.

In case of any findings, affected parts have to be replaced.

R (r)Carry out detailed visual inspection of variable stop lever for cracks, corrosion and general condition.

In case of any findings, affected parts have to be replaced.

(4)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Close access doors and install access, ceiling and floor panels.

1. General (Ref. Fig. 003)
   The rudder is operated by three mechanically controlled servo controls.
   Two interconnected pairs of pedals drive a mechanical linkage, which is single up to the artificial feel and trim unit.
   Position of the pedal assembly is adjustable by means of an adjuster consisting of a crank controlled screwjack.
   Downstream of the artificial feel and trim unit, the linkage is duplicated up to the input linkage of the servo controls, in such a way that any single disconnection does not leave the rudder out of control.
   Yaw damper signals are introduced through a duplicated differential mechanism, located on the rear cable run.

2. Component Location
   (Ref. Fig. 001)

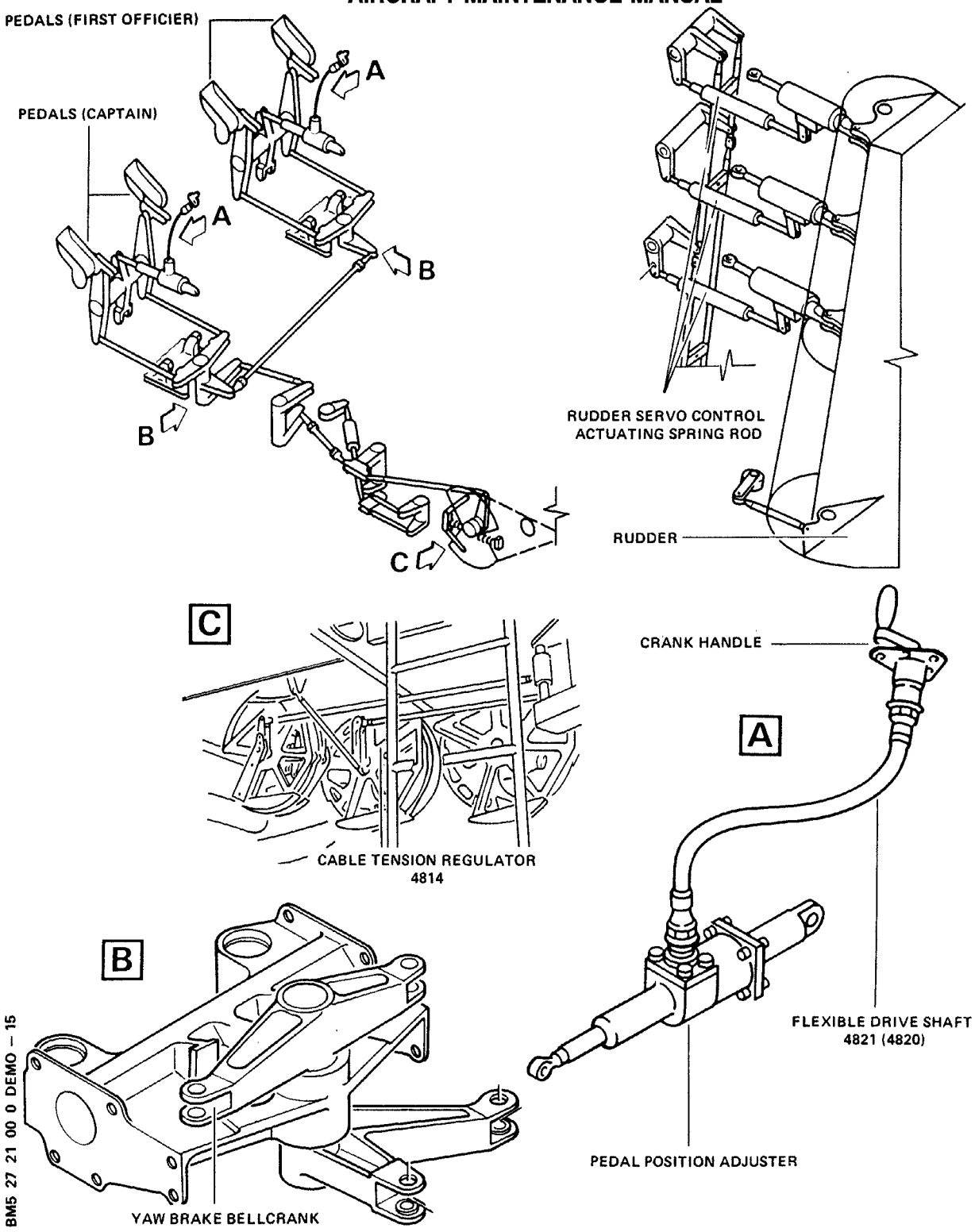
R **ON A/C 101-104,

R Post SB 31-2115 For A/C 101-104,

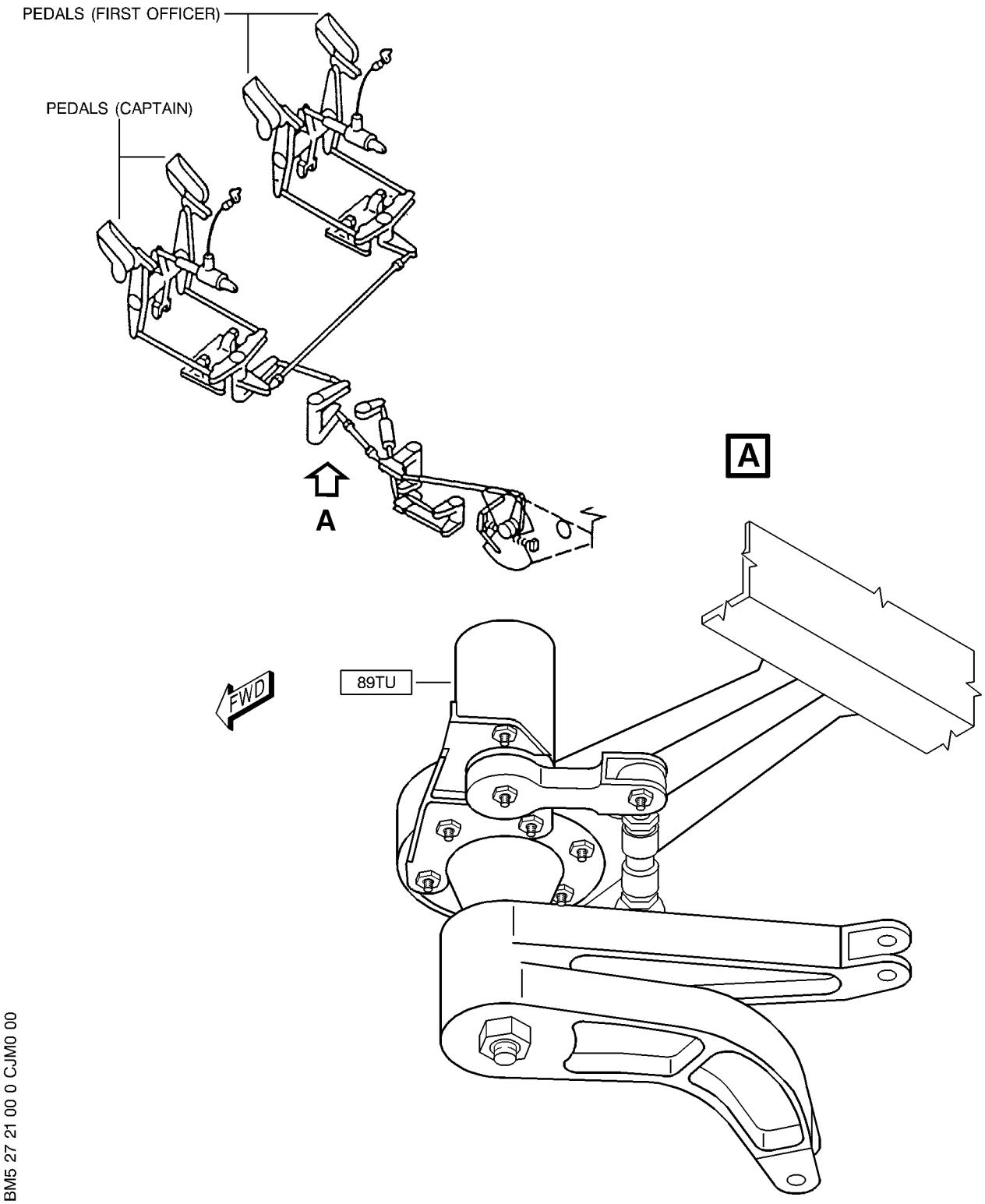
(Ref. Fig. 002)

**ON A/C ALL

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
4814	TENSION REG-RUDDER CABLE		121	121BL	27-21-14
4820	SHAFT-FLEXIBLE DRIVE, L		212		27-21-25
4821	SHAFT-FLEXIBLE DRIVE, R		211		27-21-25
	PEDALS-CAPT		211		27-21-11
	PEDALS-F/O		212		27-21-11
	ADJUSTER-PEDAL POSITION, CAPT		211		27-21-12
	ADJUSTER-PEDAL POSITION, F/O		212		27-21-12
	RUDDER		326		27-21-21
	CRANK HANDLE-CAPT		211		27-21-24
	CRANK HANDLE-F/O		212		27-21-24
	BELLCRANK-YAW/BRAKE, CAPT		121	121BL	27-21-26
	BELLCRANK-YAW/BRAKE, F/O		122	121BL	27-21-26
	SPRING ROD-RUDDER SERVO CTL ACTUATING		325	325DF	27-21-23



Component Location
Figure 001



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Component Location
Figure 002

3. Component Description

R **ON A/C 101-104,

R Post SB 31-2115 For A/C 101-104,

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
4814	TENSION REG-RUDDER CABLE		121	121BL	27-21-14
4820	SHAFT-FLEXIBLE DRIVE, L		212		27-21-25
4821	SHAFT-FLEXIBLE DRIVE, R		211		27-21-25
	PEDALS-CAPT		211		27-21-11
	PEDALS-F/O		212		27-21-11
	ADJUSTER-PEDAL POSITION, CAPT		211		27-21-12
	ADJUSTER-PEDAL POSITION, F/O		212		27-21-12
	RUDDER		326		27-21-21
	CRANK HANDLE-CAPT		211		27-21-24
	CRANK HANDLE-F/O		212		27-21-24
	BELLCRANK-YAW/BRAKE, CAPT		121	121BL	27-21-26
	BELLCRANK-YAW/BRAKE, F/O		122	121BL	27-21-26
	SPRING ROD-RUDDER SERVO CTL ACTUATING		325	325DF	27-21-23
89TU	XDCR UNIT-YAW		121	312AR	27-21-27

3. Component Description

**ON A/C ALL

(Ref. Fig. 003)

A. Cable Tension Regulator (Ref. 27-11)
One cable tension regulator maintains a constant tension on the cables (32 ±6 daN/72 ±13.5 lbf). It incorporates provision for installation of a special tool used for installing the regulator on the aircraft.

B. Servo Control Actuating Spring Rod
The rudder servo control actuating spring rods prevent runaway of the control system if an input lever jams on its servo control body.

C. Rods, Cables (Ref. 27-11)
Rods : identical to those used in the aileron control system (Ref. 27-11).
Cables : - identical to those used in the aileron control system (Ref. 27-11).
- not identical in case fairleads are static
- identical when fairleads are static but mounted on same support as the roller fairleads of aileron control.

D. Stops and Rigging Facilities
Pedal stops : pedal maximum travel is limited in both directions by non adjustable stops.
Rudder operational stops : maximum input to the servo controls is limited by the variable stop lever, maximum deflection of which (low speed configuration) is limited by adjustable stops.
Rudder travel stops : these are the stroke end stops (non adjustable) of the servo controls, never reached in normal operation.
Rudder structural stops when the servo controls are not installed : there are no specially designed stops between the rudder and the structure of the vertical stabilizer.
Adjustable lever : the length of one of the levers between the pedals and the tension regulator is adjustable in order to maintain maximum travel of the rudder within the design limits.
Rigging pins : Rigging pin holes are provided.

R **ON A/C 101-104,

R Post SB 31-2115 For A/C 101-104,

E. Yaw Transducer Unit
Under floor, at level of Captain seat, a transducer unit is installed on the yaw bellcrank. The transducer unit supplies yaw control parameters to the DFDRs.

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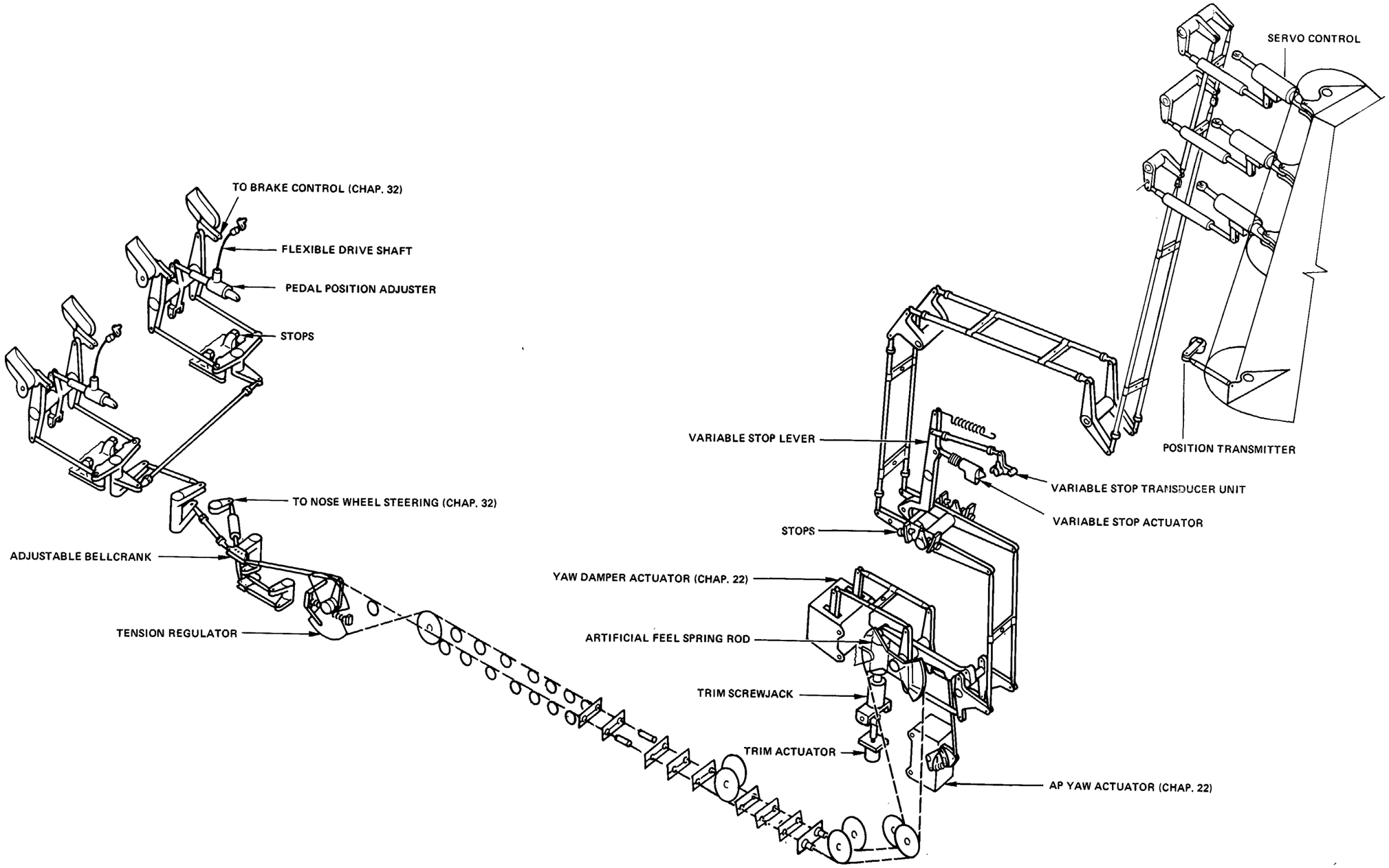

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Mechanical Control (Rudder)
Figure 003

R **ON A/C ALL

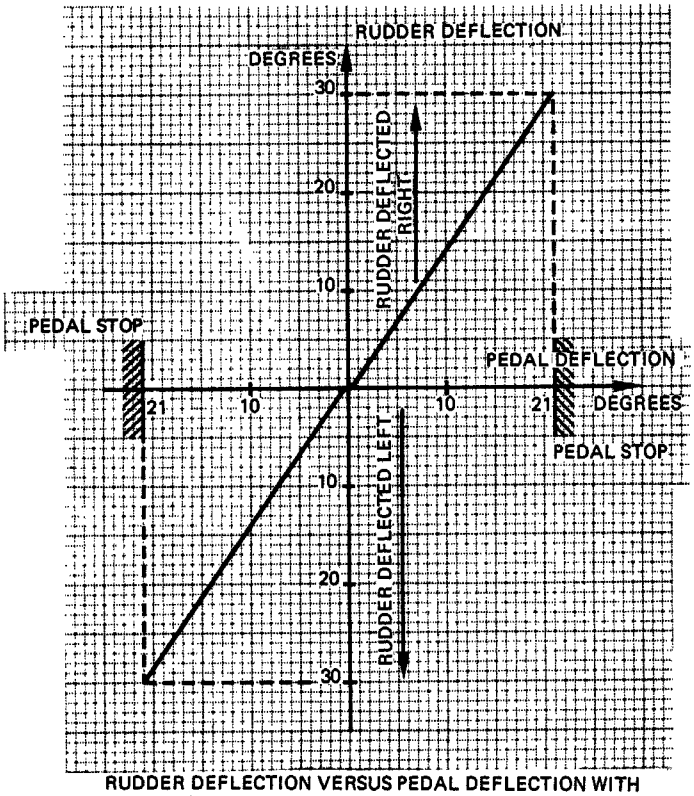
4. Leading Particulars

A. Pedals
Radius : 270 mm (10.63 in.)
Adjustment and corresponding maximum deflection

Adjustment position of the pedal assembly	RH PEDAL		LH PEDAL	
	AFT	FWD	FWD	AFT
Maximum forward	20°49'	23°50'	23°50'	20°49'
Mid position	21°	21°	21°	21°
Maximum aft	23°36'	20°46'	20°46'	23°36'

B. Rudder deflection versus pedal deflection with the pedal assembly set to mid position (Ref. Fig. 004)

C. Servo control actuating spring rod characteristics (Ref. Fig. 005)



RUDDER DEFLECTION VERSUS PEDAL DEFLECTION WITH PEDAL ASSY ADJUSTED TO MID POSITION

	LEFT TURN	RIGHT TURN
MAXIMUM OPERATIONAL DEFLECTION	$30^{o} \pm 1^{o}$	$30^{o} \pm 1^{o}$
STOPS ON SERVO CONTROLS (MID VALUE)	32.6^{o}	32.6^{o}
INTERFERENCE WITH STRUCTURE	$\geq 34^{o}$	$\geq 34^{o}$

STOPS

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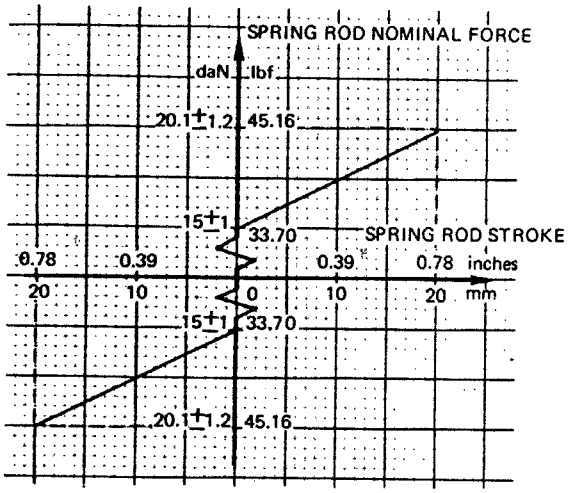
Rudder Deflection Versus Pedal Deflection - Stops
Figure 004



MAXIMUM FRICTION FORCE	AT THRESHOLD	AT MAXIMUM FORCE
WHEN NEW		
INSTALLED ON AIRCRAFT		

DIAGRAM A SERVO CONTROL ACTUATING SPRING ROD CHARACTERISTIC AT ITS APPLICATION POINT

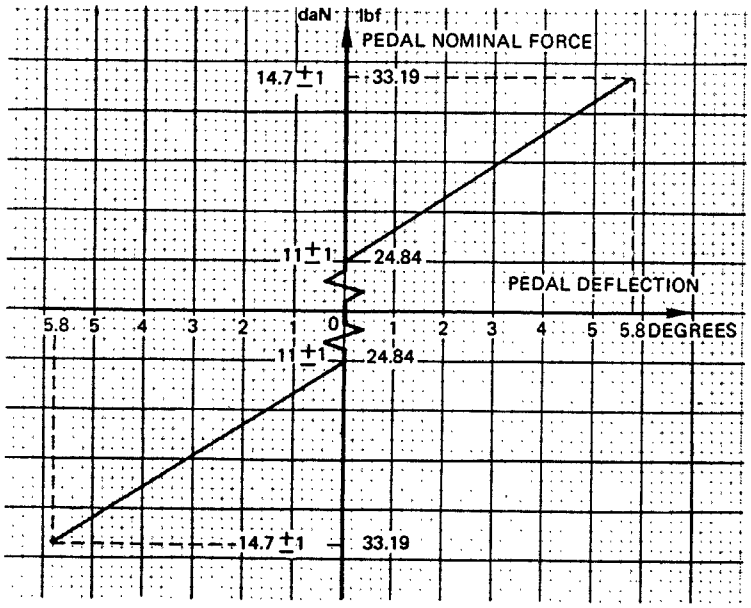


DIAGRAM B SERVO CONTROL ACTUATING SPRING ROD CHARACTERISTIC AT PEDALS

DM5 27 21 00 0 AEMO
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Servo Control Actuating Spring Rod Characteristics
Figure 005

R **WARNING** : CHECK THAT LANDING GEAR GROUND SAFETIES ARE IN POSITION.
BEFORE APPLYING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Adjustment of Rudder Control Linkage
NOTE : Prior to adjusting rod length, perform cable adjustment.

A. Reason for the Job
Adjustment of rudder control linkage from rudder pedals up to input lever of servo controls.
(1)Adjustment of linkage between rudder pedals and tension regulator.
(2)Adjustment of cable tension.
(3)Adjustment of linkage in aft section.
(4)Adjustment of rudder to neutral with the reference triangle.
(5)Adjustment of rudder to neutral without the reference triangle.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27901006000	Pin-Rigging, Rudder Control
(2)98A27901002000	Pin-Rigging, Rudder Control
(3)98A27307545000	Rigging Pin - Cable Quadrant, Rudder Mechanical Controls
(4)98A27207601000	Rigging Pin - Variable Stop Unit-Rudder Mechanical Controls
(5)98A27307547000	Rigging Pin - Bellcrank Assembly, Rudder Servo Controls
(6)	Lockwire - Corrosion - Resistant Steel Dia. 0.8 mm (0.032 in.)
(7)	Safety Barriers
(8)	Access Platform 2.7 m to 5.50 m, 12 m (8 ft. 8 in. 18 ft., 39 ft. 4 in.)
(9)	Circuit Breaker Safety Clips
10)	Warning Notices
11)97A27202500000	Quadrant Assy-Rudder
Referenced Procedures	
- 11-00-00, P. Block 001	Placards and Markings
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 24-41-00, P. Block 301	AC External Power Control
- 27-20-00, P. Block 501	Rudder

ITEM	DESIGNATION
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up

(a)Initial conditions

- connect electrical power supply (Ref. 24-41-00, P. Block 301),
- forward services ventilation system in operation,
- overhead and rear panel circuit breakers closed, particularly those associated with FLT CTL,
- aircraft in ground configuration (LDG GEAR PROX DET & RELAYS circuit breakers closed),
- hydraulic power supply on (Green, Blue and Yellow auxiliary power (Ref. 29-21-00, P. Block 301) (Ref. 29-22-00, P. Block 301). (Ref. 29-23-00, P. Block 301) or Main Hydraulic Power (Ref. 29-10-00, P. Block 301).
- on SERVO CTL section of panel 428VU, all pushbutton switches pressed (in) and legends off.

(b)Position access platforms and safety barriers.

(c)Open access doors 121BL, 312AR, 311AZ, 311BZ, 325BL, 325CL, 325DL.

(d)On panel 408VU

- make certain that rudder trim is at zero.

(e)Operate several times Captain's and First Officer's rudder pedals to deflect rudder surface in order to bleed servo controls.

(f)Open, safety and tag the following circuit breakers :

R **ON A/C 101-104,

R Post SB 31-2115 For A/C 101-104,

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27901006000	Pin-Rigging, Rudder Control
(2)98A27901002000	Pin-Rigging, Rudder Control
(3)98A27307545000	Rigging Pin - Cable Quadrant, Rudder Mechanical Controls
(4)98A27207601000	Rigging Pin - Variable Stop Unit-Rudder Mechanical Controls
(5)98A27307547000	Rigging Pin - Bellcrank Assembly, Rudder Servo Controls
(6)	Lockwire - Corrosion - Resistant Steel Dia. 0.8 mm (0.032 in.)

ITEM	DESIGNATION
(7)	Safety Barriers
(8)	Access Platform 2.7 m to 5.50 m, 12 m (8 ft. 8 in. 18 ft., 39 ft. 4 in.)
(9)	Circuit Breaker Safety Clips
10)	Warning Notices
11)97A27202500000	Quadrant Assy-Rudder
Referenced Procedures	
- 11-00-00, P. Block 001	Placards and Markings
- 24-41-00, P. Block 301	AC External Power Control
- 27-21-27, P. Block 401	Yaw Transducer Unit 89TU
- 27-20-00, P. Block 501	Rudder
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up

(a)Initial conditions

R
- connect electrical power supply (Ref. 24-41-00, P. Block 301),
- forward services ventilation system in operation,
- overhead and rear panel circuit breakers closed, particularly those associated with FLT CTL,
- aircraft in ground configuration (LDG GEAR PROX DET & RELAYS circuit breakers closed),
- hydraulic power supply on (Green, Blue and Yellow auxiliary power (Ref. 29-21-00, P. Block 301) (Ref. 29-22-00, P. Block 301). (Ref. 29-23-00, P. Block 301) or Main Hydraulic Power (Ref. 29-10-00, P. Block 301).
- on SERVO CTL section of panel 428VU, all pushbutton switches pressed (in) and legends off.

(b)Position access platforms and safety barriers.

(c)Open access doors 121BL, 312AR, 311AZ, 311BZ, 325BL, 325CL, 325DL.

(d)On panel 408VU

- make certain that rudder trim is at zero.

(e)Operate several times Captain's and First Officer's rudder pedals to deflect rudder surface in order to bleed servo controls.

(f)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
**ON A/C ALL			
21VU	ART FEEL		Line 101/J1 to 101/J5

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27

(g)Make certain that rudder pedals are in neutral position.

D. Adjustment

(1)Adjustment of linkage between rudder pedals and tension regulator (Ref. Fig. 501)

(a)Shut down pressurization of hydraulic systems. Display a warning notice prohibiting pressurization of these hydraulic systems
- on ground connector
- on HYD PWR panel 427VU.

(b)Immobilize Captain's rudder pedal bellcrank using rigging pin 98A27901006000.

(c)Immobilize First Officer's rudder pedal bellcrank using rigging pin 98A27901006000. Rigging pin must be inserted and withdrawn easily. If not, cut and remove lockwire, at ends of rod (1), loosen nuts, disengage washers and adjust length of rod. Engage washers, tighten nuts.

(d)Immobilize tension regulator input lever using rigging pin 98A27901002000.
Rigging pin must be inserted and withdrawn easily.
If not, adjust length of rod (2).

(e)Make certain that the three rigging pins can be inserted and removed easily. If not, perform new adjustment of rods (1) and (2).

(f)Fully tighten nuts, safety with lockwire.

(g)Remove rigging pins.

R **ON A/C 101-104,

R Post SB 31-2115 For A/C 101-104,

(h)Check adjustment of yaw transducer unit 89TU (Ref. 27-21-27, P. Block 401).

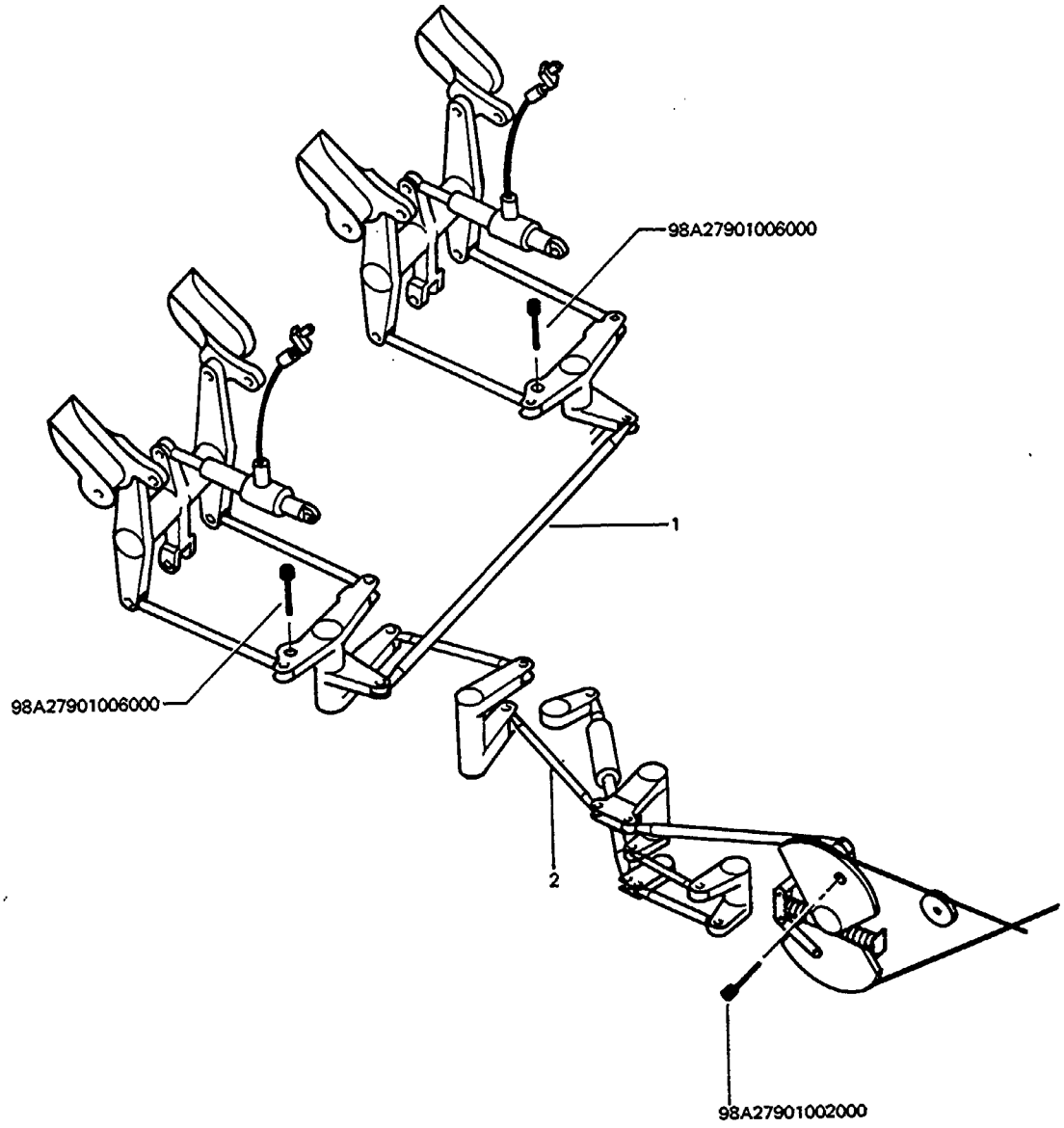
**ON A/C ALL

(2)Adjustment of cable tension
(Ref. 27-20-00, P. Block 501)

(3)Adjustment of linkage in aft Section
(Ref. Fig. 502)
CAUTION : DO NOT DISTURB PRE-ADJUSTED LENGTHS OF PUSHRODS (13).

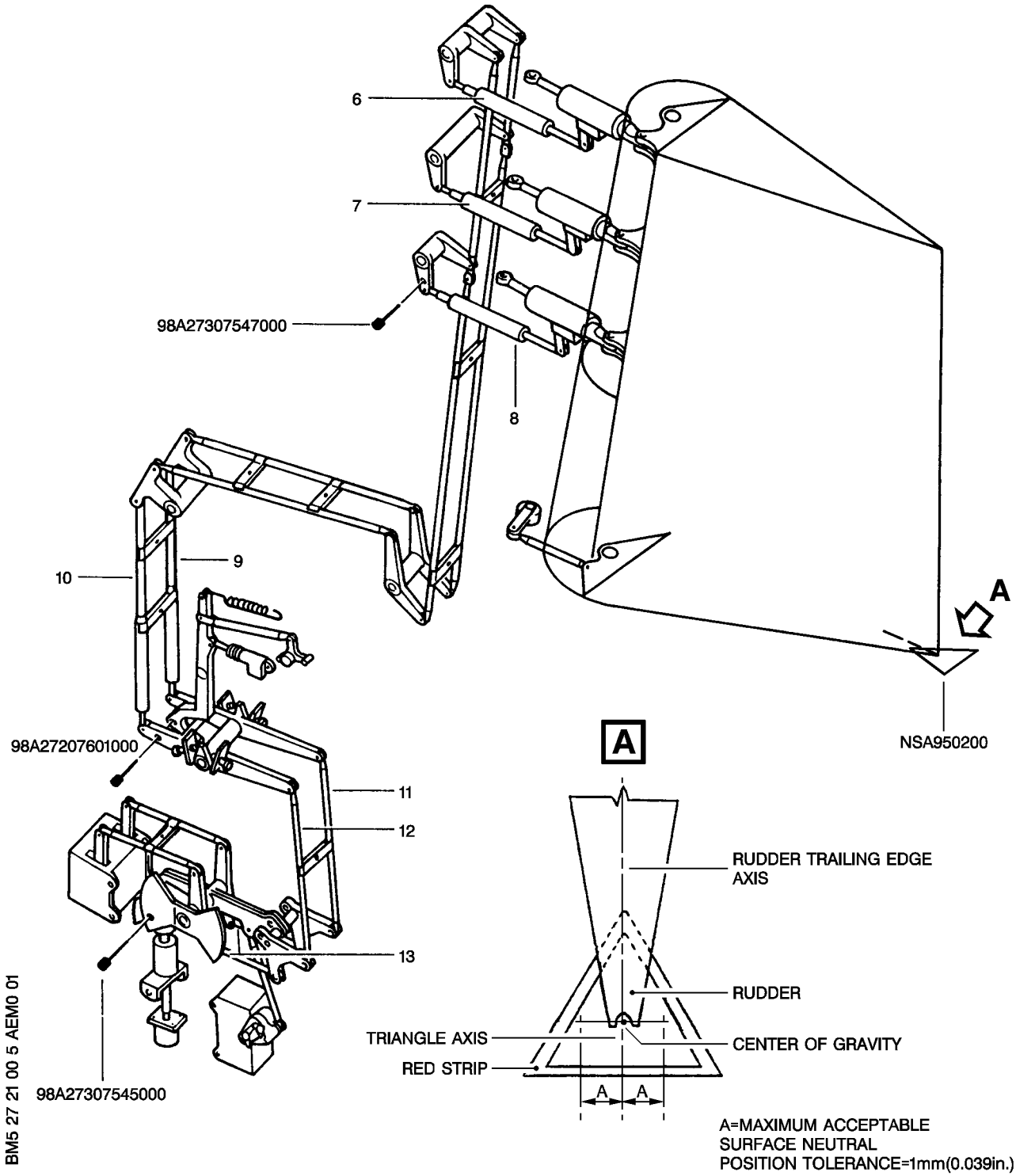
(a)Immobilize cable quadrant using rigging pin 98A27307545000.

(b)Immobilize variable stop lever using rigging pin 98A27207601000.
Rigging pin must be inserted and withdrawn easily.
If not, adjust length of rods (11) and (12).
To this end remove clamp assemblies interconnecting the two rods.
Cut lockwire and loosen nuts. Disengage washers, adjust length of rods.
Engage washers, fully tighten nuts and safety with lockwire.



BM5 27 21 00 5 AAMO
DM5

Linkage Between Rudder Pedals and Tension Regulator
Figure 501



Linkage in Aft Section
Figure 502

Install clamp assemblies.

(c)Using rigging pin 98A2730754700, immobilize spring rod input lever - rigging pin must be inserted and removed easily.
If not, adjust length of rods (9) and (10) as follows :
Remove clamps, cut and remove lockwire, loosen nuts, disengage lock washers and adjust both rods to length.
Engage lock washers, fully tighten nuts and safety with lockwire.
Install clamps.

(4)Adjustment of rudder to neutral with the reference triangle (Ref. Fig. 502)

(a)Install rigging pin 98A27307547000 on the spring rod input lever.

(b)Pressurize Green, Blue and Yellow hydraulic systems either :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301) and Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU
- release SERVO CTL, B and Y (JAM/OFF) pushbutton switches.

(d)Check that rudder trailing edge is in line with or in limits of the center of gravity of triangle NSA950200 located on the rear cone.
NOTE : Maximum tolerance of the rudder trailing edge is 1 mm (0.039 in.) on the right side, 1 mm (0.039 in.) on the left side with respect to triangle axis.
NOTE : This triangle must be taken into account for subsequent adjustments.
If not, adjust length of rod (7). To this end, cut and remove lockwire, loosen nuts, disengage washers, adjust length of rod, engage washers, tighten nuts.
NOTE : Make sure that both spring rod eye ends are held in a fixed and correctly aligned position before turning the spring rod body so that they do not move at all. Do not allow the eye ends to rotate back and forth as this may damage the bearings.

(e)On SERVO CTL section of panel 428VU
- press SERVO CTL, B (JAM/OFF) pushbutton switch
- release SERVO CTL, G (JAM/OFF) pushbutton switch.

(f)Check that rudder trailing edge is in line with or in limits of the center of gravity of triangle NSA950200 located on the rear cone.
If not, adjust length of rod (6). To this end, cut lockwire, loosen nuts, disengage washers. Adjust rod to length, engage washers, fully tighten nuts.
NOTE : Make sure that both spring rod eye ends are held in a fixed and correctly aligned position before turning the spring rod body so that they do not move at all. Do not allow the eye ends to rotate back and forth as this may damage the bearings.

(g)On SERVO CTL section of panel 428VU
- press SERVO CTL/Y (JAM/OFF) pushbutton switch
- release SERVO CTL/B (JAM/OFF) pushbutton switch.

(h)Check that rudder trailing edge is in line with or in limits of the center of gravity of triangle NSA950200 located on the rear cone.
If not, adjust length of rod (8).
To this end, cut and remove lockwire, loosen nuts, disengage washers.

Adjust rod to length, engage washers, tighten nuts.
NOTE : Make sure that both spring rod eye ends are held in a fixed and correctly aligned position before turning the spring rod body so that they do not move at all. Do not allow the eye ends to rotate back and forth as this may damage the bearings.

(i)On SERVO CTL section of panel 428VU
- press SERVO CTL/G and B (JAM/OFF) pushbutton switches.

(j)Check that rudder trailing edge is in line with or in limits of the center of gravity of triangle NSA950200 located on the rear cone. If not, perform again adjustment of rods (6), (7) and (8).

(k)Safety nuts with lockwire.

(l)Remove rigging pin 98A27307547000.

(5)Adjustment of rudder to neutral when the reference neutral position triangle is missing

(a)On SERVO CTL section of panel 428VU :
- release SERVO CTL/B, G, Y (JAM/OFF) pushbutton switches.

(b)Pressurize the aircraft hydraulic systems (Ref. 29-21-00, P. Block 301), (Ref. 29-22-00, P. Block 301), (Ref. 29-23-00, P. Block 301).

(c)On panel 408VU, make sure that the rudder trim is at zero.

(d)On SERVO CTL section of panel 428VU :
- press SERVO CTL/B (JAM/OFF) pushbutton switch.

(e)Install rigging pin 98A27307547000 on the spring rod input lever.

(f)Install rudder quadrant assy 97A27202500000 on the trailing edge of the rudder (Ref. Fig. 503).
NOTE : Install the zero of the graduated rule in line with the leveling mark located on the upper skin butt joint of tail cone between FR97 and 98.

(g)Using tool 97A27202500000, adjust the rudder neutral position by adjusting Blue servocontrol spring rod.
To this end, cut and remove lockwire, loosen nuts, disengage washers and turn spring rod until needle on rudder is at 0.5 deg on the right.

(h)Engage washers, tighten nuts and safety with lockwire.

(i)Make sure that the adjustment has not changed.

(j)On SERVO CTL section on panel 428VU :
- press SERVO CTL/G (JAM/OFF) pushbutton switch
- release SERVO CTL/B (JAM/OFF) pushbutton switch.

(k)Using tool 97A27202500000, adjust the rudder neutral position by adjusting Green servocontrol spring rod.
To this end, cut and remove lockwire, loosen nuts, disengage washers and turn spring rod until needle on rudder is at 0.5 deg on the right.

(l)Engage washers, tighten nuts and safety with lockwire.

(m)Make sure that the adjustment has not changed.

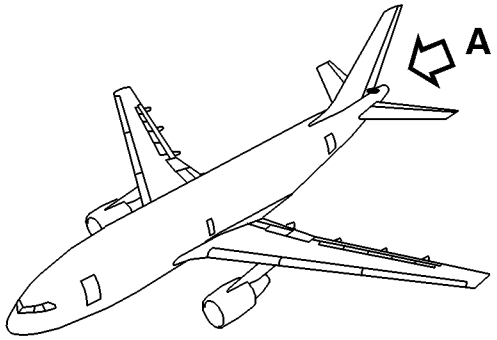
(n)On SERVO CTL section of panel 428VU :
- release SERVO CTL/G (JAM/OFF) pushbutton switch
- push SERVO CTL/Y (JAM/OFF) pushbutton switch.

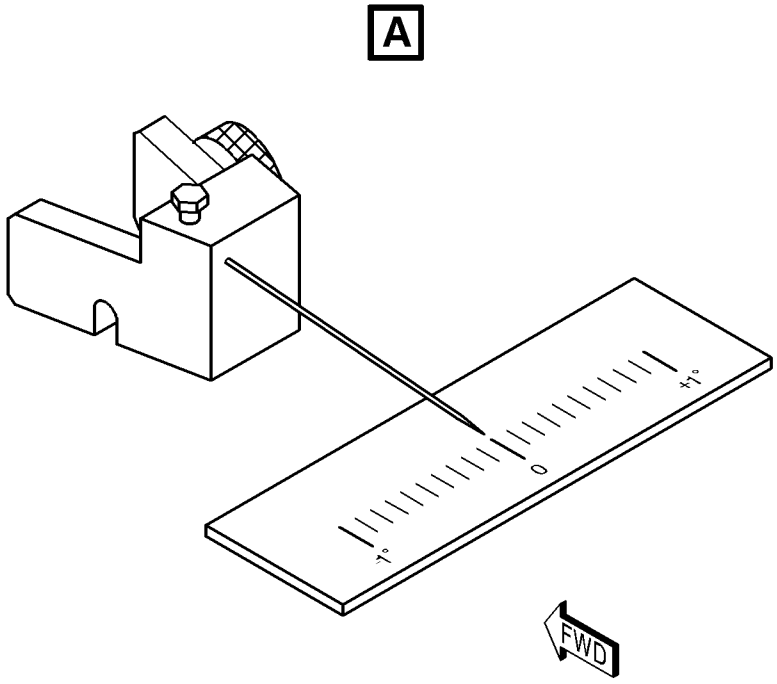
(o)Using tool 97A27202500000, adjust the rudder neutral position by adjusting Yellow servocontrol spring rod.
To this end, cut and remove lockwire, loosen nuts, disengage washers and turn spring rod until needle on rudder is at 0.5 deg on the right.

(p)Engage washers, tighten nuts and safety with lockwire.

(q)Make sure that the adjustment has not changed.
(r)Install a new reference triangle on the tail cone (Ref. 11-00-00, P. Block 001) in line with the trailing edge of the rudder.
(s)Remove rigging pin 98A27307547000.
(t)Remove tool 97A27202500000.
(u)Make certain that the rudder control surface position indicating is correctly adjusted (Ref. 27-25-00, P. Block 501).

E. Close-up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close circuit breakers opened in job set-up.
(3)Close access doors and panels.
(4)Remove safety barriers and access platforms.
(5)Depressurize hydraulic systems. If applicable, disconnect hydraulic ground power cart.
(6)Cut off electrical power supply. (Ref. 24-41-00, P. Block 301).





BM5 27 21 00 5 AGM0 00

Quadrant Assy Rudder
Figure 503

2. Operational Test/Functional Test

A. Reason for the Job
Ensure that rudder deflects when pedals are depressed

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 24-41-00, P. Block 301	Ac External Power Control

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up

(a)Initial conditions

- correct electrical power supply (Ref. 24-41-00, P. Block 301),
- forward services ventilation system in operation,
- overhead and rear panel circuit breakers closed, particularly those associated with FLT CTL,
- aircraft in ground configuration (LDG GEAR PROX DET & RELAYS circuit breakers closed),
- hydraulic power supply on (Green, Blue and Yellow auxiliary power (Ref. 29-21-00, P. Block 301) (Ref. 29-22-00, P. Block 301) (Ref. 29-23-00, P. Block 301).
- on SERVO CTL section of panel 428VU, all pushbutton switches pressed (in) and legends off,

(b)On panel 11VU, on ECAM control panel

- press F/CTL pushbutton switch ; FLT CTL page appears on right ECAM display unit.

(c)On RUD TRIM section of panel 408VU

- make certain that rudder trim is at zero.

(2)Test

ACTION	RESULT
1. Slowly press LH rudder pedal (LH turn)	- check that rudder deflects to the left - On RH ECAM display unit, on FLT CTL page, RUD pointer moves to the left mark
2. Slowly press RH rudder pedal (RH turn)	- check that rudder deflects to the right - On RH ECAM display unit, on FLT CTL page, RUD pointer moves to the right mark
3. Return rudder pedals to neutral position	- Check that rudder returns to zero

ACTION	RESULT
	- RUD pointer is at zero

D. Close-up
(1)Depressurize hydraulic systems.
(2)Cut off electrical power supply (Ref. 24-41-00, P. Block 301).

3. System Test

A. Reason for the Job
Testing of rudder control and measurement of rudder deflections (before performing test, rudder control must be first set to neutral position).

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27307545000	Rigging Pin - Cable Quadrant, Rudder Mechanical Controls
(2)98A27207601000	Rigging Pin - Variable Stop Unit - Rudder Mechanical Controls
(3)98A27203250000	Measuring Equipment - Rudder Pedal Operating Load
(4)98A27308005000	Protractor - Control Surface Deflection
or	
TR12-18	Rigmaster System
TR31	Rigmaster System - Protractor
or	
TR60	Rigmaster System - Protractor
or	
3028000	Clinometer
98A27203500000	Measurement Base - Flight Control Surface Deflection
(5)97A27902016000	Spring Scale Assy
(6)	Safety Barriers
(7)	Access Platforms, 2.7 m - 5.50 m, 12 m - 16 m, (8 ft. 8 in.-18 ft., 52 ft. 6 in.)
(8)97A27202500000	Quadrant Assy - Rudder
Referenced Procedures	
- 24-41-00, P. Block 301	Ac External Power Control
- 25-11-11, P. Block 401	Captain - Seat
- 25-11-12, P. Block 401	First Officer - Seat
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up
(a)Initial conditions
- correct electrical power supply (Ref. 24-41-00, P. Block 301),
- forward services ventilation system in operation,
- overhead and rear panel circuit breakers closed, particularly those associated with FLT CTL,

- aircraft in ground configuration (LDG GEAR PROX DET & RELAYS circuit breakers closed),
- hydraulic power supply on (Green, Blue and Yellow auxiliary power (Ref. 29-21-00, P. Block 301) (Ref. 29-22-00, P. Block 301) (Ref. 29-23-00, P. Block 301) or Main Hydraulic Power (Ref. 29-10-00, P. Block 301),
- on SERVO CTL section of panel 428VU, all pushbutton switches pressed (in) and legends off,

(b)Remove Captain's seat (Ref. 25-11-11, P. Block 401) and First Officer's seat (Ref. 25-11-12, P. Block 401).

(c)Position access platforms

(d)Open access doors 121BL and 312AR.

(e)On RUD TRIM panel 408VU

- make certain that rudder trim is at zero.

(f)Immobilize cable quadrant located in aft section using rigging pin 98A27307545000.

(g)Immobilize variable stop unit using rigging pin 98A27207601000.

R (h)Install protractors 98A27308005000 or tools TR12-18 and TR31 or TR60
R or clinometer 3028000 and flight control surface deflection measurement
R base 98A27203500000.

NOTE : Make certain that head piece of protractor is perpendicular to stabilizer trailing edge.

(j)Remove rigging pins.

(k)On RUD TRAVEL section of panel 428VU

- make certain that SYS1 and SYS2 (FAULT OFF) pushbutton switches are pressed (legends off).

(l)Make certain that Captain's and First Officer's airspeed/mach indicators read zero.

(m)Install measuring equipment 98A27203250000.

(n)On panel 11VU, on ECAM control panel.

- press F/CTL pushbutton switch to display FLT CTL page on right ECAM display unit.

(2)System test

CAUTION : DURING THE FOLLOWING TEST MAX LOAD VALUE OF 70 DAN (157.5 LBF) MUST NOT BE EXCEEDED TO AVOID DAMAGE TO THE CONTROL.

NOTE : On right ECAM display unit, FLT CTL page, RUD scale, pointer reproduces rudder deflection.

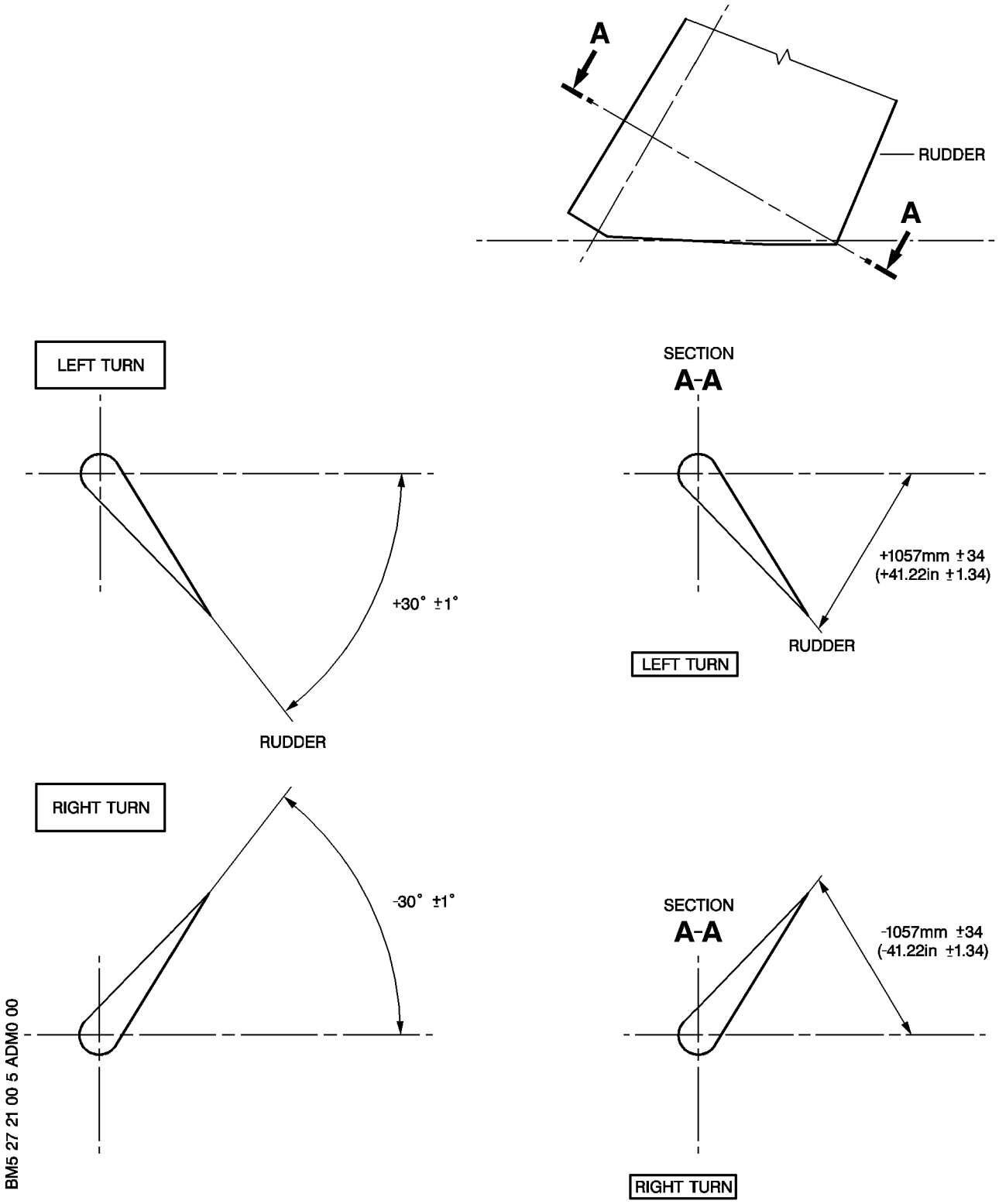
(Ref. Fig. 504)

NOTE : To measure rudder deflection, make a mark of the trailing edge position on tail cone with rudder in neutral position, then measure the distance between the mark and the trailing edge with rudder deflected.

ACTION	RESULT
1. Slowly press LH pedal down to stop	Rudder deflects to the left by + 30° ± 1° (+ 1057 mm ± 34 mm) (+ 41.22 in. ± 1.34 in.).
Using tool 97A27902016000 measure load exerted at pedal	Make certain that load is 30 daN + 2 - 4 daN (67.5 lbf + 4.5 - 9 lbf).

ACTION	RESULT
2. Slowly press RH pedal down to stop	Rudder deflects to the right by - 30° ± 1° (- 1057 mm ± 34 mm) (- 41.22 in. ± 1.34 in.).
Using tool 97A27902016000 measure load exerted at pedal	Make certain that load is 30 daN + 2 - 4 daN (67.5 lbf + 4.5 - 9 lbf).
NOTE : If in steps 1 and 2 rudder does not deflect to the left and to the right by 30° ± 1°, perform adjustment of the rudder stops and perform again system test.	
3. Return pedals to neutral.	
4. Slowly press LH pedal down to stop and slowly return to neutral	Measure angle of rudder with respect to theoretical neutral position.
5. Slowly press RH pedal down to stop and slowly return to neutral	Measure angle of rudder with respect to theoretical neutral position.
6. Repeat steps 4 and 5 three times	Non return-to-neutral angle shall be smaller than 15'. NOTE : Neutral tolerance is obtained by summing up the angles measured after a deflection to the right and to the left.

D. Close-up
(1)Install Captain's seat (Ref. 25-11-11, P. Block 401) and First Officer's seat (Ref. 25-11-12, P. Block 401).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Close access doors 312AR and 121BL.
(4)Remove safety barriers and access platforms.
(5)Depressurize hydraulic systems. If applicable, disconnect hydraulic ground power unit.
(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



Rudder Travel
Figure 504

**ON A/C 001-005, 101-200,

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Check of Authorized Play at Rudder Trailing Edge

A. Reason for the Job
- Check hinge bearings for excessive
- Detailed visual inspection of hinge bearings (in situ, as far as visible) for general condition

B. Equipment and Materials

ITEM	DESIGNATION
A. 98A27307547000	Pin-Rigging, Rudder Servo- Control, Bellcrank Assy
B. 98A27901006000	Pin-Rigging, Rudder Control (Qty : 2)
C.	Warning Notice Prohibiting Operation of Rudder Controls
D.	Access Platform 6 to 12 m (19 to 39 ft.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-21-00, P. Block 501	Rudder Mechanical Control
- 27-24-11, P. Block 601	Rudder Servo Control
- 29-22-00, P. Block 301	Blue Auxiliary Hydraulic Power
- 29-23-00, P. Block 301	Yellow Auxiliary Hydraulic Power
- 29-21-00, P. Block 301	Green Auxiliary Hydraulic Power
- 55-30-00, P. Block 601	Vertical Stabilizer
- 55-36-11, P. Block 601	Vertical Stabilizer Attach Fittings

C. Procedure
(1)Job set-up

**ON A/C 006-100,

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE

IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Check of Authorized Play at Rudder Trailing Edge

A. Reason for the Job

R - Check rudder hinge bearings for excessive play and general condition.
- Detailed visual inspection of hinge bearings (in situ, as far as visible) for general condition

B. Equipment and Materials

ITEM	DESIGNATION
A. 98A27307547000	Pin-Rigging, Rudder Servo- Control, Bellcrank Assy
B. 98A27901006000	Pin-Rigging, Rudder Control (Qty : 2)
C.	Warning Notice Prohibiting Operation of Rudder Controls
D.	Access Platform 6 to 12 m (19 to 39 ft.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-21-00, P. Block 501	Rudder Mechanical Control
- 27-24-11, P. Block 601	Rudder Servo Control
- 29-22-00, P. Block 301	Blue Auxiliary Hydraulic Power
- 29-23-00, P. Block 301	Yellow Auxiliary Hydraulic Power
- 29-21-00, P. Block 301	Green Auxiliary Hydraulic Power
- 55-30-00, P. Block 601	Vertical Stabilizer

C. Procedure

(1)Job set-up

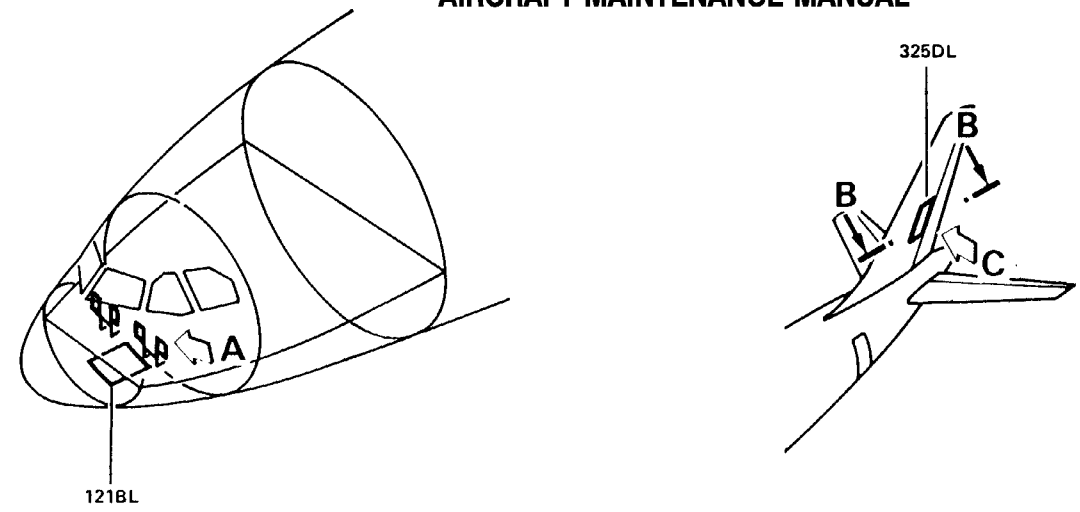
**ON A/C ALL

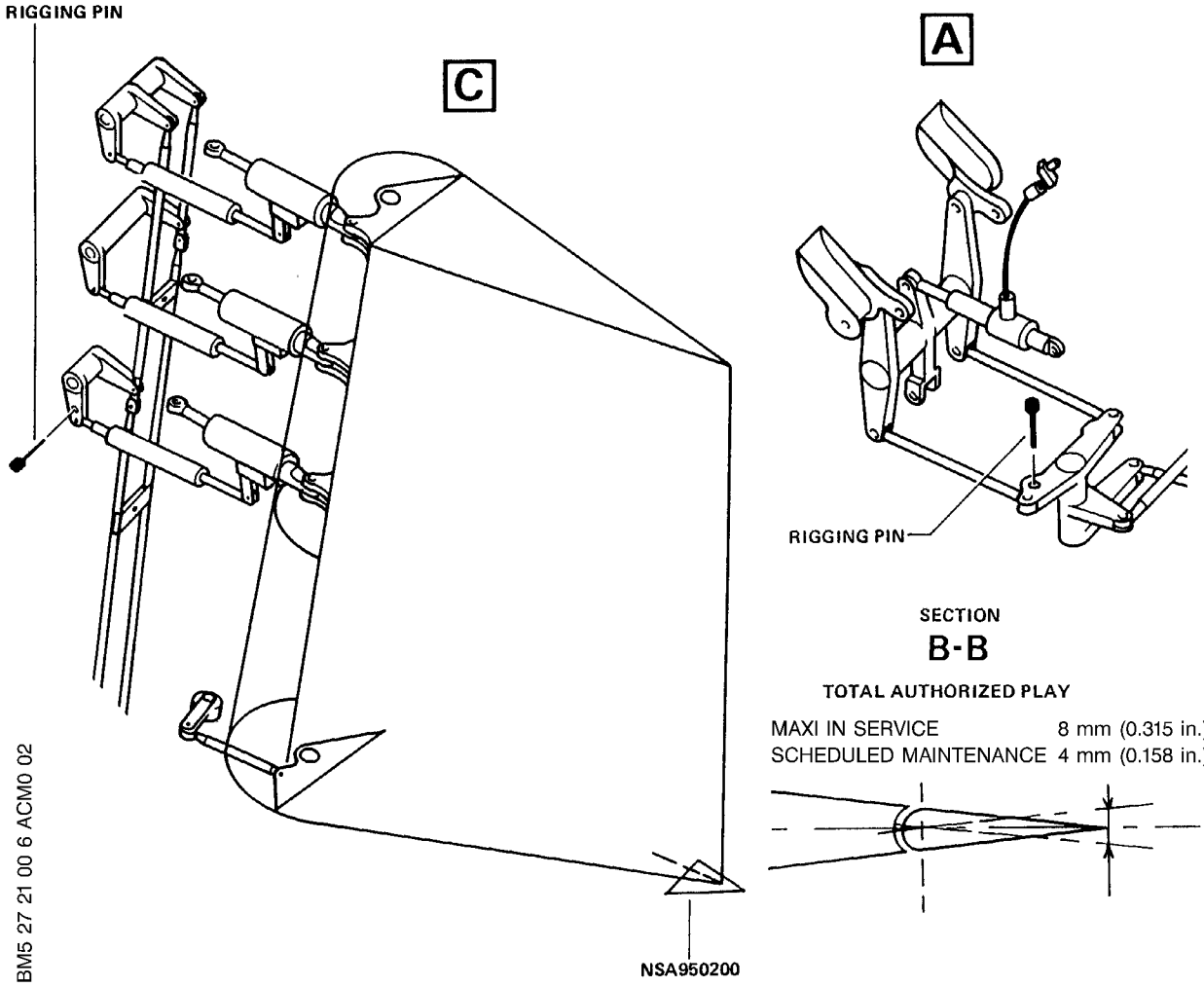
(Ref. Fig. 601)

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)Put warning notices on the pedals (CAPT and F/O) to tell persons not to operate them.

(c)Pressurize Green hydraulic system (Ref. 29-21-00, P. block 301), Blue hydraulic system (Ref. 29-22-00, P. Block 301), Yellow hydraulic system (Ref. 29-23-00, P. Block 301).





Component Location and Rigging Points
Figure 601

R

(d)Position access platforms.
(e)Open access door 121BL in nose cone.
(f)Make certain that rudder pedals are in neutral and that trim control wheel is in zero position. Insert rigging pins 98A27901006000 in bellcranks below rudder pedals.
(g)On vertical stabilizer, remove panel 325DL. Install rigging pin 98A27307547000 into the lower rudder servo spring rod input bellcrank. If rigging pin cannot be inserted, adjust rudder mechanical networks (Ref. 27-21-00, P. Block 501).
(h)In flight compartment, on panel 428VU :
- release (out) the Yellow servo controls and Blue servo controls pushbutton switches.

(2)Check of authorized play at rudder trailing edge
(a)Do this check with the Green hydraulic system pressurized :
(b)On trailing edge, opposite center servo control, apply a reasonable hand pressure leftward in order to eliminate any play with no bending of the surface and note the position on the rear cone.
(c)On trailing edge, opposite center servo control, apply a reasonable hand pressure rightward in order to eliminate any play with no bending of the surface and note the position on the rear cone.

**ON A/C 001-005, 101-200,

(d)Using the two opposite marks on the rear cone, measure the play at trailing edge. If play exceeds total authorized value (Ref. Fig. 601), proceed with inspection/check of vertical stabilizer attach fittings (Ref. 55-36-11, P. Block 601), inspection of servo controls in area of input lever bearing (Ref. 27-24-11, P. Block 601) and inspection of bearings in hinge arms (Ref. 55-30-00, P. Block 601, para B (2)(d)).
(e)In flight compartment, on panel 428VU :
- press (in) the Blue servo controls pushbutton switch and release (out) the Green servo controls pushbutton switch.

(f)Do this check with the Blue hydraulic system pressurized :
(g)On trailing edge, opposite center servo control, apply a reasonable hand pressure leftward in order to eliminate any play with no bending of the surface and note the position on the rear cone.
(h)On trailing edge, opposite center servo control, apply a reasonable hand pressure rightward in order to eliminate any play with no bending of the surface and note the position on the rear cone.
(j)Using the two opposite marks on the rear cone, measure the play at trailing edge. If play exceeds total authorized value (Ref. Fig. 601), proceed with inspection/check of vertical stabilizer attach fittings (Ref. 55-36-11, P. Block 601), inspection of servo controls in area of input lever bearing (Ref. 27-24-11, P. Block 601) and inspection of bearings in hinge arms (Ref. 55-30-00, P. Block 601, para B (2)(d)).
(k)In flight compartment, on panel 428VU :
- press (in) the Yellow servo controls pushbutton switch and release (out) the Blue servo controls pushbutton switch.

(l)Do this check with the Yellow hydraulic system pressurized.

(m)On trailing edge, opposite center servo control, apply a reasonable hand pressure leftward in order to eliminate any play with no bending of the surface and note the position on the rear cone.
(n)On trailing edge, opposite center servo control, apply a reasonable hand pressure rightward in order to eliminate any play with no bending of the surface and note the position on the rear cone.
(p)Using the two opposite marks on the rear cone, measure the play at trailing edge. If play exceeds total authorized value (Ref. Fig. 601), proceed with inspection/check of vertical stabilizer attach fittings (Ref. 55-36-11, P. Block 601), inspection of servo controls in area of input lever bearing (Ref. 27-24-11, P. Block 601) and inspection of bearings in hinge arms (Ref. 55-30-00, P. Block 601, para B (2)(d)).

**ON A/C 006-100,

(d)Using the two opposite marks on the rear cone, measure the play at trailing edge. If play exceeds total authorized value (Ref. Fig. 601), proceed with inspection/check of vertical stabilizer attach fittings (Ref. 55-30-00, P. Block 601) and inspection of servo controls in area of input lever bearing (Ref. 27-24-11, P. Block 601).
(e)In flight compartment, on panel 428VU :
- press (in) the Blue servo controls pushbutton switch and release (out) the Green servo controls pushbutton switch.
(f)Do this check with the Blue hydraulic system pressurized :
(g)On trailing edge, opposite center servo control, apply a reasonable hand pressure leftward in order to eliminate any play with no bending of the surface and note the position on the rear cone.
(h)On trailing edge, opposite center servo control, apply a reasonable hand pressure rightward in order to eliminate any play with no bending of the surface and note the position on the rear cone.
(j)Using the two opposite marks on the rear cone, measure the play at trailing edge. If play exceeds total authorized value (Ref. Fig. 601), proceed with inspection/check of vertical stabilizer attach fittings (Ref. 55-30-00, P. Block 601) and inspection of servo controls in area of input lever bearing (Ref. 27-24-11, P. Block 601).
(k)In flight compartment, on panel 428VU :
- press (in) the Yellow servo controls pushbutton switch and release (out) the Blue servo controls pushbutton switch.
(l)Do this check with the Yellow hydraulic system pressurized.
(m)On trailing edge, opposite center servo control, apply a reasonable hand pressure leftward in order to eliminate any play with no bending of the surface and note the position on the rear cone.
(n)On trailing edge, opposite center servo control, apply a reasonable hand pressure rightward in order to eliminate any play with no bending of the surface and note the position on the rear cone.
(p)Using the two opposite marks on the rear cone, measure the play at trailing edge. If play exceeds total authorized value (Ref. Fig. 601), proceed with inspection/check of vertical stabilizer attach fittings (Ref. 55-30-00, P. Block 601) and inspection of servo controls in area of input lever bearing (Ref. 27-24-11, P. Block 601).

**ON A/C ALL

(3)Close-Up
(a)Remove rigging pins, and depressurize Green hydraulic power supply (Ref. 29-21-00, P. Block 301), Blue hydraulic power supply (Ref. 29-22-00, P. Block 301), Yellow hydraulic power supply (Ref. 29-23-00, P. Block 301).
(b)Make certain that the Green servo controls, Blue servo controls and Yellow servo controls pushbutton switches are pressed.
(c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(e)Close access doors and panels, and remove access platforms.

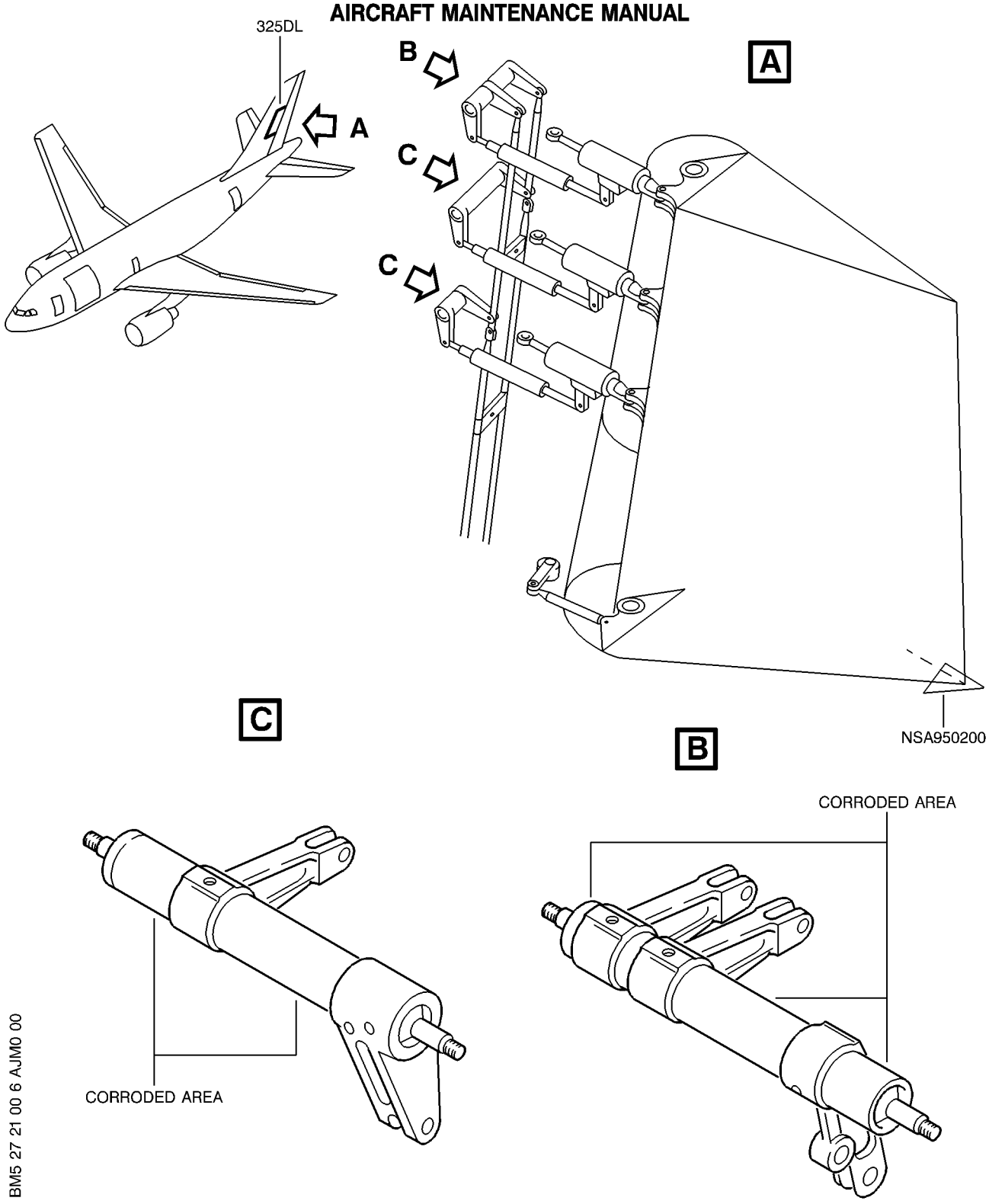
R 2. Check of Corrosion on Rudder Drive Shaft Assembly

R A. Reason for the Job
R To check corrosion on rudder drive shaft assembly.

R B. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 7.5 to 15 m (25 to 49 ft.)
Referenced Procedures	
- 27-21-17, P. Block 401	Bellcranks RIB1 thru RIB10
- 55-33-13, P. Block 401	Trailing Edge Access Panels

R C. Procedure
R (1)Job set-up
R (a)Position access platform at the rudder area.
R (b)Remove access panel 325DL (Ref. 55-33-13, P. Block 401).
R (Ref. Fig. 602)
R (2)Check of corrosion on rudder drive shaft assembly (Ref. Fig. 602)
R (a)Do a visual inspection of the drive shaft assembly.
R 1 If there is no corrosion, the drive shaft is serviceable.
R 2 If corrosion on drive shaft assembly is below 0,2mm,
R the corroded shaft has to be replaced within 400 FH.
R 3 If corrosion on drive shaft assembly exceeds 0,2mm, repla-
R cement of the shaft has to be accomplished before next flight.
R (3)Close-Up
R (a)Install access panel 325DL (Ref. 55-33-13, P. Block 401).
R (b)Remove access platform.



Rudder Drive Shaft Assembly Corrosion
Figure 602

R

R 4. Check of Rudder Servo Control Hinge Bearings

R A. Reason for the Job
R To check the correct rudder servo control hinge bearings function

R B. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 7.5 to 15 m (25 to 49 ft.)

R C. Procedure

R **ON A/C 001-005, 101-200,

R (1)Job set-up
R (a)Position access platform at the rudder area.
R (b)Remove access panels 326BR, 326DR, 326FR, 326HR, and 326KR.
R (2)Check of rudder servo control hinge bearings
R (a)Do a visual check of the servo control bearings.
R (b)Do a visual check of the rudder hinge bearings.
R (c)Make sure that the liners are not damaged.

R **ON A/C 006-100,

R (1)Job set-up
R (a)Position access platform at the rudder area.
R (b)Remove access panels 325AL, 325FL, 325HL, and 325KL.
R (2)Check of rudder servo control hinge bearings
R (a)Do a visual check of the servo control bearings.
R (b)Do a visual check of the rudder hinge bearings.
R (c)Make sure that the liners are not damaged.

R **ON A/C 001-005, 101-200,

R (3)Close-Up
R (a)Make certain that working area is clean and clear of tools and miscel-
R laneous items of equipment.
R (b)Install access panels 326BR, 326DR, 326FR, 326HR, and 326KR.
R (c)Remove access platform.

R **ON A/C 006-100,

R (3)Close-Up
R (a)Make certain that working area is clean and clear of tools and miscel-
R laneous items of equipment.
R (b)Install access panels 325AL, 325FL, 325HL, and 325KL.
R (c)Remove access platform.

R **ON A/C ALL

R 5. Check of Cables in Rear Part of Aft Pressure Bulkhead

R A. Reason for the Job
R Detailed inspection of cables in rear part of aft pressure bulkhead

R B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2 to 5,50 m (6 ft. to 18 ft.)
Referenced Procedures	
- 20-29-12, P. Block 1	Control Cable Check
- 20-29-13, P. Block 1	Cable Cleaning and Application of Protective Finishes on Cables
- 20-29-14, P. Block 1	Control Cable Rejection Criteria
- 24-41-00, P. Block 301	AC External Power Control
- 27-20-00, P. Block 401	Rudder - Removal/Installation
- 29-21-00, P. Block 301	Green Auxiliary Hydraulic Power

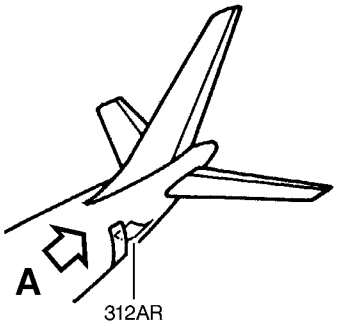
R C. Procedure
R (1)Job set-up
R (Ref. Fig. 603)
R (a)Position access platform.
R (b)Open access door 312AR.
R (c)Remove the floor panels and control cable protective cover to get access to pulleys (3) and (4).
R (d)Make certain that rudder trim is at zero position.

R (2)Inspection of cables and pulleys
R (a)Check condition of pulleys (1), (2), (3) and (4) (Ref. 20-29-14, P. Block 1).
R (b)Clean control cables (Ref. 20-29-13, P. Block 1).
R (c)Check cables for wear and corrosion (Ref. 20-29-12, P. Block 1).

R (d)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
R (e)Pressurize Green hydraulic system using Green electric pumps (Ref. 29-21-00, P. Block 301).

R WARNING : MAKE SURE THAT THE PULLEYS AND CONTROL CABLES ARE CLEAR. MOVEMENT OF THE RUDDER PEDALS CAN CAUSE INJURY TO PERSONS.
R (f)Press LH rudder pedal to move the cables and maintain it.
R (g)Check condition of pulleys (1), (2), (3) and (4) (Ref. 20-29-14, P. Block 1).
R (h)Clean control cables (Ref. 20-29-13, P. Block 1).
R (j)Check cables for wear and corrosion (Ref. 20-29-12, P. Block 1).

R WARNING : MAKE SURE THAT THE PULLEYS AND CONTROL CABLES ARE CLEAR.



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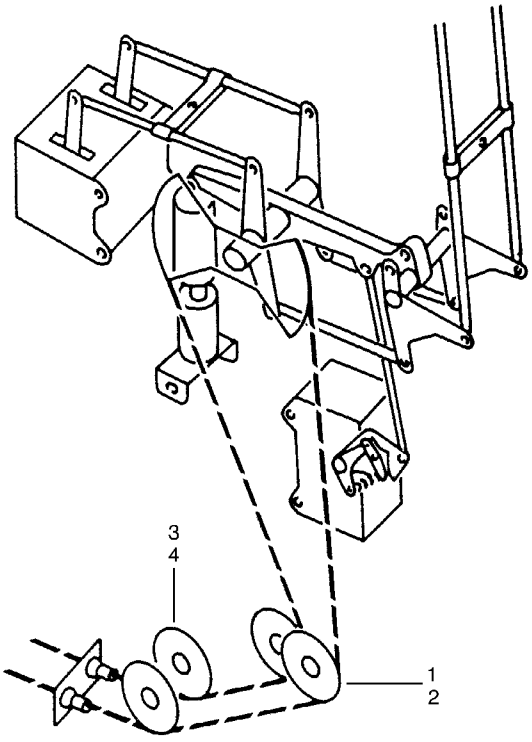


BM5 27 21 00 6 CAM0 00

Location of Cables and Pulleys
Figure 603

R

R MOVEMENT OF THE RUDDER PEDALS CAN CAUSE INJURY TO PERSONS.
R (k)Press RH rudder pedal to move the cables and maintain it.
R (l)Check condition of pulleys (1), (2), (3) and (4) (Ref. 20-29-14, P. Block 1).
R (m)Clean control cables (Ref. 20-29-13, P. Block 1).
R (n)Check cables for wear and corrosion (Ref. 20-29-12, P. Block 1).

R WARNING : MAKE SURE THAT THE PULLEYS AND CONTROL CABLES ARE CLEAR.
R MOVEMENT OF THE RUDDER PEDALS CAN CAUSE INJURY TO PERSONS.
R (p)Return rudder pedals to neutral position.

R (q)If the corroded and/or broken wires are found to be outside the limit, replace the control cables (Ref. 27-20-00, P. Block 401).
R (r)Protect the control cables (Ref. 20-29-13, P. Block 1).

R (4)Close-Up
R (a)Shut off Green hydraulic power supply (Ref. 29-21-00, P. Block 301).
R (b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R (c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (d)Install the removed control cable protective cover and floor panels.
R (e)Close access door 312AR.
R (f)Remove access platform.

R 6. Check of Rudder Servocontrol Actuating Spring Rods

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 11 m (36 ft.)
(2)	Warning Notice
Referenced Procedures	
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 27-21-23, P. Block 401	Servo Control Actuating Spring Rod
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

B. Procedure

(1)Job set-up
(Ref. Fig. 604)

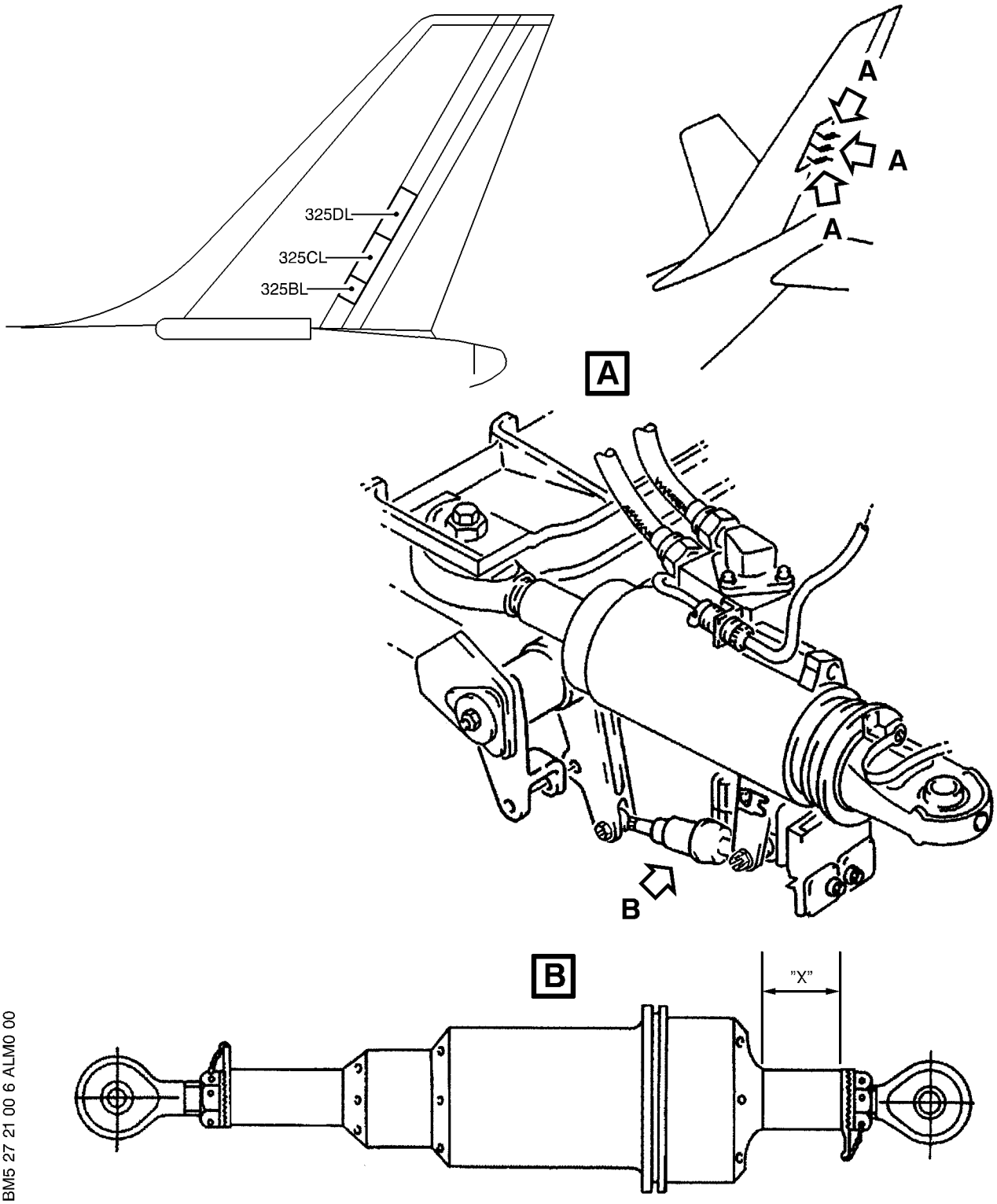
(a)Display warning notice in flight compartment prohibiting operation of flight controls.
(b)Make certain that hydraulic systems are depressurized (Ref. 29-10-00, P. Block 301).
(c)Display warning notice, prohibiting repressurization of hydraulic systems.
(d)Position access platform.
(e)Open access panels 325BL, 325CL and 325DL.
(f)Make certain that rigging pins have not been installed.

(2)Check of the lower, middle and upper spring rods

NOTE : This check procedure is given for the lower spring rod. Do the same procedure for the middle and upper spring rods.

NOTE : It is recommended to use a digital calliper to measure the dimension "X".

(a)Measure the dimension "X" of the lower spring rod which is in neutral position and record the value as the value "X1".
(b)Push the left pedal on CAPT or F/O side to the maximum deflection. The lower spring rod should reach its inner stop.
(c)Release the pedal to the neutral position and measure the dimension "X" of the lower spring rod and record the value as the value "X2".
(d)Push the right pedal on CAPT or F/O side to the maximum deflection. The lower spring rod should reach its other inner stop.
(e)Release the pedal to the neutral position and measure the dimension "X" of the lower spring rod and record the value as the value "X3".
(f)Add the values "X1", "X2" and "X3" and divide by 3. Record the result as value "X4".
(g)If the measured values of "X1", "X2" and "X3" are between the calculated value of "X4", plus a tolerance of ±0.2mm, the spring rod is serviceable.
(h)If one or more of the measured values of "X1", "X2" and "X3" are not between the calculated value "X4", plus a tolerance of ±0.2mm:
- Replace the lower spring rod (Ref. 27-21-23, P. Block 401).



BM5 27 21 00 6 ALM0 00

Actuating Spring Rod
Figure 604

R

R (3)Close-Up
R (a)Make certain that working area is clean and clear of tools and
R miscellaneous items of equipment.
R (b)Close access panels 325BL, 325CL and 325DL.
R (c)Remove access platform.
R (d)Perform a functional test (Ref. 27-21-00, P. Block 501 Para. 2.).

PEDALS - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVINGCOMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROL.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.65 to 5.50 m (8 ft. 8 in. to 18 ft.
B. 98A27901006000	Pin - Rigging, Rudder Control
C.	Circuit Breaker Safety Clips
D.	Warning Notices Prohibiting Hydraulic System Pressurization
Referenced Procedure - 27-21-00, P. Block 501	Mechanical Control (Rudder)

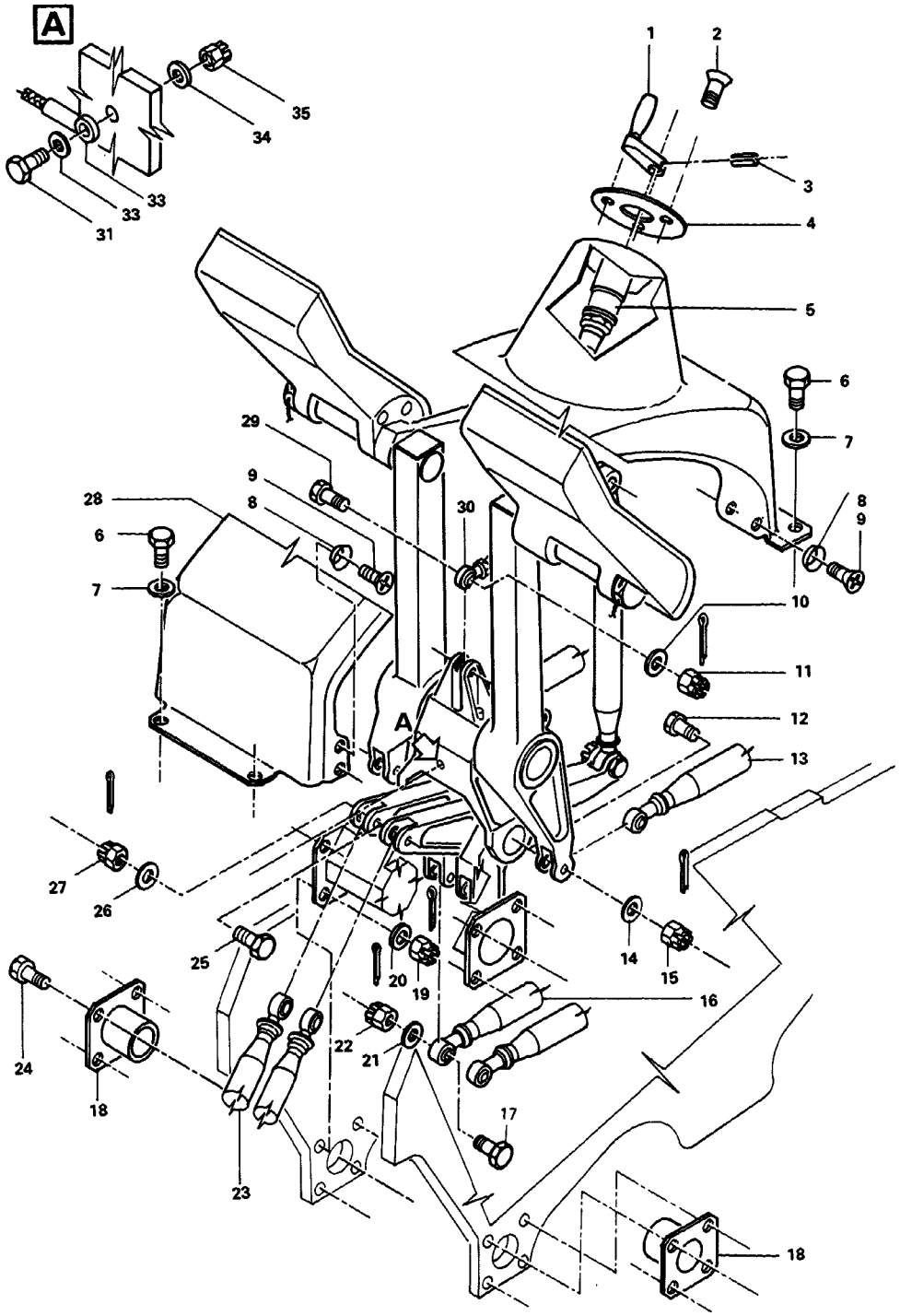
2. Procedure

A. Job Set-Up
(1)Position access platform and open door 121BL.
(2)On panel 408VU, make certain that rudder trim is in zero position.
(3)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27

(4)Insert rigging pin 98A27901006000 in brake-rudder control bellcrank on Captain's (First Officer's) control mechanism.
(5)On overhead panel, display warning notice prohibiting hydraulic system pressurization.

B. Removal (Ref. Fig. 401)
NOTE : The description below deals with the removal of First Officer's pedal assembly. Captain's pedal assembly removal is identical with First Officer's pedal assembly removal, except for link rod disconnection (23) from brake transmitter.



Pedals
Figure 401

NOTE : Disconnect the various rods and the jack and attach to an adjacent unit to prevent damage.

(1)Remove cotter pin (3) and remove crank handle (1).
(2)Support pedal position adjuster control (5), remove screws (2), retain cover plate (4) and remove control (5).
(3)Remove bolts (6) and (9), remove washers (7) and (8) and housing (28).
(4)Remove cotter pin, remove nut (35) ; retain washer (34) ; remove nut (31), retain washer (32) and remove bonding lead (33).
(5)Remove cotter pin, remove nuts (22) ; retain washers (21) ; remove bolts (17) and remove rods (16).
(6)On First Officer's side, remove cotter pins, remove nuts (27), retain washers (26),remove bolts (25) and rods (23).
(7)Remove cotter pin ; remove nuts (15), retain washers (14) ; remove bolts (12) and rods (13).
(8)Remove cotter pin, remove nut (11), retain washer (10).
(9)Support pedal assembly and adjusting jack (30) then remove bolt (29).
(10)Remove cotter pin, remove nuts (19), retain washers (20) and remove bolts (24).
(11)Support pedal assembly by any suitable means.
(12)Remove sleeves (18) and remove pedal assembly.

C. Installation

NOTE : Before installation, make certain that the various bellcranks of the pedal assembly are equipped with their rings.

(1)Position pedal assembly ; support it by any appropriate means, position sleeves (18) and install bolts (24).
(2)Install washers (20), nuts (19) and cotter pins.
(3)Position adjusting jack (30), install bolt (29), washer (10), nut (11) and cotter pin.
(4)Position the two rods (13), install bolts (12), washers (14), nuts (15) and cotter pins.
(5)Position the two rods (16), install bolts (17), washers (21), nuts (22 and cotter pins.
(6)On First Officer's side, position the two rods (23), install bolt (25), washers (26), nuts (27) and cotter pins.
(7)Install washer (32) on bolt (31), install bonding lead (33) then install bolt with washer (34), nut (35) and cotter pin.
(8)Position pedal position adjuster control (5), located under housing (28) and cover plate (4) on housing ; install with screws (2).
(9)Install housing (28) with bolts (6) and (9) equipped with their washers (7) and (8) respectively.
(10)Install crank handle (1) and cotter pin (3).
(11)Close circuit breaker 1CG.
(12)Remove rigging pin 98A27901006000

D. Test

(1)Perform functional test (Ref. 27-21-00, P. Block 501).

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Remove warning notice.
(3)Close access door 121BL.
(4)Remove access platform.

PEDAL POSITION ADJUSTER - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROL.

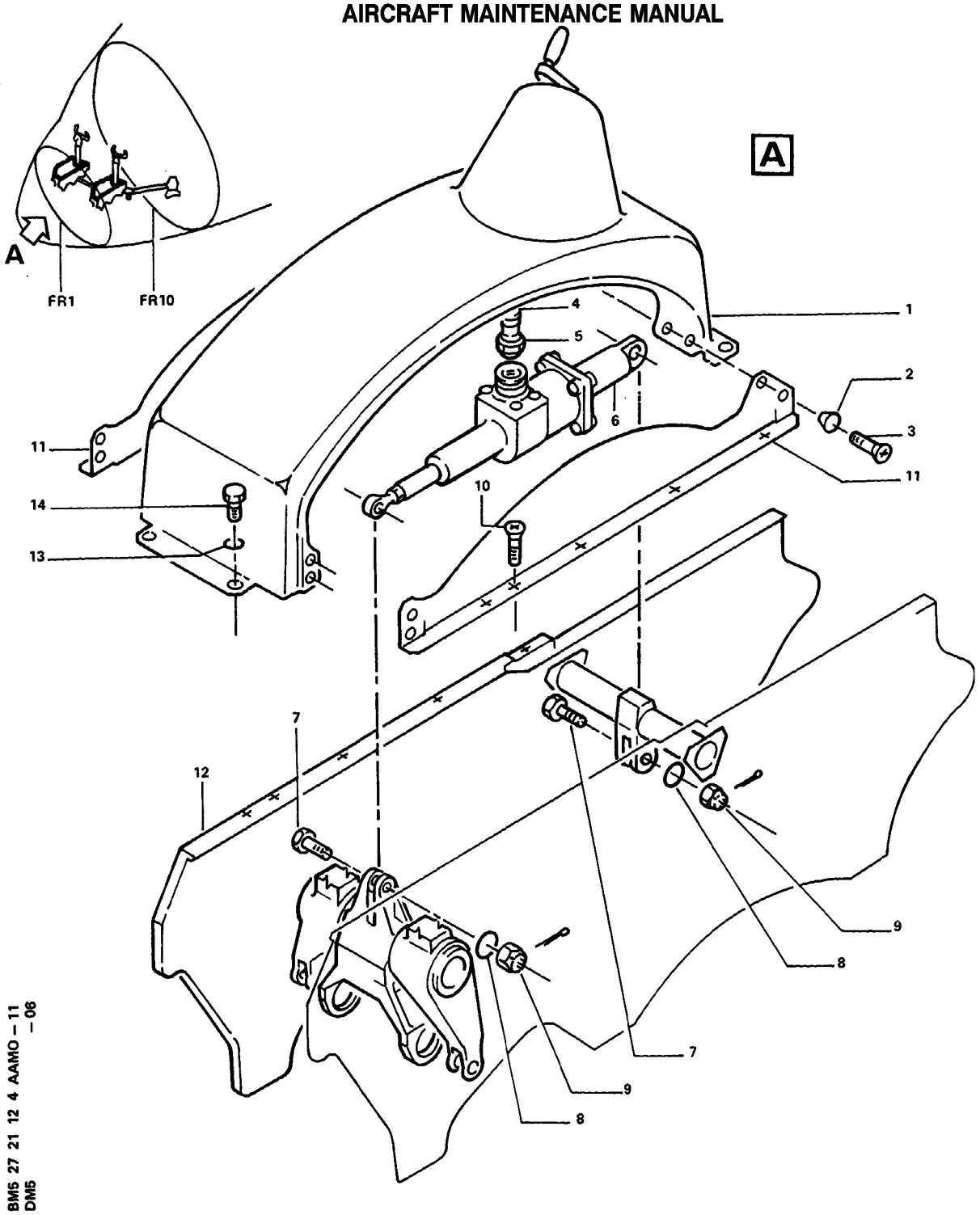
1. Equipment and Materials

ITEM	DESIGNATION
A.	Lockwire, Corrosion Resistant Steel, Dia. 0.8 mm (0.032 in.)
B. Material No. 04-004	Common Greases (Ref. 20-31-00)
C.	Access Platform 5.75 m (8 ft. 10 in.)
D.	Warning Notice

2. Procedure

A. Job Set-Up
(1)Position access platform
(2)Open Fwd passenger/crew door
(3)On overhead panel, display a warning notice prohibiting hydraulic system pressurization.

B. Removal (Ref. Fig. 401)
(1)Remove attaching screws (10) from side plates (11) of cover on beam and attaching screws (3) from side plates located on housing (1). Retain washers (2).
(2)Remove side plates (11).
(3)Remove lockwire, remove nut (5) connecting flexible control cable (4) to screwjack (6). Disengage end of flexible control cable.
(4)Remove attaching screws (14) from housing (1). Retain washers (13).
(5)Remove housing (1).
(6)Remove cotter pins, remove nuts (9). Retain washers (8).
CAUTION : BEFORE REMOVING BOLTS (7), SUPPORT CONTROL COLUMN ASSEMBLY. PROVIDE FOR A DEVICE TO BE USED IN PLACE OF SCREWJACK TO SUPPORT CONTROL COLUMN ASSEMBLY (ROD FOR INSTANCE).
(7)Remove bolts (7).



Pedal Position Adjuster
Figure 401

C. Preparation of Replacement Part
Adjust replacement screwjack to length of removed screwjack.

D. Installation
NOTE : Coat threads of bolts, nuts and parts with grease No.04-004.
(1)Support control column assembly and remove control column assembly supporting device.
(2)Position replacement screwjack and install with bolts (7).
(3)Engage washers (8) on bolts (7).
(4)Install nuts (9) and cotter pins.
(5)Position housing (1) on beam (12).
(6)Connect flexible control cable (4) to screwjack (6).
(7)Install nut (5) and lockwire.
(8)Install housing (1) with bolts (14) and washers (13).
(9)Position side plates (11) and install on beam (12) with bolts (10) and on housing with washers (2) and bolts (3).

E. Test
Operate control from stop to stop. Check for smooth operation.

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)On overhead panel, remove warning notice.
(3)Close Fwd passenger/crew door.
(4)Remove access platform.

CABLE TENSION REGULATOR 4814 - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING, WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A27901006000	Pin - Rigging, Rudder Control
B. 98A27901002000	Pin - Rigging, Rudder Control
C. 98A27307545000	Rigging Pin - Cable Quadrant, Rudder Mechanical Controls
R D. FE101901	Locking Equipment - Cable Tension Regulator
E.	Lockwire Corrosion Resistant Steel, dia. 0.8 mm (0.032 in.)
F.	Circuit Breaker Safety Clips
G.	Warning Notices
H.	Access Platforms, 2.5 to 5.5 m (8 ft. 3 in. to 10 ft. 2 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-20-00, P. Block 501	Rudder
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

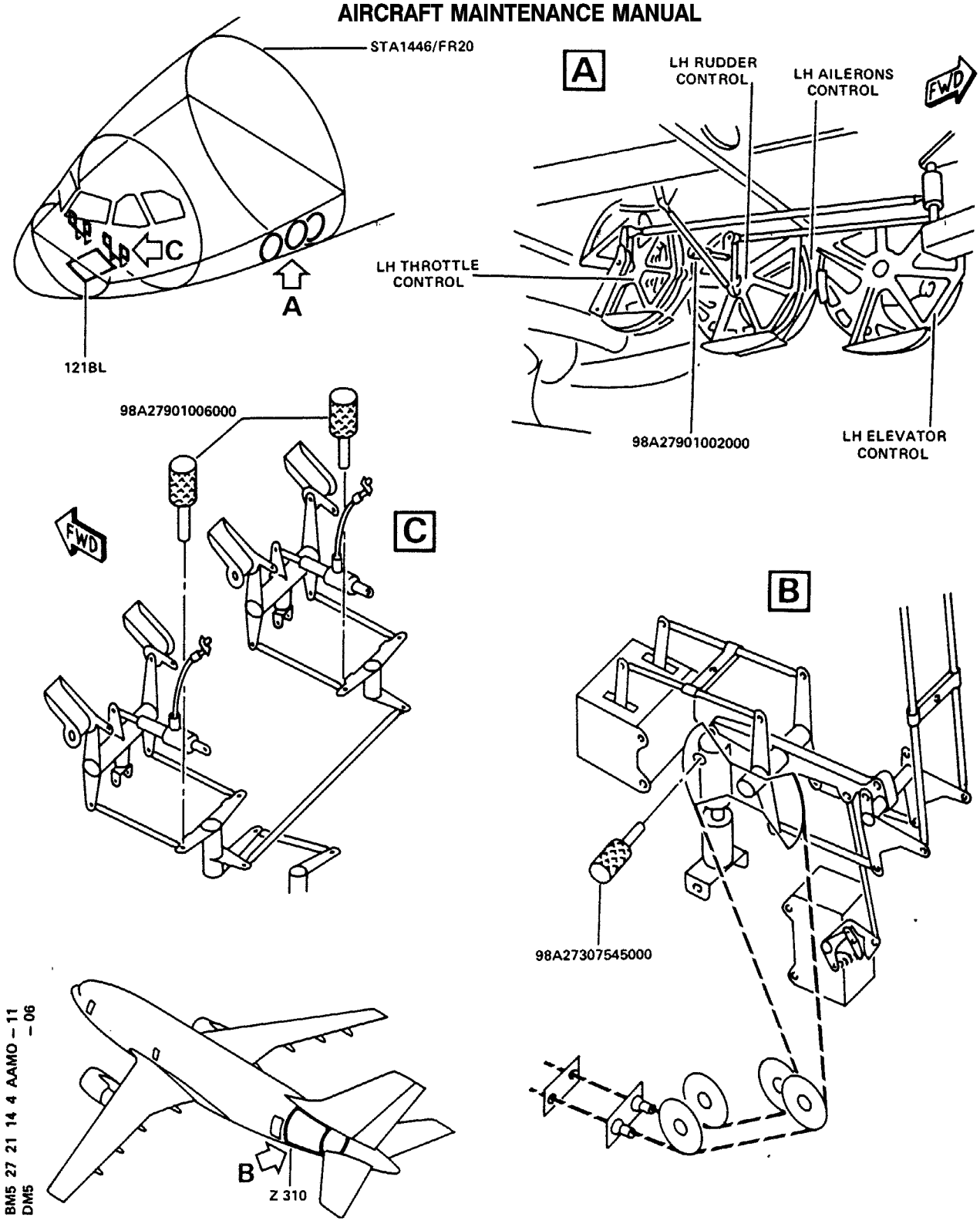
2. Procedure

A. Job Set-Up
(1)Position access platforms.
(2)Pressurize hydraulic systems using hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(3)On RUD TRIM section of panel 408VU
- make certain that rudder trim is in neutral position.
(4)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(5)Display warning notices in flight compartment prohibiting any action involving rudder controls.
(6)Open door 121BL for access to avionics compartment.
(7)Install rigging pin 98A27901006000 in yaw/brake bellcrank mounted on Captain's flight control mechanism mounting beam.
(8)Lock rudder tension regulator input lever using rigging pin

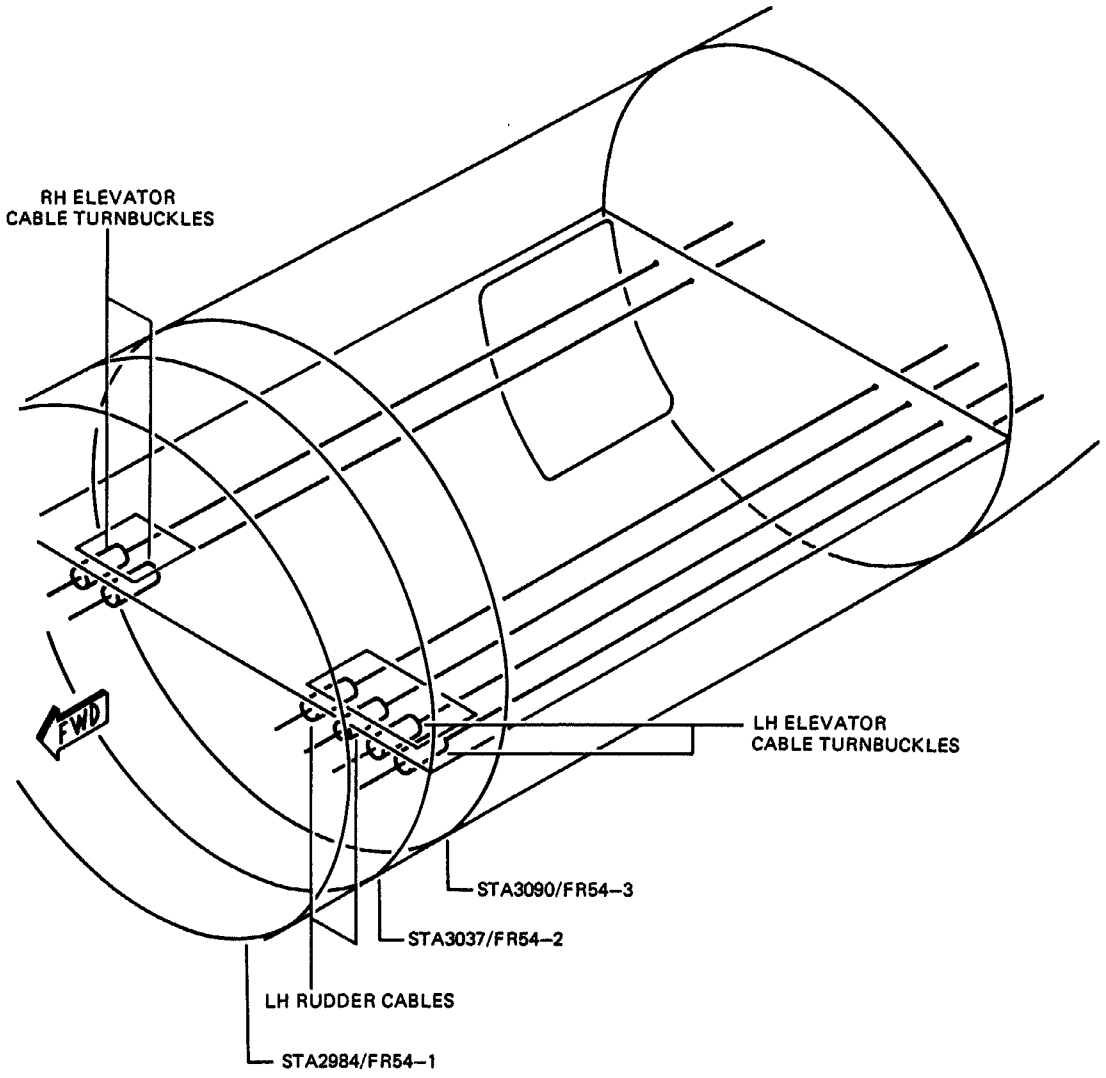
98A27901002000.
(9)Open access door 312AR and install rigging pin 98A27307545 in cable quadrant on rudder control frame.
(10)Open floor panels between STA2984/FR 54.1 and STA3090/FR 54.3 for access to turnbuckles.
(11)Remove turnbuckle safety clips and slacken cables until locking tool
R FE101901 can be installed on tension regulator cable quadrants.
(Ref. Fig. 401)
(Ref. Fig. 402)

B. Removal (Ref. Fig. 403)
(1)Remove cotter pin from nut (25), remove nut (25) and washer (26). Hold regulator input rod (24) and remove bolt (27).
(2)Stow input rod (24) on an adjacent part of the aircraft to prevent damage.
(3)Remove cotter pin from nut (28), remove nut (28) and washer (29). Hold brace rod (31) and remove bolt (30).
(4)Stow brace rod (31) on an adjacent part of the aircraft to prevent damage.
(5)Remove cotter pins from the two nuts (20), remove nuts (20) and washers (21). Remove bolts (23) and spacers (22) equipped with protective cover (Ref. Detail F).
(6)Remove cotter pin from nut (14), remove nut (14), washer (15), bolt (19), spacers (16) and (18) lower cable guard (17) and upper cable guard (2) (Ref. Detail E).
(7)Cut and remove lockwire, remove bolt (9), spacer (8). (Ref. Detail C).
(8)Cut and remove lockwire, remove bolt (4), spacer (3), upper cable guard (2) and spacer (1) (Ref. Detail A).
(9)Remove cable ends from slots on tension regulator cable quadrants. Hang cables on structure.
(10)At forward attachment point of regulator, remove cotter pin from nut (10), remove nut (10), washer (11), bolt (13) and shim washers (12). (Ref. Details D).
(11)At aft attachment points of regulator, remove cotter pins from nuts (5), remove nuts (5) and washers (6). (Ref. Detail B).
(12)Support regulator and remove bolts (7).
(13)Remove regulator assembly.

C. Preparation of Replacement Component
(1)Disassembly of regulator (Ref. Fig. 404)
(a)Remove rigging pin 98A27901002000 and cotter pin from nut (61), remove nut (61), washer (62), input lever (63) and shim washer (64).
(b)Cut and remove lockwire, remove the two bolts (69), lock washer (68) and washer (67).
(c)Remove cotter pins from the three nuts (60), remove nuts (60), washers (59) and bolts (70).
(d)Remove cotter pin from nut (58), remove nut (58) and washer (57).
(e)Remove frame (56).
(f)Separate frame (53) from regulator (65).
(g)On frame (53) :
1 Hold suspension block (54)



Location of Components and Rigging Points
Figure 401



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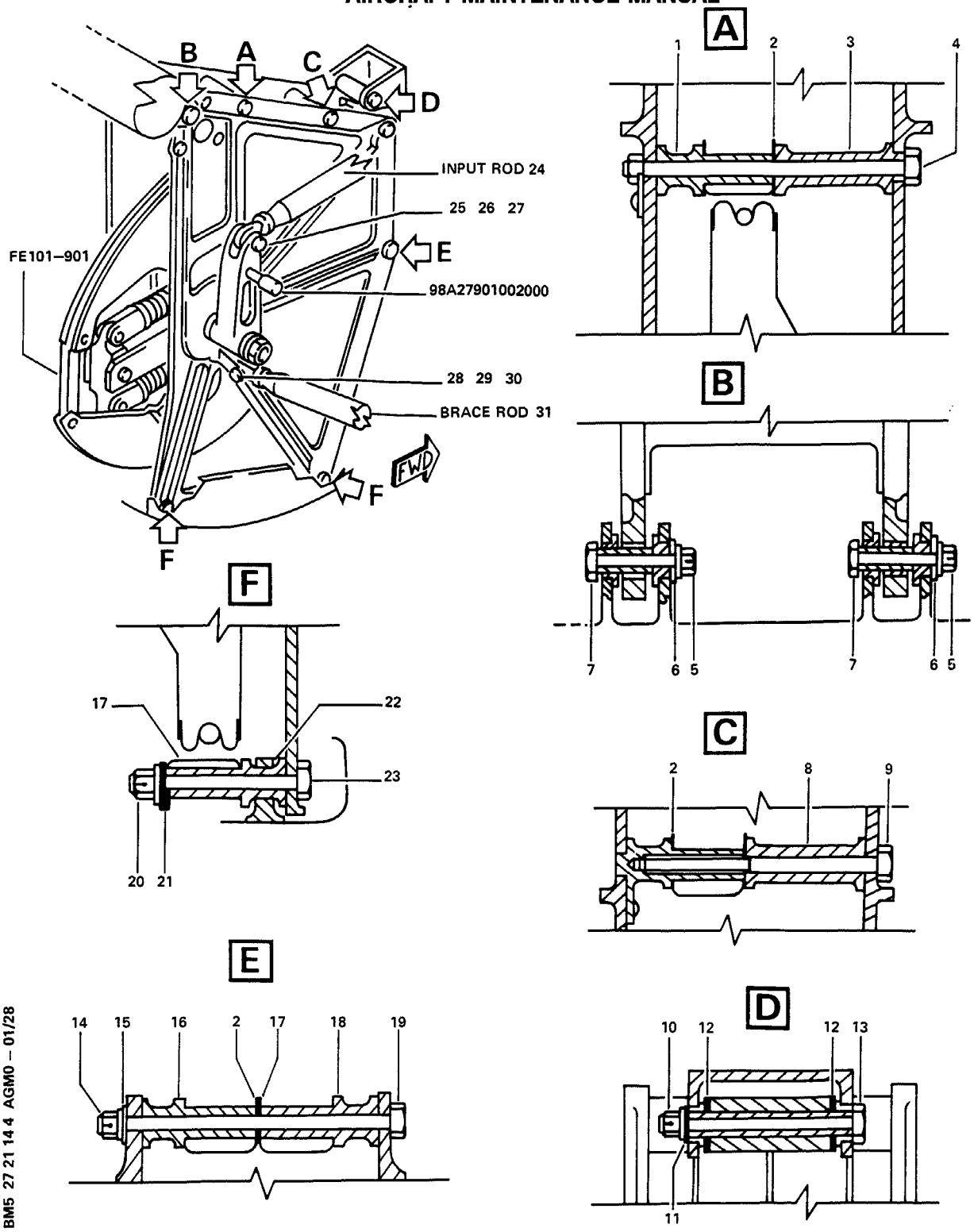
Location of Cables and Turnbuckles
Figure 402



Cable Tension Regulator Assembly
Figure 403

2 Remove bolt (51) and washer (52)
3 Remove suspension block (54) together with spacer (55).

(2)Assembly of regulator

WARNING : REPLACEMENT REGULATOR MUST MANDATORILY BE FITTED WITH ITS CABLE QUADRANT LOCKING EQUIPMENT.

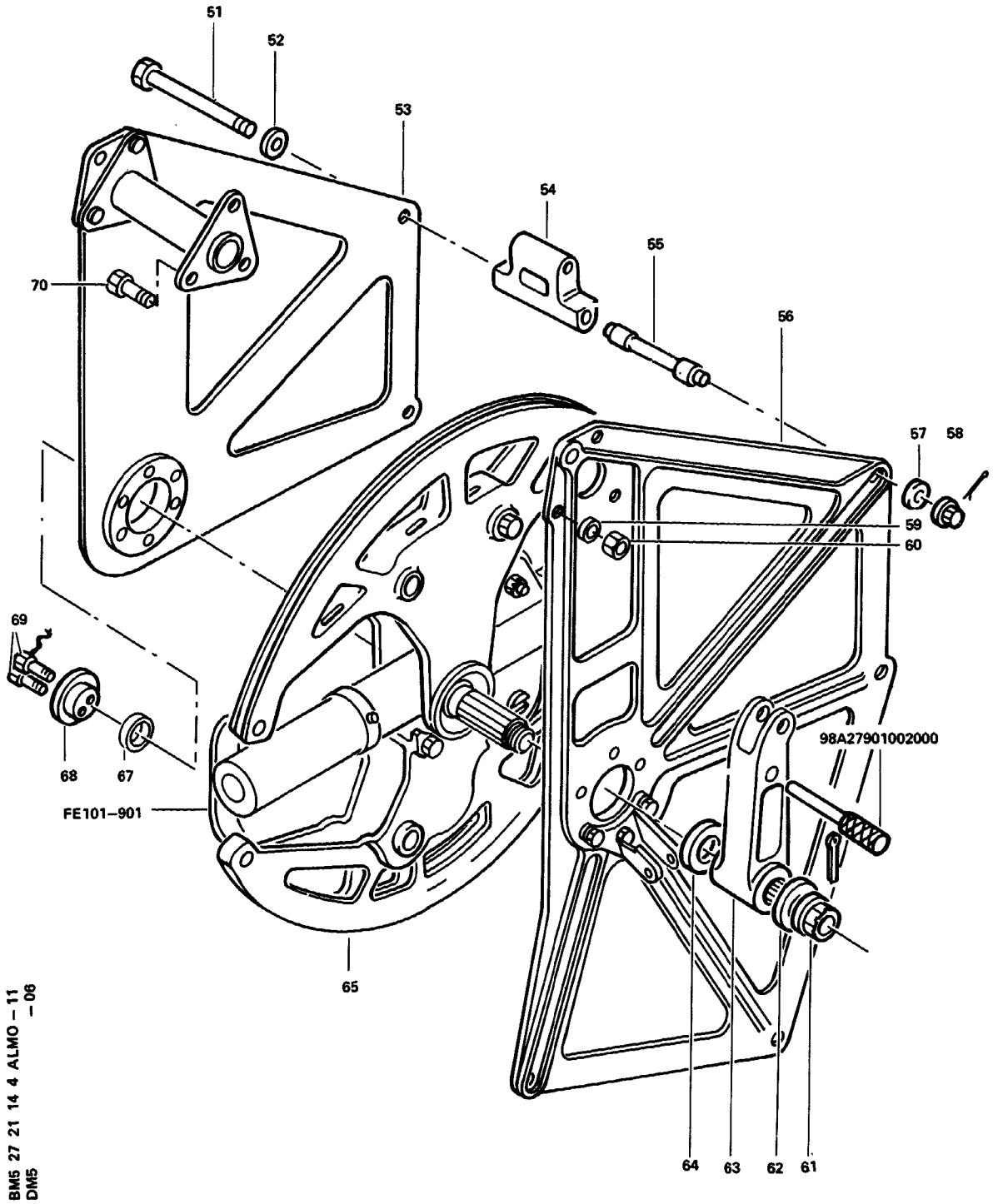
(a)Install washer (67) on shorter hub of regulator and insert hub into bearing of frame (53).
(b)Install lock washer (68).
(c)Secure lock washer (68) using the two bolts (69), tighten and wire-lock bolts.
(d)Make certain that spacer (55) is inserted in suspension block (54). Install suspension block assembly on frame (53) using bolt (51) and washer (52).
(e)Install frame (56) centering it on regulator hub and on shoulder of spacer attached to frame (53).
(f)Install washer (57) on bolt (51). Install nut (58), tighten and safety with cotter pin.
(g)Install washers (59) on bolts (70). Install nuts (60), tighten and safety with cotter pins.
(h)Install shim washer (64) and input lever (63) on regulator hub.

NOTE : A double spline in regulator hub and a double groove on input lever provide foolproof mating of input lever with respect to regulator.

(j)Place regulator in correct installation attitude and install rigging pin 98A27901002000 in input lever (63).
(k)Install washer (62).
(l)Install nut (61), tighten and safety with cotter pin.

D. Installation (Ref. Fig. 403)

(1)Position tension regulator assembly and secure using bolts (7), shim washers (12) and bolt (13).
(2)At aft attachment point of tension regulator, install washers (6), nuts (5). Tighen nuts and safety with cotter pins (Ref. Detail B).
(3)At forward attachment point of tension regulator, install washer (11) on bolt (13), install nut (10), tighten nut and safety with cotter pin (Ref. Detail D).
(4)Insert end fitting of each cable in respective slot on cable quadrants.
(5)Position upper cable guard (2) and attach using bolt (4), the two spacers (3) and (1). Tighten bolt (4) and wirelock. (Ref. Detail A).
(6)Attach upper cable quard (2), and spacer (8) with bolt (9). Tighten and wirelock bolt (9). (Ref. Detail C).
(7)Attach upper cable guard (2) and spacer (16) ; and lower cable guard (17) and spacer (18), with washer (15), bolt (19) and nut (14). Tighten nut and safety with cotter pin (Ref. Detail E).
(8)Attach lower cable guard (17) and spacers (22) fitted with protective cover with washers (21), bolts (23) and nuts (20). Tighten nuts and safety with cotter pins (Ref. Detail F).
(9)Install brace rod (31) on tension regulator using bolt (30). Install washer (29) on bolt (30). Install nut (28), tighten nut and safety with cotter pin.
(10)Install input rod (24) on regulator input lever using bolt (27). Install



Tension Regulator
Figure 404

washer (26). Install nut (25), tighten and safety with cotter pin.

(11)Progressively tighten cables to enable removal of locking tool
R FE101901.

E. Adjustment

Adjust cable tension (Ref. 27-20-00, P. Block 501).

F. Tests

(1)Remove all rigging pins and carry out functional test (Ref. 27-21-00, P. Block 501).

(2)Install rigging pin 98A27901006000 in yaw/brake bellcrank on Captain's mechanism mounting beam.

(3)Make certain that rigging pins can be installed in regulator input lever and cable quadrant.

(4)Check that cable tension, as read on tension regulator compensation scale, has not changed.

(5)Re-adjust cable tension as required (Ref. 27-20-00, P. Block 501).

G. Close-Up

(1)Remove all rigging pins

(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3)Remove all warning notices.

(4)Close access doors.

(5)Remove access platforms.

BELLCRANKS RIB1 THRU RIB10 - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT TRAVEL RANGES OF CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITIONS OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

A. Removal and Installation of the following:
(1)Pushrods
(2)Bellcranks
(3)Shaft Assemblies RIB8 thru RIB10

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platforms, 5.5 m, 12 m (18 ft., 39 ft.)
B. 98A27207601000	Pin - Rigging, Variable Stop Unit, Rudder Mechanical Controls
C. 98A27307547000	Rigging Pin - Bellcrank Assembly, Rudder Servo Controls
D. 98A27901006000	Pin - Rigging, Rudder Control (Qty. 2)
E.	Warning Notices
F.	Circuit Breaker Safety Clips
G.	Torque Wrench, up to 2.0 m.daN (177.0 lbf.in.)
H.	Torque Wrench, up to 14.7 m.daN (108.4 lbf.ft.)
J.	Cotter Pins
K.	Corrosion-Resistant Steel Lockwire, 0.8 mm (0.032 in.) dia.
L. Material No. 04-004	Common Greases (Ref. 20-31-00)
M. Material No. 05-002	Special Materials (Ref. 20-31-00)
N. Material No. 05-027	Special Materials (Ref. 20-31-00)
P. Material No. 05-048	Special Materials (Ref. 20-31-00)
Q. Material No. 07-001	Lacquers (Ref. 20-31-00)
R. Material No. 08-006	Bonding and Adhesive Compounds (Ref. 20-31-00)
S. Material No. 09-013	Sealants (Ref. 20-31-00)

R Referenced Procedures

R - 24-41-00, P. Block 301	AC External Power Control
R - 27-21-00, P. Block 501	Mechanical Control (Rudder)
R - 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/
R	Depressurization
R - 51-75-10, P. Block 801	Repair of Paint Coatings
R - 55-33-13, P. Block 401	Trailing Edge Access Panels

R 3. Procedure

A. Job Set-Up (Ref. Fig. 401)

(1)Position access platforms and open access door 312AR.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(4)Set rudder trim to zero.
(5)Move rudder pedals to neutral.
(6)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(7)Open, safety and tag the following circuit breakers:

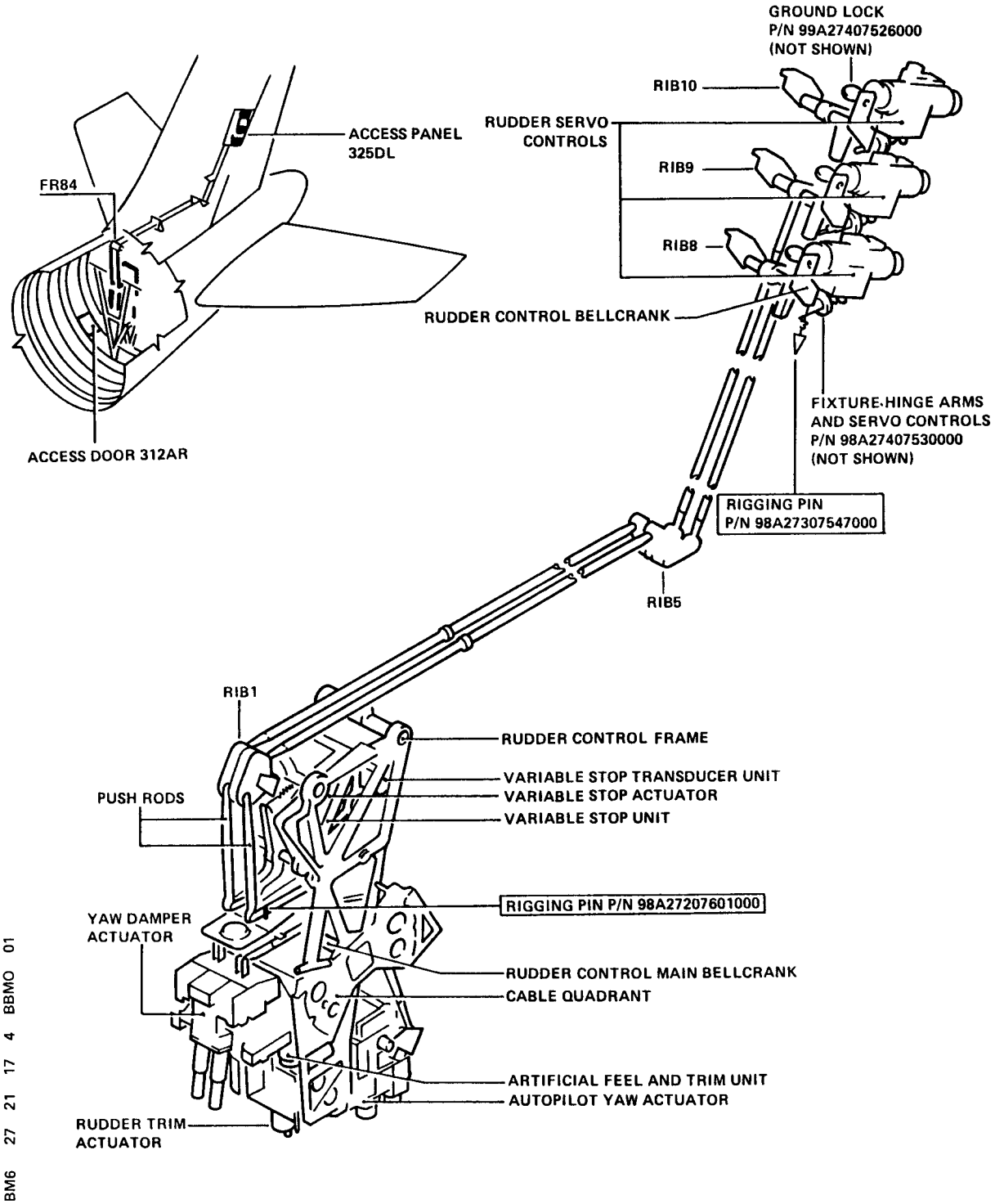
PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM SLOW	1CG	201/J27
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(8)Display warning notices in flight compartment prohibiting operation of flight controls.
(9)Install rigging pins P/N 98A27901006000 (Qty. 2) in rudder control bellcranks on control mechanism mounting beam in avionics compartment.
(10)Install rigging pin P/N 98A27207601000 in variable stop unit.
(11)Open access panel 325DL (Ref. 55-33-13, P. Block 401).
(12)Install rigging pin P/N 98A27307547000 in rudder control bellcrank at RIB8.
(13)Open relevant access door/panel for component to be removed (Ref. Fig. 402).

DESIGNATION	RIB	ACCESS DOOR/PANEL
PUSHRODS	1-5	311AZ/311BZ/325AL
PUSHRODS	5-8	325AL/325CL/325DL
PUSHRODS	8-10	325DL
BELLCRANK	1	311AZ
PUSHROD-CONNECTOR	4	311BZ
BELLCRANK	5	325AL
DRIVE SHAFT ASSEMBLY	8/9/10	325DL

B. Removal

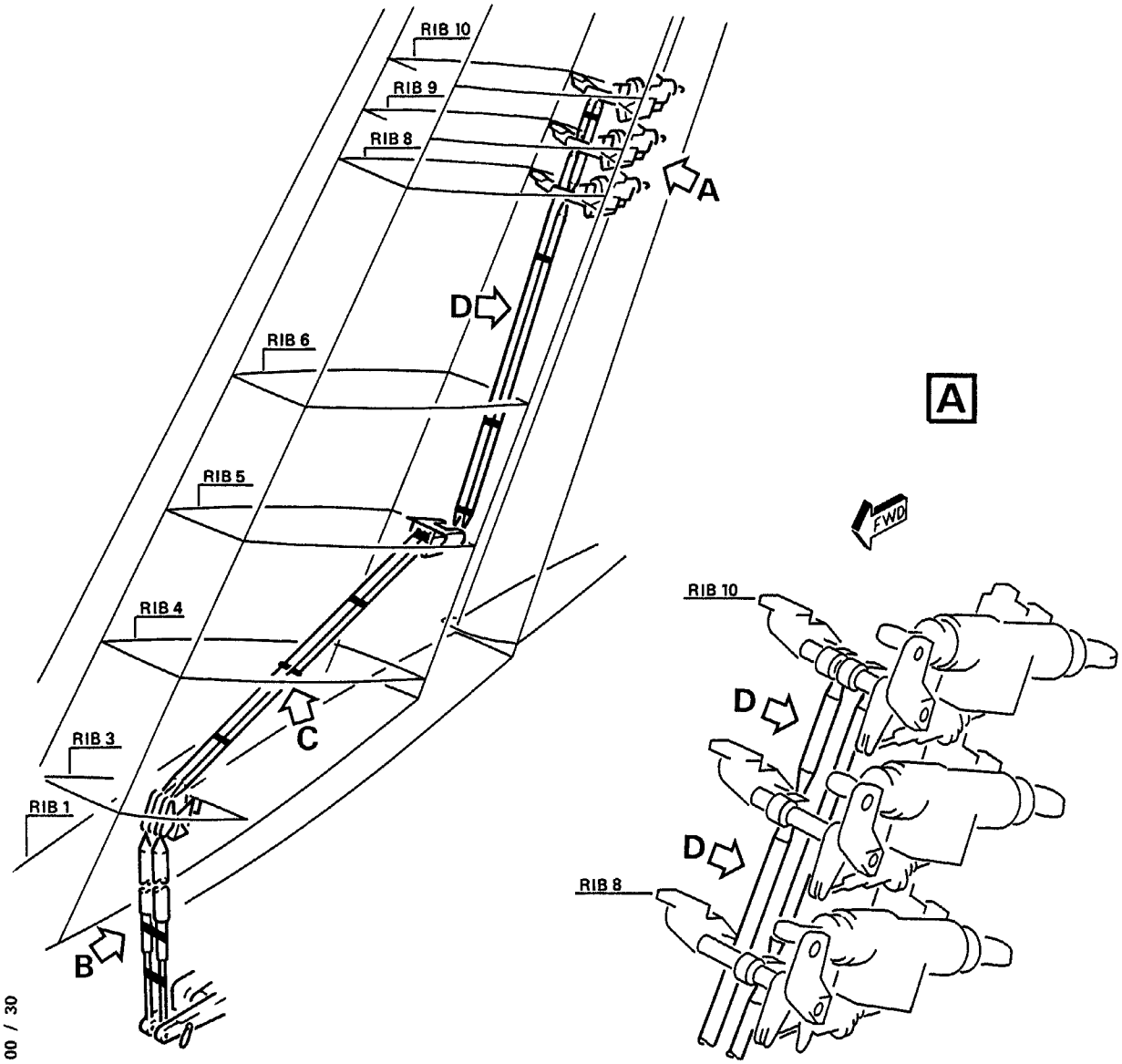
NOTE : The parts in each paragraph ((1) to (14)) can be removed independently without the need to remove parts from another paragraph first. Therefore it can appear that certain parts are



Rigging Points, Rudder Controls
Figure 401

removed twice in different paragraphs.

(1)Remove pushrods (1) as follows:
(Ref. Fig. 402)
R (Ref. Fig. 403)
R (a)Disassemble pushrod pair.
R 1 Record position of the clamp halves (7).
R NOTE : This information is required for subsequent installation.
R 2 Remove cotter pins (6), nuts (5), washers (4) and bolts (8, 9).
R 3 Remove clamp halves (7) and spacers (10, 11).
R CAUTION : BE CAREFUL WHEN YOU REPLACE ONE OR BOTH OF THE PUSHRODS.
R DO NOT DISTURB THE ADJUSTED LENGTH OF THE PUSHROD.
R DO NOT REMOVE THE TWO PUSHRODS AT THE SAME TIME.
R ADJUST THE REPLACEMENT PUSHROD TO ITS INITIAL LENGTH AND INSTALL
R IT BEFORE YOU REMOVE THE OTHER PUSHROD.
R THIS MAKES SURE THAT YOU KEEP THE INITIAL ADJUSTMENT OF THE
R PUSHROD SYSTEM.
R (b)Remove cotter pins (6), nuts (5), washers (4) and bolts (2).
R (c)Remove pushrods (1) and bushes (3).
R (d)Measure and record dimension between eye-end centers of pushrods (1)
R (Ref. Fig. 403).
R NOTE : This information is required for subsequent installation.
R (2)Remove pushrods (12, 13, 14, 15) (Ref. Fig. 402) as follows:
R (a)Disassemble pushrod pair.
R 1 Record position of the clamp halves (17).
R NOTE : This information is required for subsequent installation.
R 2 Remove cotter pins (6), nuts (5), washers (4) and bolts (18).
R 3 Remove clamp halves (17) and spacers (19).
R CAUTION : BE CAREFUL WHEN YOU REPLACE ONE OR BOTH OF THE PUSHRODS.
R DO NOT DISTURB THE ADJUSTED LENGTH OF THE PUSHROD.
R DO NOT REMOVE THE TWO PUSHRODS AT THE SAME TIME.
R ADJUST THE REPLACEMENT PUSHROD TO ITS INITIAL LENGTH AND INSTALL
R IT BEFORE YOU REMOVE THE OTHER PUSHROD.
R THIS MAKES SURE THAT YOU KEEP THE INITIAL ADJUSTMENT OF THE
R PUSHROD SYSTEM.
R (b)Remove cotter pins (6), nuts (5), washers (4) and bolts (2).
R (c)Remove pushrods (12, 13, 14, 15) and bushes (3).
R (d)Measure and record dimension between eye-end centers of
R pushrods (12, 14) and (13, 15) (Ref. Fig. 403).
R NOTE : This information is required for subsequent installation.
R (e)Disassemble pushrods (12, 14), (13, 15) as follows:
R 1 Release tabwashers (24) and locking device (26).
R 2 Remove pushrods (12, 13, 14, 15) from connectors (25).
R 3 Remove tabwashers (24) and locking device (26).
R (3)Not applicable.
R (4)Remove pushrods (20, 21) (Ref. Fig. 402) as follows:
R (a)Disassemble pushrod pair.
R 1 Record position of the clamp halves (17).
R NOTE : This information is required for subsequent installation.
R 2 Remove cotter pins (6), nuts (5), washers (4) and bolts (18).
R 3 Remove clamp halves (17) and spacers (19).
R CAUTION : BE CAREFUL WHEN YOU REPLACE ONE OR BOTH OF THE PUSHRODS.



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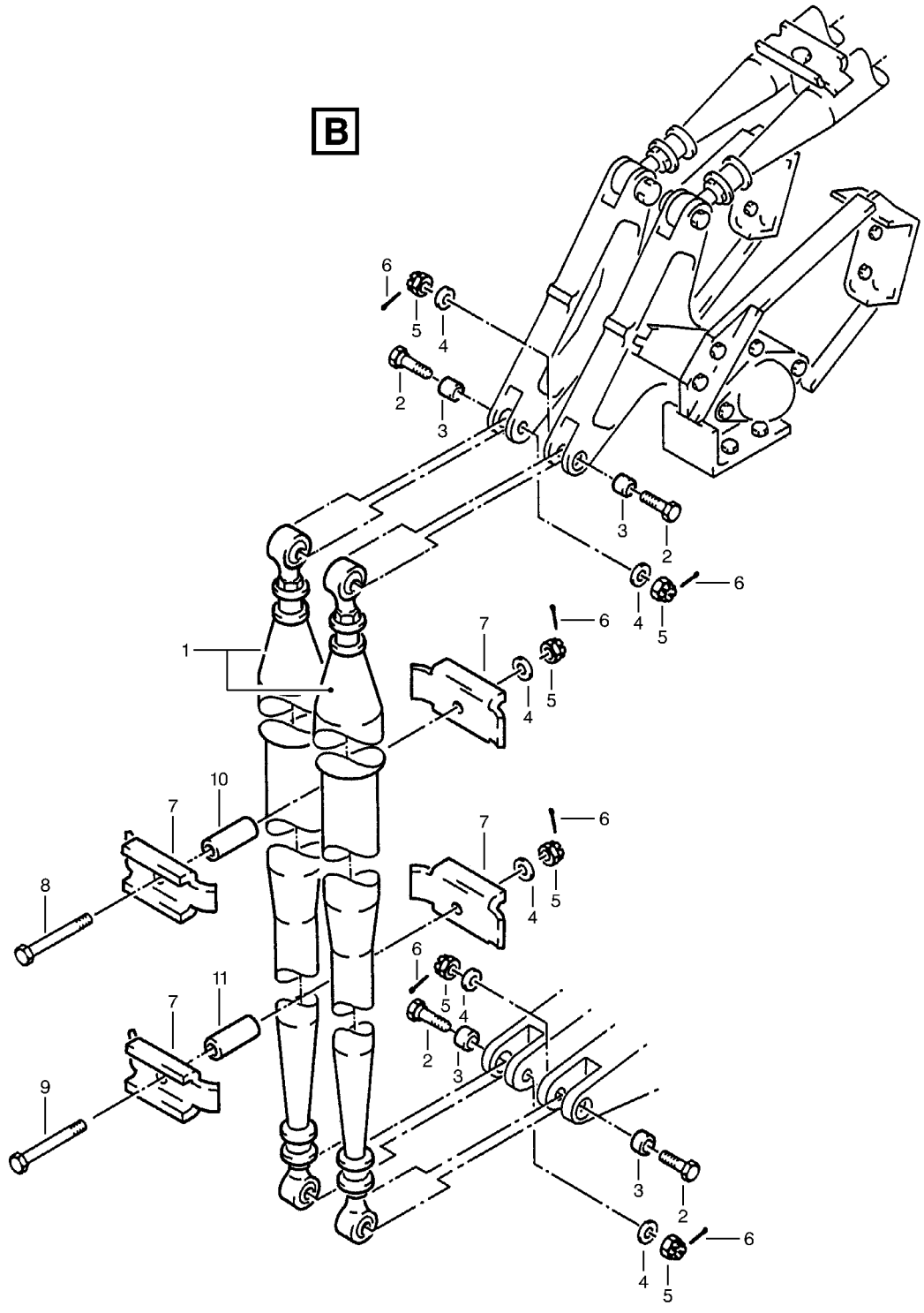
Pushrods (Sheet 1/4)
Figure 402



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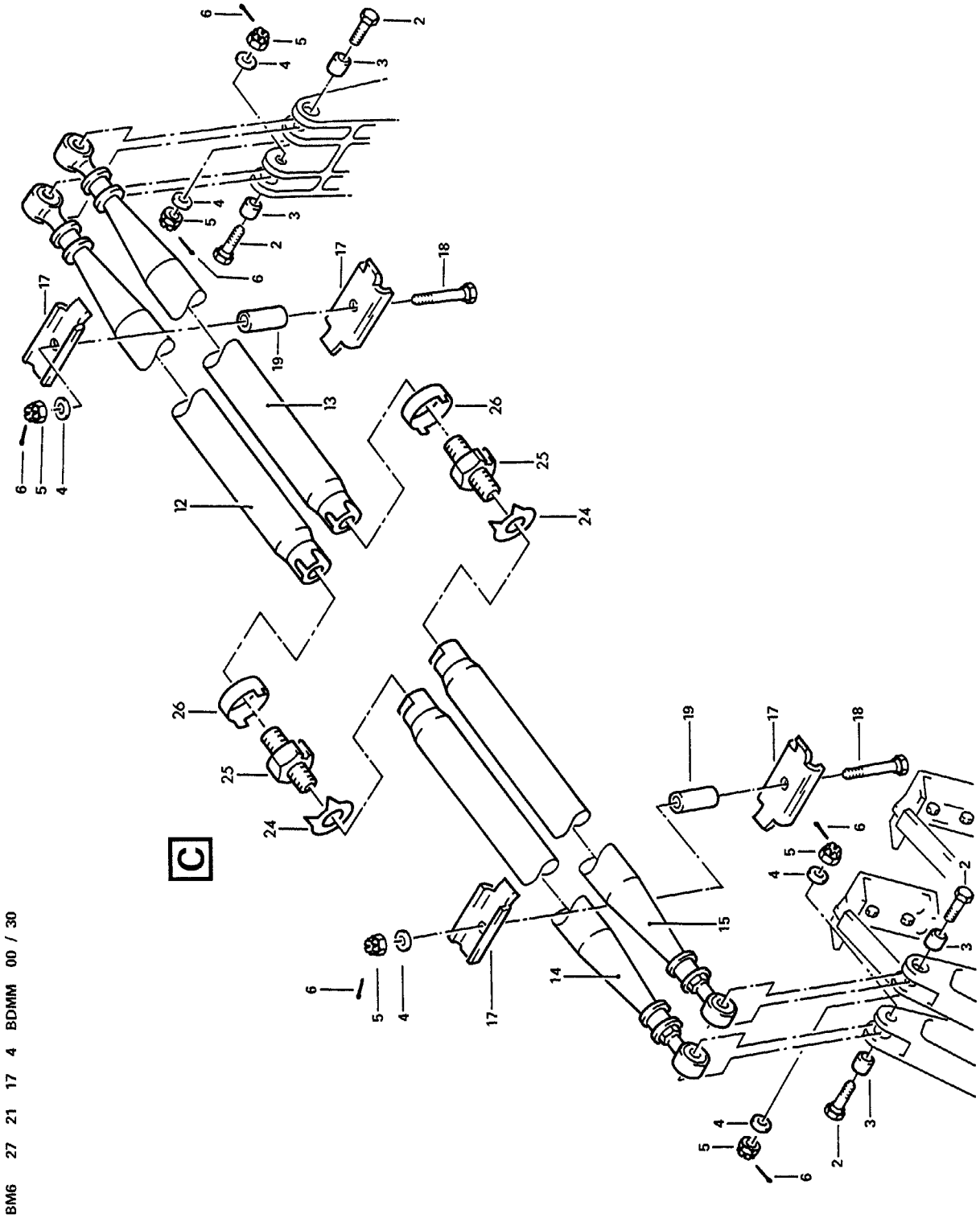
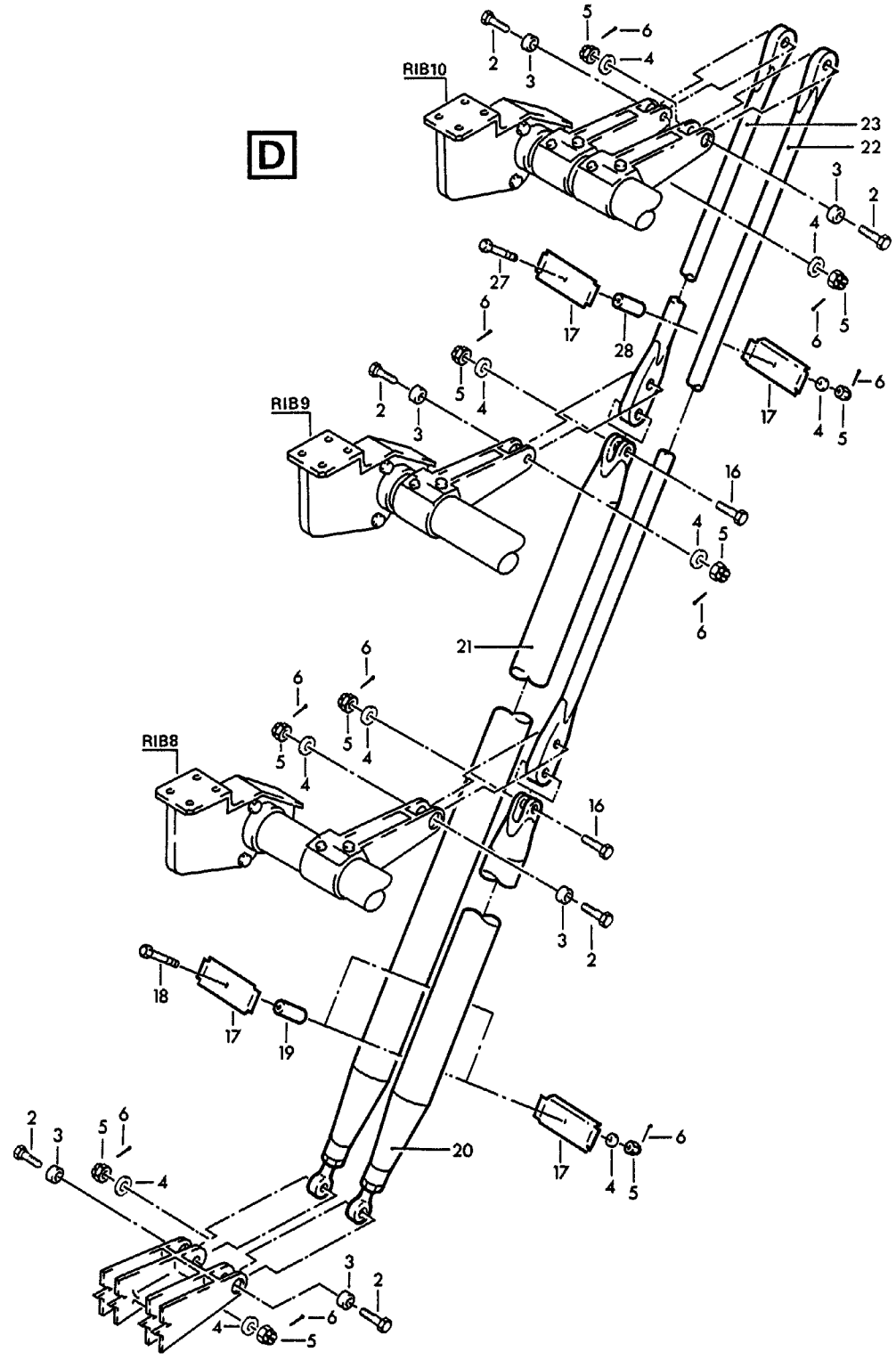
Pushrods (Sheet 2/4)
Figure 402

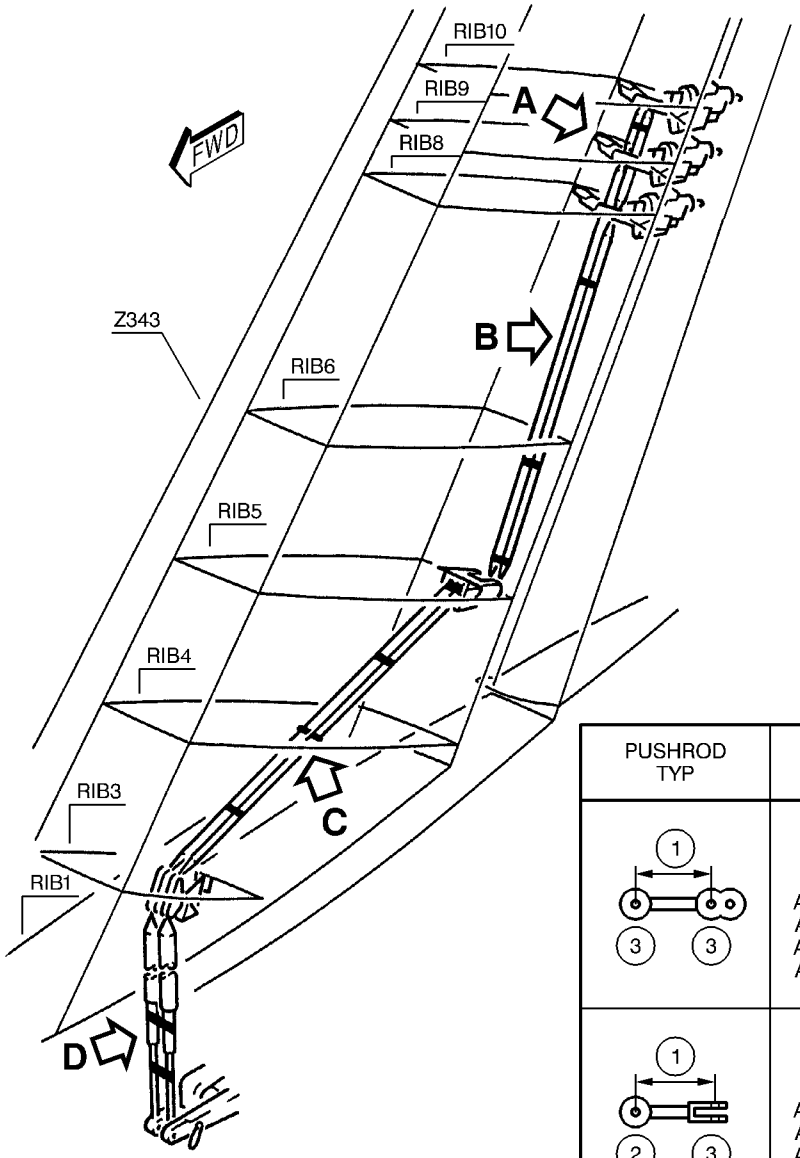
R

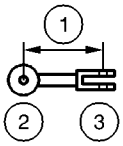
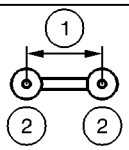
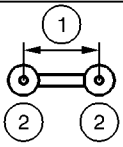


Pushrods (Sheet 3/4)
Figure 402



Pushrods (Sheet 4/4)
Figure 402



PUSHROD TYP	PART-NO.	SUPPLIER SARMA NO.	SUPPLIER TAC NO.
	A A272-70226-066-00 A272-71405-006-00 A272-70226-072-00 A272-71405-008-00	 45306 45306D 45304 45304D	 R22293-006 R22293-008
	**B** A272-70226-064-00 A272-71405-002-00 A272-70226-068-00 A272-71405-004-00	 45310 45310D 45311 45311E	 R22293-002 R22293-004
	**C** A272-70226-070-00 A272-71405-000-00	 45309 45309C	 R22293-000
	**D** A272-71222-000-00		

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NOTE:

(1) DIMENSION TO BE RECORDED
(2) ADJUSTABLE
(3) FIXED

Pushrods Identification
Figure 403

R

R DO NOT DISTURB THE ADJUSTED LENGTH OF THE PUSHROD.
R DO NOT REMOVE THE TWO PUSHRODS AT THE SAME TIME.
R ADJUST THE REPLACEMENT PUSHROD TO ITS INITIAL LENGTH AND INSTALL
R IT BEFORE YOU REMOVE THE OTHER PUSHROD.
R THIS MAKES SURE THAT YOU KEEP THE INITIAL ADJUSTMENT OF THE
R PUSHROD SYSTEM.
R (b)Remove cotter pins (6), nuts (5), washers (4) and bolts (2, 16).
R (c)Remove pushrods (20, 21) and bushes (3).
R (d)Measure and record dimension between eye-end centers of pushrods
R (20, 21) (Ref. Fig. 403).
R NOTE : This information is required for subsequent installation.
R (5)Not applicable.
R (6)Remove pushrods (22, 23) (Ref. Fig. 402) as follows:
R (a)Disassemble pushrod pair.
R 1 Record position of the clamp halves (17).
R NOTE : This information is required for subsequent installation.
R 2 Remove cotter pin (6), nut (5), washer (4) and bolt (27).
R 3 Remove clamp halves (17) and spacer (28).
R CAUTION : BE CAREFUL WHEN YOU REPLACE ONE OR BOTH OF THE PUSHRODS.
R DO NOT DISTURB THE ADJUSTED LENGTH OF THE PUSHROD.
R DO NOT REMOVE THE TWO PUSHRODS AT THE SAME TIME.
R ADJUST THE REPLACEMENT PUSHROD TO ITS INITIAL LENGTH AND INSTALL
R IT BEFORE YOU REMOVE THE OTHER PUSHROD.
R THIS MAKES SURE THAT YOU KEEP THE INITIAL ADJUSTMENT OF THE
R PUSHROD SYSTEM.
R (b)Disconnect pushrods (22, 23) from pushrods (20, 21) as follows:
R 1 Remove cotter pins (6), nuts (5), washers (4) and bolts (16).
R (c)Remove cotter pins (6), nuts (5), washers (4) and bolts (2).
R (d)Remove pushrods (22, 23) and bushes (3).
R (e)Measure and record dimension between eye-end centers of pushrods
R (22, 23) (Ref. Fig. 403).
R NOTE : This information is required for subsequent installation.
R (7)Not applicable.
(8)Remove bellcrank assembly RIB1 (Ref. Fig. 404) as follows:
(a)Disconnect lower pushrods (Ref. Para. (1)).
(b)Disconnect upper pushrods (Ref. Para. (2)).
(c)Remove bonding straps (29) as follows:
1 Remove nuts (16) and bolts (22, 25).
(d)Remove bellcrank assembly as follows:
1 Remove nuts (12, 23) and bolts (11, 18).
2 Remove bellcrank assembly, bonding plates (24), plates (21)
and shims (20).
NOTE : Mark position and thickness of shims (20).
(e)Remove bellcrank (1) as follows:
1 Remove nuts (16) and bearing caps (4).
2 Remove cotter pin (5), nut (15), washers (14), bolt (27) and
bellcrank (1).
(f)Disassemble brackets (2, 3) as follows:
1 Remove cotter pins (5), nuts (6), washers (7), and bolts (19).
2 Pull bearing assembly from brackets (2, 3) and remove bolts (17).
3 Pull bearing flanges (8, 13) from retainers (10) and remove

shims (9).
NOTE : Mark position and thickness of shims (9).
4 Remove bolts (28), nuts (16) and indicator plate (26) from bracket (3).

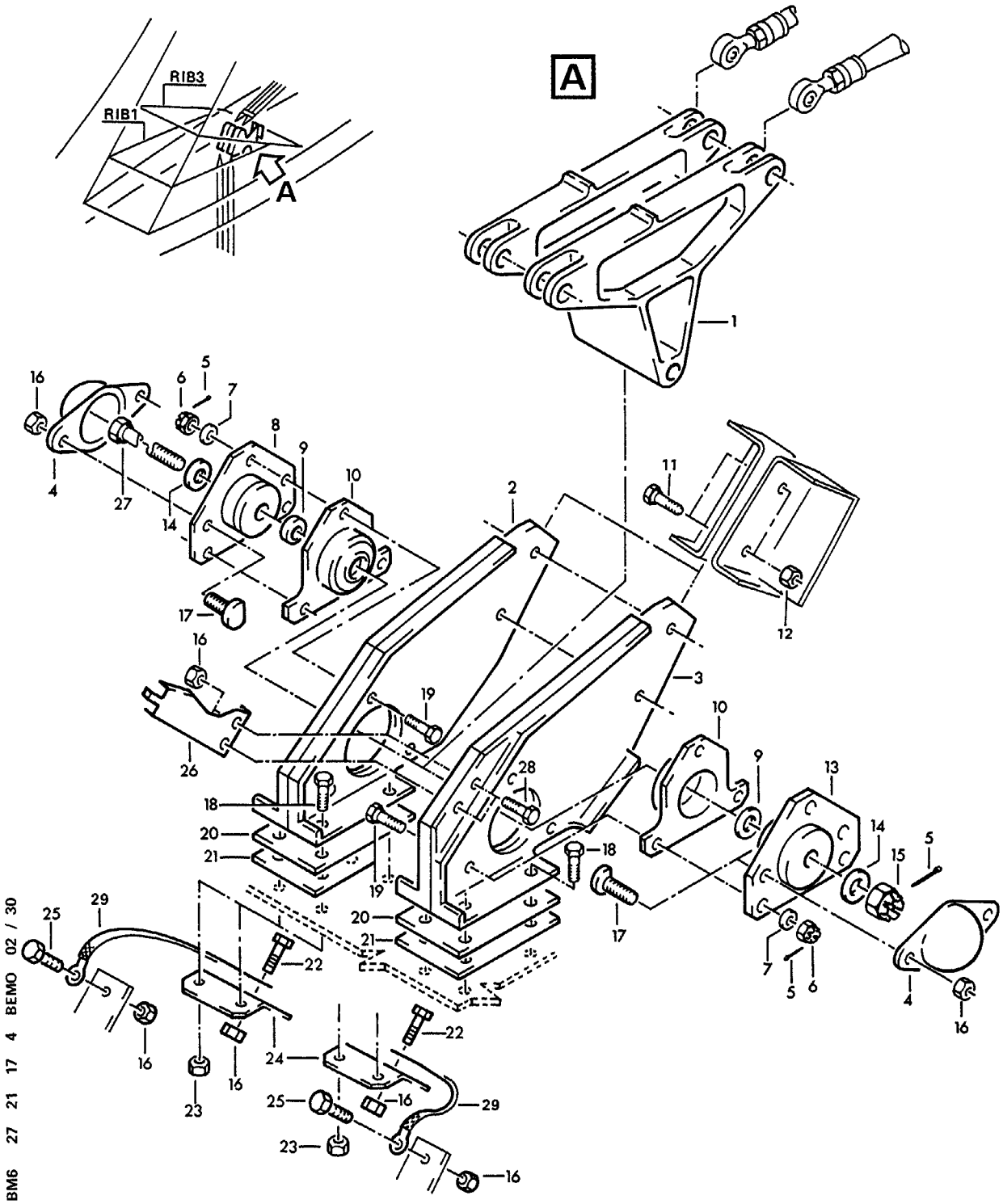
(9)Not applicable.

(10)Remove bellcrank assembly RIB5 (Ref. Fig. 405) as follows:
(a)Disconnect lower pushrods (Ref. para. (2)).
(b)Disconnect upper pushrods (Ref. para. (4)).
(c)Disconnect bonding strap (21) as follows:
1 Remove nut (22) and bolts (20).
(d)Remove bracket assembly (1) as follows:
1 Remove nuts (27) and bolts (23, 24, 25, 26).
2 Remove bracket asssembly (1) and shims (28, 29, 30).
NOTE : Mark position and thickness of shims (28, 29, 30).
(e)Remove lever (2) as follows:
1 Remove nuts (3) and bearing caps (13).
2 Remove cotter pin (12), nut (11), washers (5), bolt (4) and lever (2).
(f)Remove bearing assemblies as follows:
1 Remove cotter pins (12), nuts (14), washers (15), and bolts (10).
2 Pull bearing assemblies from bracket assembly (1) and remove bolts (7).
3 Pull bearing flanges (6, 16) from retainers (9) and remove shims (8).
NOTE : Mark position and thickness of shims (8).
(g)Remove bolts (18), nuts (3) and indicator plate (17) from bracket assembly (1).

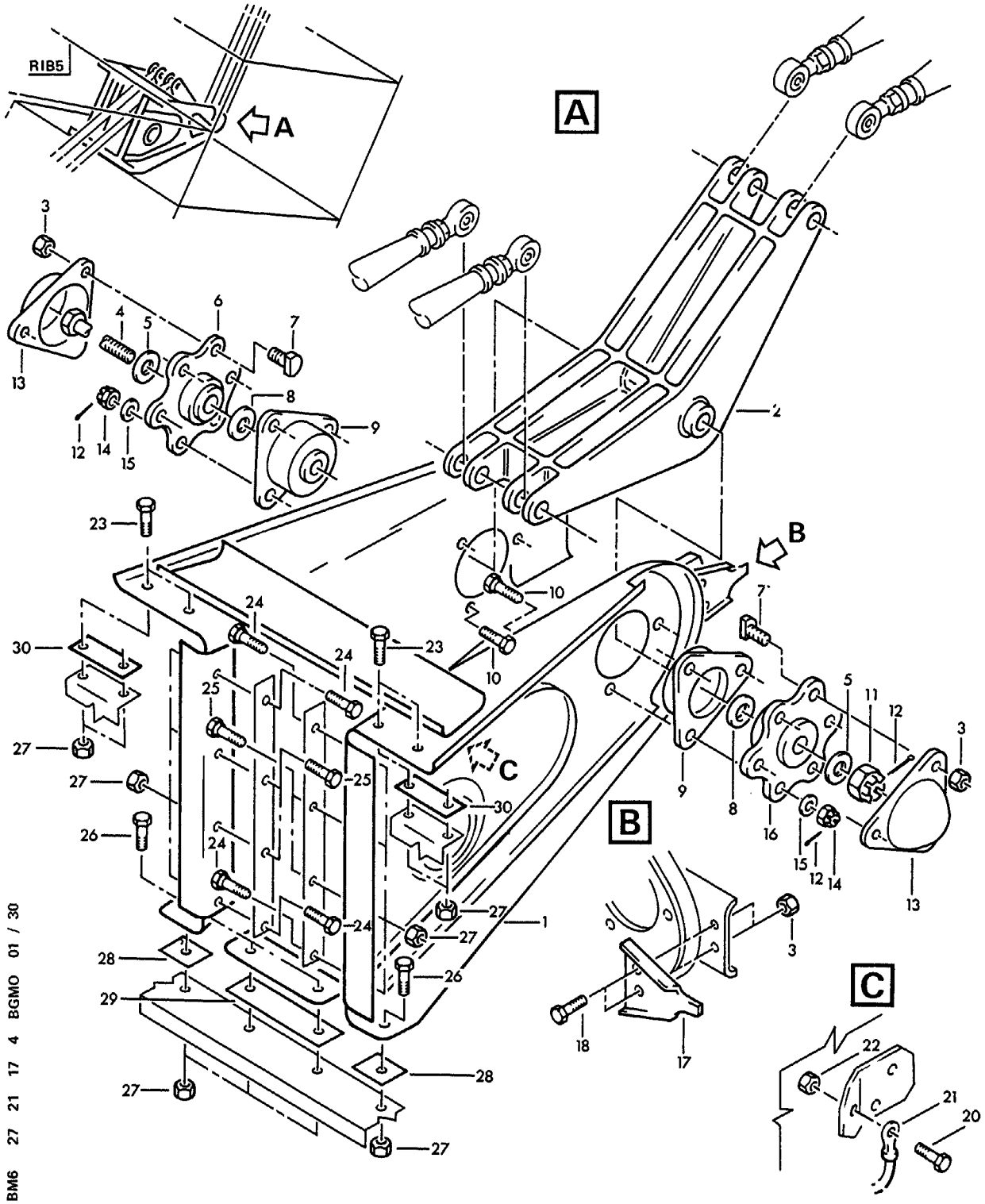
(11)Not applicable.

(12)Remove drive shaft assembly (1) RIB8 as follows:
(Ref. Fig. 406)
(a)Disconnect lower pushrod (Ref. para. (4)).
(b)Disconnect upper pushrod (Ref. para. (6)).
(c)Remove rigging pin P/N 98A27307547000.
(d)Disconnect spring rod (11) as follows:
1 Remove cotter pin (5), nut (17), washer (16), bolt (14) and bush (15).
(e)Remove cotter pin (5), nuts (6) and washers (7) from drive shaft assembly (1).
(f)Remove bracket assembly (3) as follows:
1 Remove cotter pins (5), nuts (6), washers (7), and bolts (21).
2 Pull bracket assembly (3) from drive shaft assembly (1).
(g)Disassemble bracket assembly (3) as follows:
1 Remove cotter pins (5), nuts (6), washers (7) and bolts (19).
2 Pull flange assembly (3) from drive shaft assembly (1).
(h)Remove drive shaft assembly (1), shim (18) and bushes (12).
(j)Remove support plate (2) as follows:
1 Remove cotter pins (5), nuts (6), washers (7), and bolts (4).
(k)Disassemble support plate (2) as follows:
1 Remove cotter pins (5), nuts (6), washers (7), and bolts (9).
2 Remove flange assembly (8) and connecting lever (13) from support plate (2).
3 Pull bearing (10) from flange assembly (8).

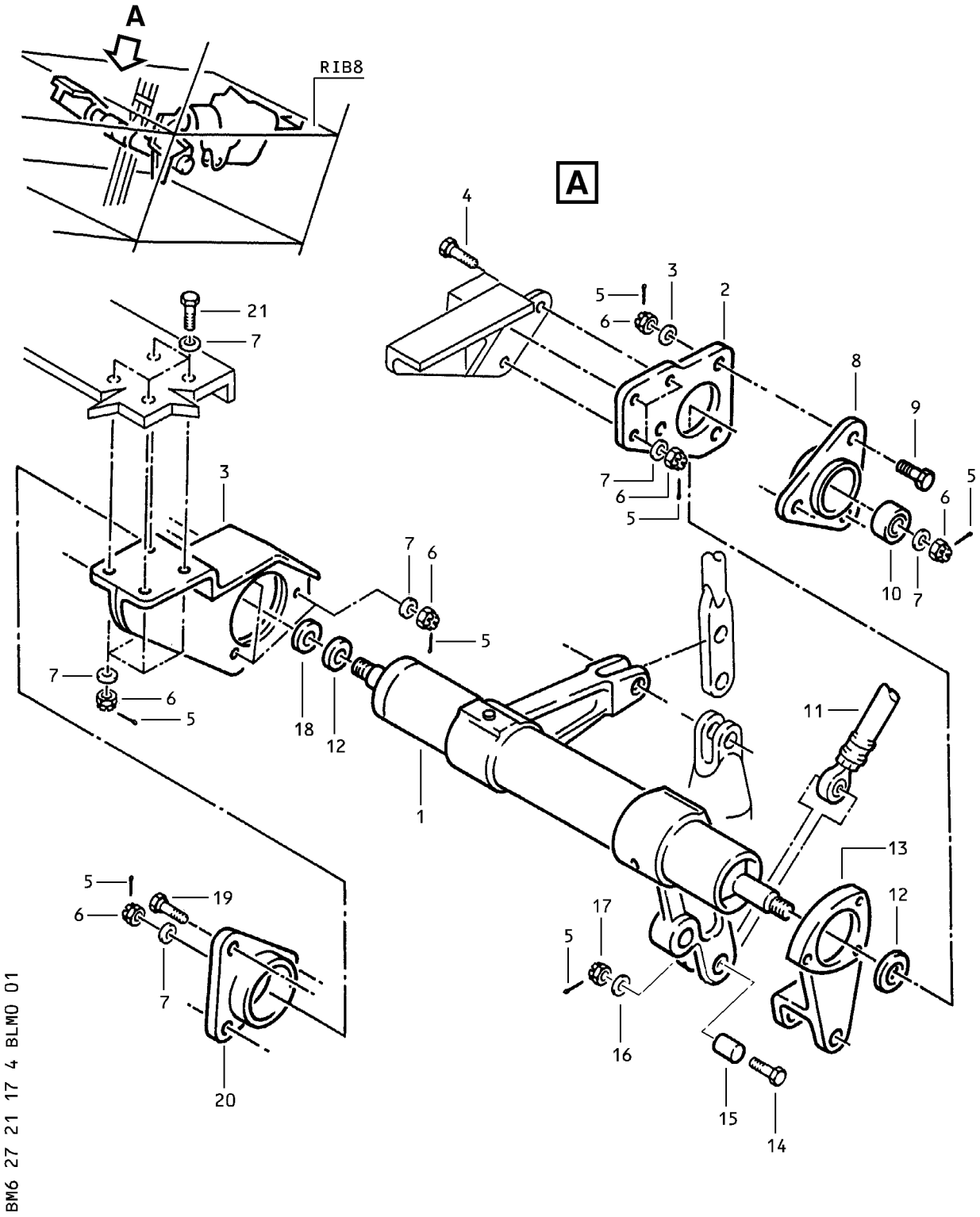
(13)Remove drive shaft assembly (1) RIB9 as follows:



Bellcrank Assembly RIB1
Figure 404



Bellcrank Assembly RIB5
Figure 405



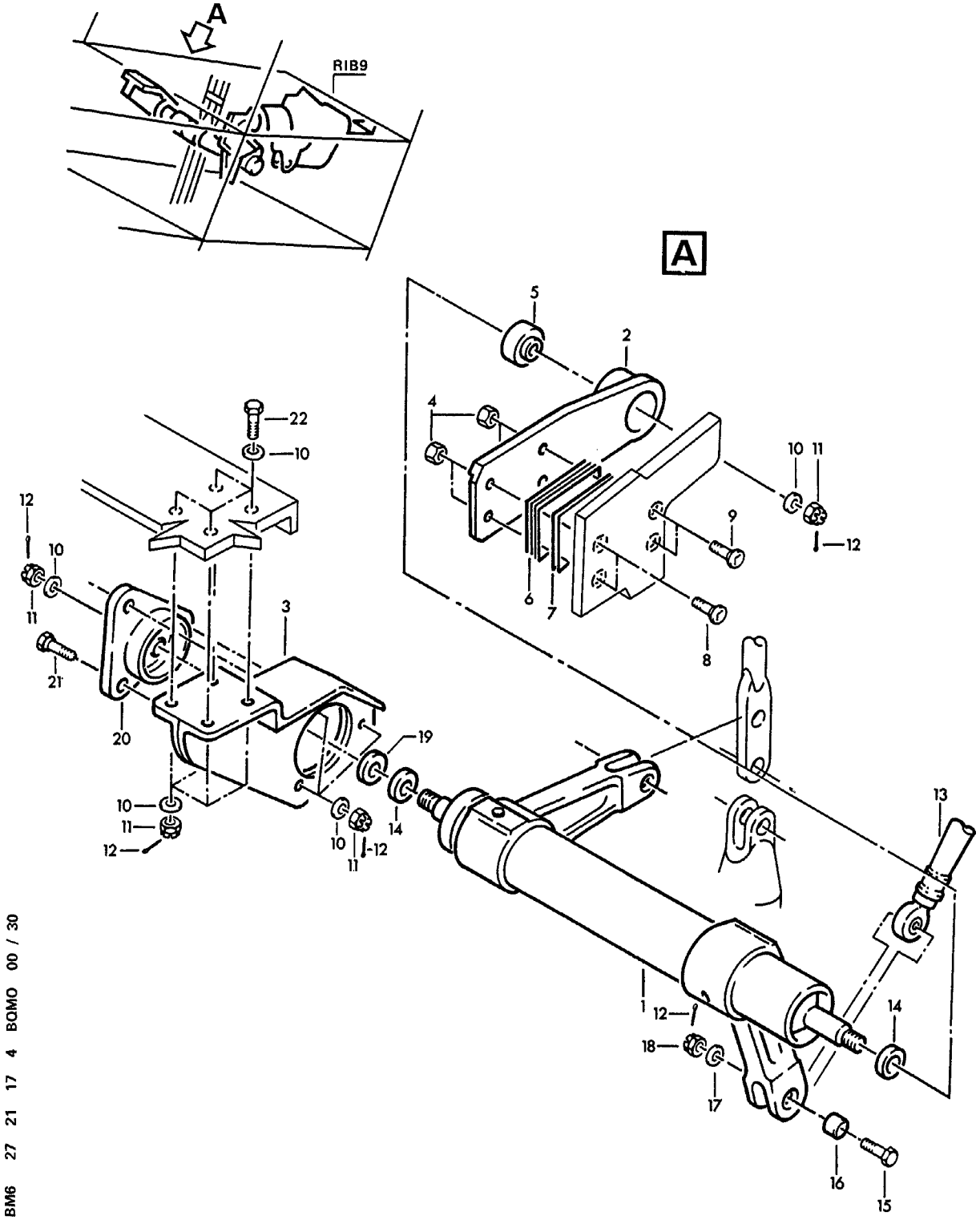
Drive Shaft Assembly RIB8
Figure 406

(Ref. Fig. 407)
(a)Disconnect lower pushrod (Ref. para. (4)).
(b)Disconnect upper pushrod (Ref. para. (6)).
(c)Disconnect spring rod (13) as follows:
1 Remove cotter pin (12), nut (18), washer (17), bolt (15) and bush (16).
(d)Remove cotter pins (12), nuts (11), washers (10) from drive shaft assembly (1).
(e)Remove support assembly (3) as follows:
1 Remove cotter pins (11), nuts (10), washers (9), and bolts (22).
2 Pull support assembly (3) from drive shaft assembly (1).
(f)Disassemble support assembly (3) as follows:
1 Remove cotter pins (12), nuts (11), washers (10), and bolts (21).
2 Pull flange assembly (20) from support assembly (3).
(g)Remove drive shaft assembly (1), shims (19) and bushes (14).
(h)Remove support (2) as follows:
1 Remove nuts (4), screws (8, 9) and plates (6, 7).
(j)Disassemble support (2) as follows:
1 Pull bearing (5) from bracket (2).

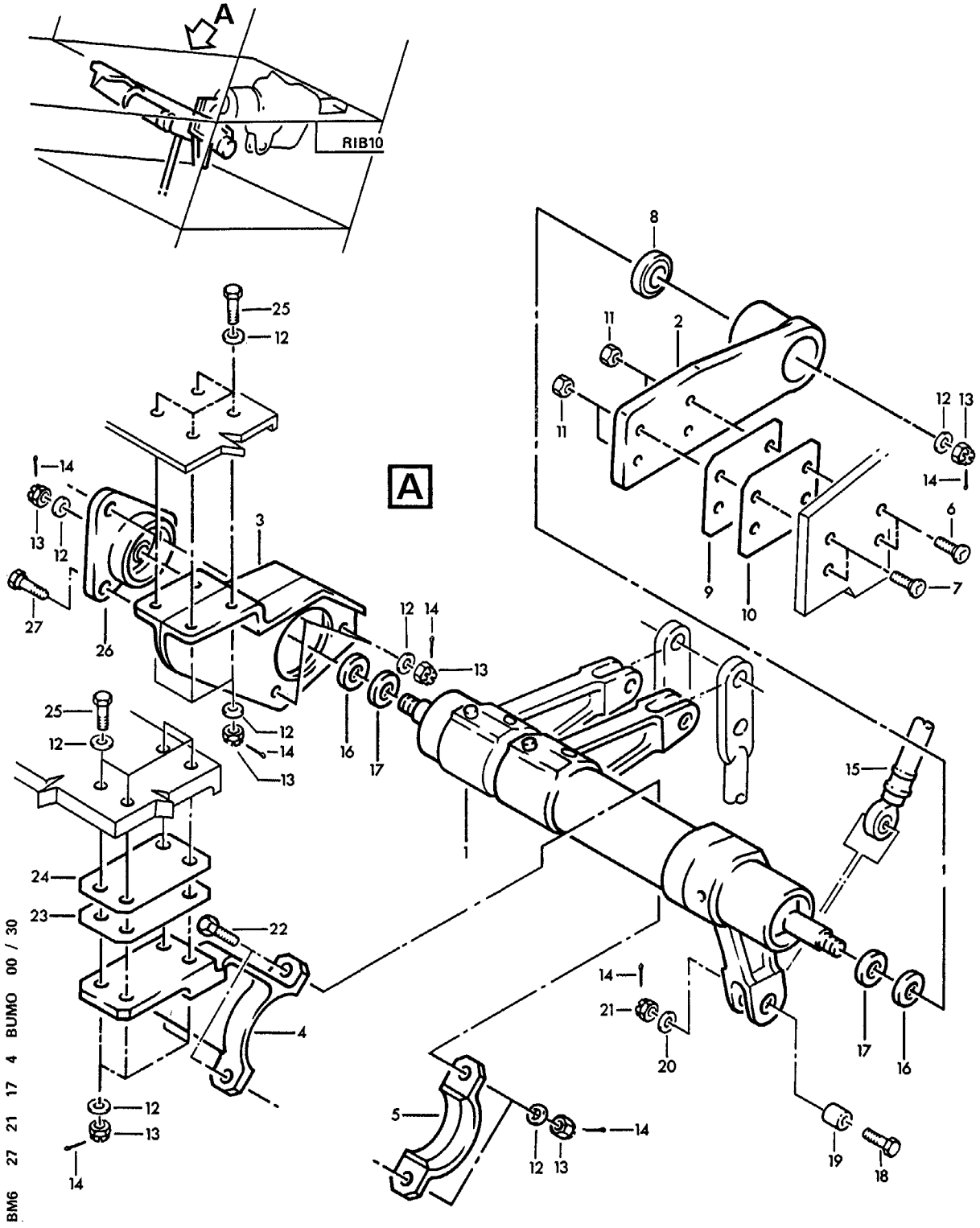
(14)Remove drive shaft assembly (1) RIB10 as follows:
(Ref. Fig. 408)
(a)Disconnect lower pushrods (Ref. para. (6)).
(b)Disconnect spring rod (15) as follows:
1 Remove cotter pin (14), nut (21), washer (20), bolt (18) and bush (19).
(c)Remove bracket (4) as follows:
1 Remove cotter pins (14), nuts (13), washers (12), bolts (22) and retainer (5).
2 Remove cotter pins (14), nuts (13), washers (12), bolts (25) and plates (23, 24).
(d)Remove cotter pins (14), nuts (13), washers (12) from drive shaft assembly (1).
(e)Remove support assembly (3) as follows:
1 Remove cotter pins (14), nuts (13), washers (12), and bolts (25).
2 Pull support assembly (3) from drive shaft assembly (1).
(f)Disassemble support assembly (3) as follows:
1 Remove cotter pins (14), nuts (13), washers (12), and bolts (27).
2 Pull flange assembly (26) from support assembly (3).
(g)Remove drive shaft assembly (1), shims (16) and bushes (17).
(h)Remove bracket (2) as follows:
1 Remove nuts (11), screws (6, 7) and plates (9, 10).
(j)Disassemble bracket (2) as follows:
1 Pull bearing (8) from bracket (2).

C. Installation

CAUTION : DURING INSTALLATION ALL RIGGING PINS MUST REMAIN IN PLACE OR MUST BE REINSTALLED AS SOON AS PRACTICABLE. IF PROBLEMS OCCUR, WHEN INSTALLING BOLTS OR INSERTING RIGGING PINS, REFER TO ADJUSTMENT OF LINKAGE IN AFT SECTION (27-21-00, P. Block 501) AND CARRY OUT APPROPRIATE STEPS UNTIL BOLT OR RIGGING PIN CAN BE INSERTED EASILY.



Drive Shaft Assembly RIB9
Figure 407



Drive Shaft Assembly RIB10
Figure 408

NOTE : The parts in each paragraph ((1) to (14)) can be installed independently without the need to install parts from another paragraph first. Therefore it can appear that certain parts are installed twice in different paragraphs.

(1)Install drive shaft assembly (1) RIB10 (Ref. Fig. 408) as follows:

(a)Assemble bracket (2) as follows:

1 Apply grease (Mat. No. 04-004) to mating surfaces of bearing (8) and bracket (2).

2 Install bearing (8) in bracket (2).

(b)Install bracket (2) as follows:

1 Apply a thin film of sealant (Mat. No. 09-013) to mating surface of bracket (2).

2 Apply grease (Mat. No. 04-004) to screws (6, 7) and nuts (11).

3 Position bracket (2) and plates (9, 10) on structure.

4 Install screws (6, 7) and nuts (11).

5 TORQUE nuts (11) to between 0.93 and 1.03 m.daN (82.3 and 91.1 lbf.in.).

(c)Assemble support assembly (3) as follows:

1 Apply grease (Mat. No. 04-004) to mating surface of flange assembly (26).

2 Position flange assembly (26) on support assembly (3).

3 Apply grease (Mat. No. 04-004) to bolts (27) and nuts (13).

4 Install bolts (27), washers (12) and nuts (13).

5 TORQUE nuts (13) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pin (14).

(d)Install bushes (17) and shims (16) on drive shaft assembly (1).

(e)Insert drive shaft assembly (1) into bracket (2).

(f)Install support assembly (3) as follows:

1 Apply a thin film of sealant (Mat. No. 09-013) to mating surface of support (3).

2 Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (25) and nuts (13).

3 Slide support (3) onto drive shaft (1) and into position on structure.

4 Install bolts (25), washers (12) and nuts (13).

5 TORQUE nuts (13) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (14).

(g)Apply grease (Mat. No. 04-004) to nuts (13).

(h)Install washers (12) and nuts (13) on drive shaft assembly (1).

(j)TORQUE nuts (13) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (14).

(k)Install bracket (4) as follows:

1 Apply a thin film of sealant (Mat. No. 09-013) to mating surface of bracket (4).

2 Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (25) and nuts (13).

3 Position bracket (4) and plates (23, 24) on structure.

4 Install bolts (25), washers (12) and nuts (13).

5 TORQUE nuts (13) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (14).

6 Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (22),

nuts (13) and mating surface of retainer (5).
7 Position retainer (5) on bracket (4).
8 Install bolts (22), washers (12) and nuts (13).
9 TORQUE nuts (13) to between 0.80 and 0.88 m. daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (14).

(l)Connect spring rod (15) as follows:
1 Apply grease (Mat. No. 04-004) to bolt (18), bush (19) and nut (21).
2 Insert bush (19) in lever.
3 Position spring rod (15) in lever (8) and install bolt (18), washer (20) and nut (21).
4 TORQUE nut (21) to between 0.21 and 0.23 m.daN (18.5 and 20.4 lbf.in.) and safety with cotter pin (14).

(m)Connect lower pushrods (Ref. para. (9)).

(2)Install drive shaft assembly (1) RIB9 (Ref. Fig. 407) as follows:

(a)Assemble support (2) as follows:
1 Apply grease (Mat. No. 04-004) to mating surface of bearing (5) and support (2).
2 Install bearing (5) in support (2).

(b)Install support (2) as follows:
1 Apply a thin film of sealant (Mat. No. 09-013) to mating surface of support (2).
2 Apply grease (Mat. No. 04-004) to screws (8, 9) and nuts (4).
3 Position support (2) and plates (6, 7) on structure.
4 Install screws (8, 9) and nuts (4).
5 TORQUE nuts (4) to between 0.93 and 1.03 m.daN (82.3 and 91.1 lbf.in.).

(c)Assemble support assembly (3) as follows:
1 Apply grease (Mat. No. 04-004) to mating surface of flange assembly (20).
2 Position flange assembly (20) on support assembly (3).
3 Apply grease (Mat. No. 04-004) to bolts (21) and nuts (11).
4 Install bolts (21), washers (10) and nuts (11).
5 TORQUE nuts (11) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (12).

(d)Install bushes (14) and shims (19) on drive shaft assembly (1).

(e)Insert drive shaft assembly (1) into support (2).

(f)Install support assembly (3) as follows:
1 Apply a thin film of sealant (Mat. No. 09-013) to mating surface of support (3).
2 Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (22) and nuts (11).
3 Slide support (3) onto drive shaft (1) and into position on structure.
4 Install bolts (22), washers (10) and nuts (11).
5 TORQUE nuts (11) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (12).

(g)Apply grease (Mat. No. 04-004) to nuts (11).

(h)Install washers (10) and nuts (11) on drive shaft assembly (1).

(j)TORQUE nuts (11) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (12).

(k)Connect spring rod (13) as follows:

1 Apply grease (Mat. No. 04-004) to bolt (15), bush (16) and nut (18).
2 Insert bush (16) in lever.
3 Position spring rod (13) in lever (4) and install bolt (15), washer (17) and nut (18).
4 TORQUE nut (18) to between 0.21 and 0.23 m.daN (18.5 and 20.4 lbf.in.) and safety with cotter pin (12).

(l)Connect upper pushrod (Ref. para. (9)).
(m)Connect lower pushrod (Ref. para. (11)).

(3)Install drive shaft RIB8 (Ref. Fig. 406) as follows:
(a)Assemble support plate (2) as follows:
1 Apply grease (Mat. No. 04-004) to mating surfaces of bearing (10), flange assembly (8) and connecting lever (13).
2 Install bearing (10) in flange assembly (8).
3 Position flange assembly (8) and connecting lever (13) on support plate (2).
4 Apply grease (Mat. No. 04-004) to bolts (9) and nuts (6).
5 Install bolts (9), washers (7) and nuts (6).
6 TORQUE nuts (6) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (5).

(b)Install support plate (2) as follows:
1 Apply a thin film of sealant (Mat. No. 09-013) to mating surface of support (2).
2 Apply grease (Mat. No. 04-004) to bolts (4) and nuts (6).
3 Position support plate (2) on structure.
4 Install bolts (4), washers (7) and nuts (6).
5 TORQUE nuts (6) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (5).

(c)Assemble support assembly (3) as follows:
1 Apply grease (Mat. No. 04-004) to mating surface of flange assembly (20).
2 Position flange assembly (20) on support assembly (3).
3 Apply grease (Mat. No. 04-004) to bolts (19) and nuts (6).
4 Install bolts (19), washers (7) and nuts (6).
5 TORQUE nuts (6) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (5).

(d)Install bushes (12) and shims (18) on drive shaft assembly (1).
(e)Insert drive shaft assembly (1) into support plate (2).
(f)Install support assembly (3) as follows:
1 Apply a thin film of sealant (Mat. No. 09-013) to mating surface of support (3).
2 Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (21) and nuts (6).
3 Slide support (3) onto drive shaft (1) and into position on structure.
4 Install bolts (21), washers (7) and nuts (6).
5 TORQUE nuts (6) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (5).

(g)Apply grease (Mat. No. 04-004) to nuts (6).
(h)Install washers (7) and nuts (6) on drive shaft assembly (1).
(j)TORQUE nuts (6) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (5).

(k)Connect spring rod (11) as follows:
1 Apply grease (Mat. No. 04-004) to bolt (14), bush (15) and nut (17).
2 Insert bush (15) in lever.
3 Position spring rod (11) in lever (5) and install bolt (14), washer (16) and nut (17).
4 TORQUE nut (17) to between 0.21 and 0.23 m.daN (18.5 and 20.4 lbf.in.) and safety with cotter pin (5).

(l)Insert rigging pin P/N 98A27307547000.
NOTE : If a new drive shaft (1), or a new connecting lever (13), is installed, location of rigging pin hole has to be established after final adjustment.

(m)Connect upper pushrod (Ref. para. (9)).
(n)Connect lower pushrod (Ref. para. (11)).

(4)Not applicable.
(5)Install bellcrank assembly RIB5 (Ref. Fig. 405) as follows:
(a)Install indicator plate (17) as follows:
1 Position indicator plate (17) on bracket assembly (1).
2 Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (18) and nuts (3).
3 Install bolts (18) and nuts (3).
4 TORQUE nuts (3) to between 0.46 and 0.50 m.daN (40.4 and 44.8 lbf.in.).

(b)Install bearing assemblies as follows:
1 Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (7, 10) and nuts (3, 4).
2 Position shims (8) on bearing flanges (6, 16).
NOTE : Make sure shims (8) are of the same thickness and are installed in the same position as recorded during removal.
3 Insert bearing flanges (6, 16) in retainers (9).
4 Install bolts (7).
5 Position bearing assemblies on bracket assembly (1).
6 Install bolts (10), washers (15) and nuts (14).
8 TORQUE nuts (14) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (12).

(c)Install lever (2) as follows:
1 Apply corrosion-preventive paste (Mat. No. 05-002) to bolt (4) and nut (11).
2 Position lever (2) in bracket assembly (1).
3 Install bolt (4), washers (5) and nut (11).
4 TORQUE nut (11) to between 1.59 and 1.75 m.daN (140.4 and 155.2 lbf.in.) and safety with cotter pin (12).
5 Position bearing caps (13) on bearing flanges (6, 16).
6 Install nuts (3).
7 TORQUE nuts (3) to between 0.46 and 0.50 m.daN (40.4 and 44.6 lbf.in.).

(d)Install bracket assembly (1) as follows:
1 Apply a thin film of sealant (Mat. No. 09-013) to mating surface of bracket assembly (1).
2 Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (23, 24, 25, 26) and nuts (27).
3 Position support bracket (1) on structure.

4 Install bolts (23, 24, 25, 26), shims (28, 29, 30) and nuts (27).
NOTE : Make sure shims (28, 29, 30) are of the same thickness and are installed in the same position as recorded during removal.
5 TORQUE nuts (27) to between 0.93 and 1.03 m.daN (82.4 and 91.1 lbf.in.).

(e)Connect bonding strap (21) as follows:
1 Install bolt (20) and nut (22) and apply nylon coating (Mat. No. 07-001).

(f)Connect upper pushrods (Ref. para. (11)).

(g)Connect lower pushrods (Ref. para. (13)).

(6)Not applicable.

(7)Install bellcrank assembly RIB1 (Ref. Fig. 404) as follows:

(a)Install indicator plate (26) as follows:
1 Position indicator plate (26) on bracket (3).
2 Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (28) and nuts (16).
3 Install bolts (28) and nuts (16).
4 TORQUE nuts (16) to between 0.46 and 0.50 m.daN (40.4 and 44.6 lbf. in.).

(b)Assemble brackets (2, 3) as follows:
1 Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (17, 19) and nuts (6, 16).
2 Position shims (9) on bearing flanges (8, 13).
NOTE : Make sure shims (9) are of the same thickness and are installed in the same position as recorded during removal.
3 Insert bearing flanges (8, 13) in retainers (10).
4 Install bolts (17).
5 Position bearing assemblies on brackets (2, 3).
6 Install bolts (19), washers (7) and nuts (6).
7 TORQUE nuts (6) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (5).

(c)Install brackets (2, 3) as follows:
1 Apply a thin film of sealant (Mat. No. 09-013) to mating surface of bracket assemblies (2, 3).
2 Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (11, 18) and nuts (12, 23).
3 Position brackets (2, 3) plates (21), shims (20) and bonding plates (24) on structure.
NOTE : Make sure shims (20) are of the same thickness and are installed in the same position as recorded during removal.
4 Install bolts (11, 18) and nuts (12, 23).
5 TORQUE nuts (12, 23) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.).

(d)Install bellcrank (1) as follows:
1 Apply corrosion-preventive paste (Mat. No. 05-002) to bolt (27) and nut (15).
2 Position bellcrank (1) between brackets (2, 3).
3 Install bolt (27), washers (14) and nut (15).
4 TORQUE nut (15) to between 1.59 and 1.75 m.daN (140.4 and 155.2 lbf.in.) and safety with cotter pin (5).

5 Position bearing caps (4) on bearing flanges (8, 13).
6 Install nuts (16).
7 TORQUE nuts (16) to between 0.46 and 0.50 m.daN (40.4 and 44.6 lbf.in.).

(e)Install bonding straps (29) as follows:
1 Position bonding straps (29) between bonding plates (24) and structure.
2 Install bolts (22, 25) and nuts (16) and apply nylon coating (Mat. No. 07-001).

(f)Connect upper pushrods (Ref. para. (13)).
(g)Connect lower pushrods (Ref. para. (14)).

(8)Not applicable.
(9)Install pushrods (22, 23) (Ref. Fig. 402) as follows:
R CAUTION : DO NOT DISTURB PRE-ADJUSTED LENGTH OF PUSHROD.
(a)Position pushrod (23) between drive shaft RIB9 and drive shaft RIB10.
(b)Position pushrod (22) between drive shaft RIB8 and drive shaft RIB10.
(c)Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (2), bushes (3) and nuts (5).
(d)Install bushes (3), bolts (2), washers (4) and nuts (5).
(e)TORQUE nuts (5) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (6).
(f)Position clamp halves (17) on pushrods (22, 23) in the position recorded during removal.
(g)Install spacer (28), bolt (27), washer (4) and nut (5).
NOTE : Nut (5) is normally torqued and safetied after the rigging is accomplished.
(h)TORQUE nut (5) to between 0.40 and 0.44 m.daN (35.3 and 39.0 lbf.in.) and safety with cotter pin (6).
(j)Connect pushrod (20, 21) as follows:
1 Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (16) and nuts (5).
2 Install bolts (16), washers (4) and nuts (5).
3 TORQUE nuts (5) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (6).

(10)Not applicable.
(11)Install pushrods (20, 21) (Ref. Fig. 402) as follows:
CAUTION : DO NOT DISTURB PRE-ADJUSTED LENGTH OF PUSHRODS.
(a)Position pushrod (20) on bellcrank RIB5.
(b)Position pushrod (21) on bellcrank RIB5.
(c)Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (2), bushes (3) and nuts (5).
(d)Install bushes (3), bolts (2), washers (4) and nuts (5).
(e)TORQUE nuts (5) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (6).
(f)Position clamp halves (17) on pushrods (20, 21) in the positions recorded during removal.
(g)Install spacers (19), bolts (18), washers (4) and nuts (5).
NOTE : Nuts (5) are normally torqued and safetied after the rigging is accomplished.
(h)TORQUE nuts (5) to between 0.40 and 0.44 m.daN (35.3 and 39.0 lbf.in.) and safety with cotter pins (6).

R (j)Make sure that there is no gap between the clamp halves (17) and
R the pushrods (20, 21).
R NOTE : Pushrods from different manufacturers can have different
R tube diameters.
R (k)If necessary, shim the gap as follows:
R 1 Bond an adequate piece of a rubber strip (Mat. No. 05-048) with
R bonding compound (Mat. No. 08-006) on the clamp halves (17).

(12)Not applicable.

(13)Install pushrods (12, 13, 14, 15) (Ref. Fig. 402) as follows:
CAUTION : DO NOT DISTURB PRE-ADJUSTED LENGTH OF PUSHRODS.
(a)Assemble pushrods (12-14), (13-15) as follows:
1 Apply corrosion-preventive paste (Mat. No. 05-002) to connectors (25) and nuts (5).
2 Install connectors (25), together with tabwashers (24) and locking devices (26), between pushrods (1-4), (1-5).
3 TORQUE connectors (25) to between 9.8 and 14.7 m.daN (72.3 and 108.4 lbf.ft.) and safety with tabwashers (24) and locking devices (26).
(b)Position pushrods (12, 14), (13, 15) between bellcrank RIB1 and bellcrank RIB5.
(c)Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (2), bushes (3) and nuts (5).
(d)Install bushes (3), bolts (2), washers (4) and nuts (5).
(e)TORQUE nuts (5) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (6).
(f)Position clamp halves (17) on pushrods (12-14), (13-15) in the position recorded during removal.
(g)Install spacers (19), bolts (18), washers (4) and nuts (5).
NOTE : Nuts (5) are normally torqued and safetied after the rigging is accomplished.
(h)TORQUE nuts (5) to between 0.40 and 0.44 m.daN (35.3 and 39.0 lbf.in.) and safety with cotter pins (6).

(14)Install pushrods (1) (Ref. Fig. 402) as follows:
CAUTION : DO NOT DISTURB PRE-ADJUSTED LENGTH OF PUSHRODS.
(a)Position pushrods (1) between bellcrank RIB1 and variable stop unit.
(b)Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (2), bushes (3) and nuts (5).
(c)Install bushes (3), bolts (2), washers (4) and nuts (5).
(d)TORQUE nuts (5) to between 0.80 and 0.88 m.daN (70.8 and 77.9 lbf.in.) and safety with cotter pins (6).
(e)Position clamp halves (7) on pushrods (1) in the positions recorded during removal.
(f)Install spacers (10, 11), bolts (8, 9), washers (4) and nuts (5).
NOTE : Nuts (5) are normally torqued and safetied after the rigging is accomplished.
(g)TORQUE nuts (5) to between 0.40 and 0.44 m.daN (35.3 and 39.0 lbf.in.) and safety with cotter pins (6).

(15)If a new drive shaft at RIB 8 is installed,
drill rigging pin hole (Ref. para. (18)).

(16)Carry out adjustment of linkage in aft section (Ref. 27-21-00, P. Block 501).

R (17)Installation of new drive shaft assembly at RIB 8.

NOTE : The new drive shaft assembly is delivered without rigging pin hole.

(a)Equipment and Materials

ITEM	DESIGNATION
A.	Lint-free cloth
E. Material No. 08-010	Bonding Compounds (Ref. 20-31-00)
F. Material No. 09-043	Sealants (Ref. 20-31-00)
G. Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
H. Material No. 16-003	Structure Paints (Ref. 20-31-00)
Referenced Procedure - 27-21-00, P. Block 501	Mechanical Control (Rudder)

(b)Procedure

1 Install new drive shaft assembly at RIB 8 (Ref. para. 3. C. (3)).
2 Complete installation of rudder control linkage.

NOTE : Location of rigging pin hole has to be established after final adjustment.

3 Carry out adjustment of rudder to neutral (Ref. 27-21-00 P. Block 501).
4 In neutral position drill bore 8 - 8.015 mm (0.3149 - 0.3155 inch) dia. using bushes of connecting lever rigging pin hole as guide.

NOTE : Protect area below drive shaft assembly to prevent contamination.

5 Remove drive shaft assembly at RIB 8 (Ref. para. 3. B. (12)).
6 Fit drive shaft to drilling machine.
7 Align bore.
8 Enlarge bore with drill of 11.7 - 11.8 mm (0.4606 - 0.4645 inch) dia.
9 Rim bore to 12 - 12.018 mm (0.4725 - 0.4731 inch) dia.
10 Deburr bore.
11 Roughen mating surfaces with suitable abrasive cloth to improve adhesion.

WARNING : CLEANING AGENT (MAT. NO. 11-003) IS DANGEROUS.

CAUTION : HANDLING OF SURFACE AFTER DEGREASING WILL IMPAIR BONDING.

12 Clean and degrease component bore and bush with cleaning agent (Mat. No. 11-003).
13 Dry bore and bush with a dry, clean, lint-free cloth.

14 Install drive shaft assembly at RIB 8 (Ref. para. 3. C. (3)).
15 Apply bonding compound (Mat. No. 08-010) evenly to new bush and component bore.
16 Insert new bush into bore and install rigging pin P/N 98A27307547000 for proper seating.
17 Remove exuded bonding compound with a dry, clean, lint-free cloth.
18 Allow bond to cure for at least 2 hours at 20 deg. C (68 deg. F).
19 Remove rigging pin P/N 98A27307547000.
20 Apply sealant (Mat. No. 09-043) to edges of both at both ends.
21 Apply a coat of structure paint (Mat. No. 16-003) to cured sealant.

R (18)Installation of new connecting lever on drive shaft assembly at RIB 8.

NOTE : The new connecting lever is delivered without rigging pin holes.

(a)Equipment and Materials

ITEM	DESIGNATION
A.	Lint-free cloth
E. Material No. 08-010	Bonding Compounds (Ref. 20-31-00)
F. Material No. 09-043	Sealants (Ref. 20-31-00)
G. Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
H. Material No. 16-003	Structure Paints (Ref. 20-31-00)
Referenced Procedure	
- 27-21-00, P. Block 501	Mechanical Control (Rudder)

(b)Procedure
1 Install new connecting lever on drive shaft assembly at RIB 8 (Ref. para. 3. C. (3)).
2 Complete installation of rudder control linkage.

NOTE : Location of rigging pin holes has to be established after final adjustment.

3 Carry out adjustment of rudder to neutral (Ref. 27-21-00 P. Block 501).
4 Make sure that the connecting lever is not deflected during the following drilling operation. Use a suitable clamp or equivalent to hold the connecting lever in its correct position. This will prevent distortion of the connection lever.
5 In neutral position drill bore 8 - 8.015 mm (0.3149 - 0.3155 inch) dia. using bush of drive shaft rigging pin hole as guide.

NOTE : Protect area below drive shaft assembly to prevent contamination.

6 Make sure that the bush of the drive shaft is not damaged. If necessary, replace the bush (Ref. para. 3.C.(18)).
7 Remove connecting lever from drive shaft assembly at RIB 8 (Ref. para. 3. B. (12)).
8 Fit connecting lever to drilling machine.
9 Align bore.
10 Enlarge bore with drill of 11.7 - 11.8 mm (0.4606 - 0.4645 inch) dia.
11 Rim bore to 12 - 12.018 mm (0.4725 - 0.4731 inch) dia.
12 Deburr bore.
13 Roughen mating surfaces with suitable abrasive cloth to improve adhesion.

WARNING : CLEANING AGENT (MAT. NO. 11-003) IS DANGEROUS.

CAUTION : HANDLING OF SURFACE AFTER DEGREASING WILL IMPAIR BONDING.

14 Clean and degrease component bores and bushes with cleaning agent (Mat. No. 11-003).
15 Dry bores and bushes with a dry, clean, lint-free cloth.
16 Install connecting lever on drive shaft assembly at RIB 8 (Ref. para. 3. C. (3)).
17 Apply bonding compound (Mat. No. 08-010) evenly to new bushes and component bores.
18 Insert new bushes into bores and install rigging pin P/N 98A27307547000 for proper seating.
19 Remove exuded bonding compound with a dry, clean, lint-free cloth.
20 Allow bond to cure for at least 2 hours at 20 deg. C (68 deg. F).
21 Remove rigging pin P/N 98A27307547000.
22 Apply sealant (Mat. No. 09-043) to edges of bushes at both ends.
R 23 Apply a coat of structure paint (Mat. No. 16-003) to cured sealant.

D. Test
(1)Carry out rudder mechanical control operational/functional test. (Ref. 27-21-00, P. Block 501).

E. Close-Up
(1)In the following areas of rudder controls in vertical stabilizer, check coating of moisture-removing oil (Mat. No. 05-027) for good condition and renew as necessary (Ref. 51-75-10, P. Block 801).
(a)Pushrods
(b)Bellcranks and brackets
(c)Shaft assemblies and bracket between RIB8 and RIB10
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Close access panel 325DL (Ref. 55-33-13, P. Block 401).
(4)Close access door/panel previously opened. Refer to para. 3.A. (13).
(5)Close access door 312AR.
(6)Disconnect electrical ground power unit and de-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(7)Remove warning notices.

(8)Remove access platforms.

RUDDER CONTROL FRAME - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

A. Removal and Installation of the following:
(1)Rudder Control Frame
(2)Cover and Pushrods

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platforms, 5.5 m, 11.0 m (18 ft., 36 ft.)
B. 98A27207601000	Pin - Rigging, Variable Stop Unit, Rudder Mechanical Controls
C. 98A27307545000	Rigging Pin - Cable Quadrant, Rudder Mechanical Controls
D. 98A27307546000	Rigging Pin - Main Bellcrank, Rudder Mechanical Controls
E. 98A27307547000	Rigging Pin - Bellcrank Assembly, Rudder Servo Controls
F. 98A27901006000	Pin - Rigging, Rudder Control (Qty. 2)
G. 98A53207606000	Panels - Floor, Fuselage Tail Section
H.	Torque Wrench, up to 2.2 m.daN (195 lbf.in.)
J.	Electrical Connector - Blanking Plugs/Caps
K.	Container - Hydraulic Fluid Spillage
L.	Cotter Pins
M.	Corrosion-Resistant Steel Lockwire, 0.5 mm (0.02 in.) Dia.
N.	Warning Notices
P.	Circuit Breaker Safety Clips
Q. Material No. 05-002	Special Materials (Ref. 20-31-00)
R. Material No. 05-027	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 20-28-11, P. Block 1	Electrical Bonding

- 22-13-27, P. Block 401	Autopilot Yaw Actuator 22CA
- 22-26-00, P. Block 501	Yaw Damper
- 22-23-22, P. Block 401	Yaw Damper Actuator (304CC)
- 27-20-00, P. Block 401	Rudder
- 27-20-00, P. Block 501	Rudder
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 27-22-00, P. Block 501	Trim (Rudder)
- 27-22-23, P. Block 401	Rudder Trim Actuator 8CG
- 27-23-00, P. Block 501	Artificial Feel and Rudder Travel Limiting
- 27-23-11, P. Block 401	Artificial Feel and Trim Unit
- 27-23-22, P. Block 401	Variable Stop Unit
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 51-75-10, P. Block 801	Repair of Paint Coatings
- 55-33-13, P. Block 401	Trailing Edge Access Panels

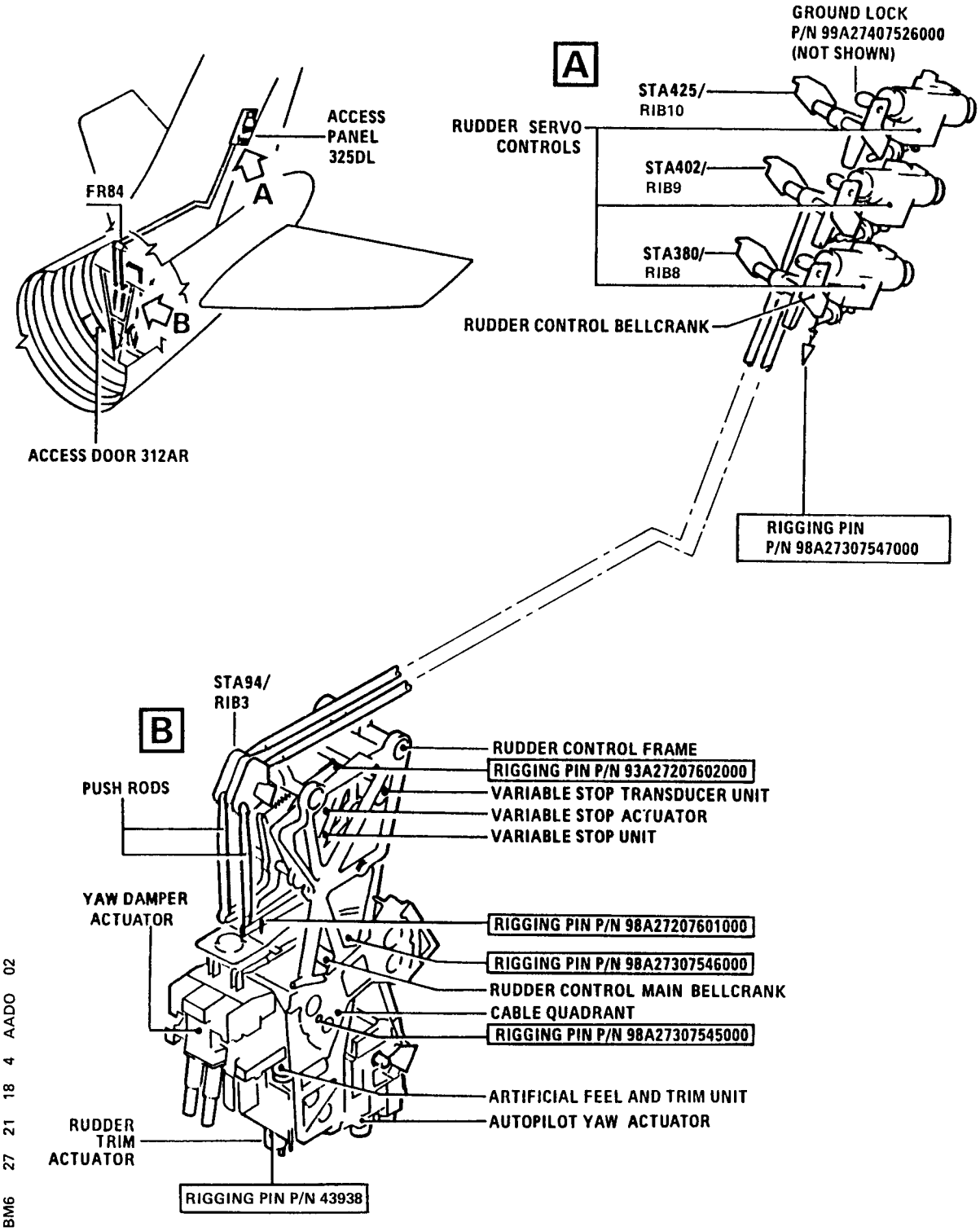
3. Procedure

A. Job Set-Up (Ref. Fig. 401)
(1)Position access platforms.
(2)Make certain that rudder trim is set at zero.
(3)Make certain that rudder pedals are set at neutral and install rigging pins P/N 98A27901006000, (Qty. 2) in rudder control bellcranks on control mechanism mounting beam in avionics compartment.
(4)Display warning notice in flight compartment prohibiting operation of flight controls.
(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	ARTF FEEL/FLC 1/28VDC	5CY1	101/J 1
21VU	ARTF FEEL/FLC 1/26VAC/ESS	305CY1	101/J 2
21VU	ARTF FEEL/FLC 1/26VAC/EMER	306CY1	101/J 3
21VU	ARTF FEEL/FLC 2/26VAC	305CY2	101/J 4
21VU	ARTF FEEL/FLC 2/28VDC	5CY2	101/J 5
22VU	RUD/TRIM SLOW	1CG	201/J27
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(6)Display warning notices, prohibiting repressurization of hydraulic systems.
(7)Open access door 312AR.
(8)Install floor panels P/N 98A53207606000 in fuselage tail section.
(9)Position container for hydraulic fluid spillage.
(10)Install rigging pin P/N 98A27307545000 in cable quadrant.
(11)Install rigging pin P/N 98A27307546000 in rudder control main bellcrank.
(12)Install rigging pin P/N 98A27207601000 in variable stop unit.
(13)Open trailing edge access panel 325DL and remove access panel support struts (Ref. 55-33-13, P. Block 401).
R (14)Install rigging pin P/N 98A27307547000 in drive shaft RIB8.

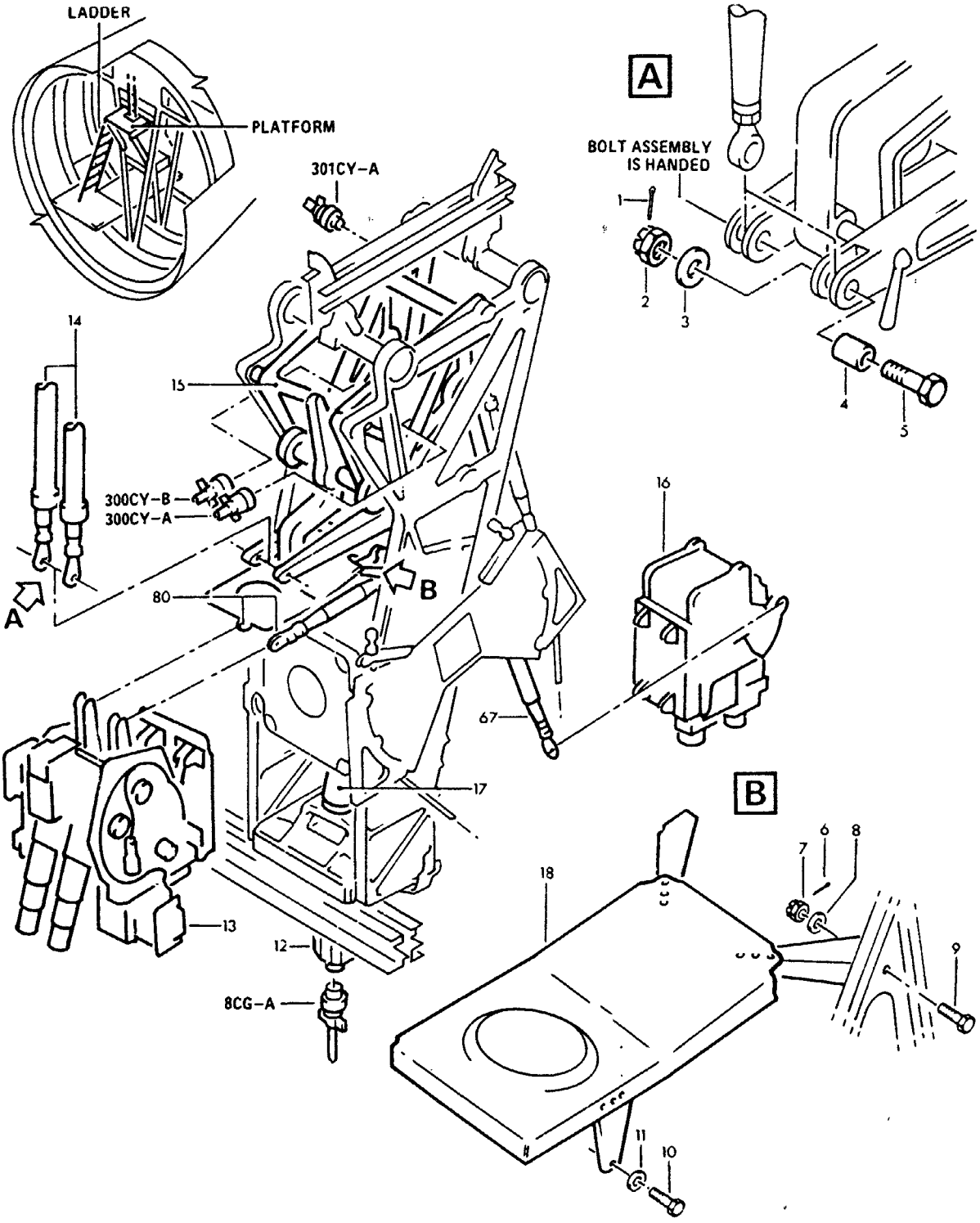
B. Removal (Ref. Fig. 402, 403)
(1)Disconnect bonding strap from yaw damper actuator (13).
(2)Remove yaw damper actuator (13) (Ref. 22-23-22, P. Block 401) and make certain that hydraulic lines are removed between yaw damper actuator (13) and first connections.
(3)Disconnect yaw damper actuator electrical looms from platform supports and attach to airframe structure.
(4)Disconnect bonding strap from autopilot yaw actuator (16).
(5)Loosen first clamp attaching hydraulic lines of autopilot yaw actuator (16).
(6)Remove autopilot yaw actuator (16) (Ref. 22-13-27, P. Block 401).
(7)Secure disconnected autopilot yaw actuator electrical connectors to airframe structure.
(8)Remove cotter pins (1), nuts (2), washers (3), bolts (5), bushes (4) and disconnect pushrods (14).
(9)Remove ladder and platform (Ref. Fig. 402).



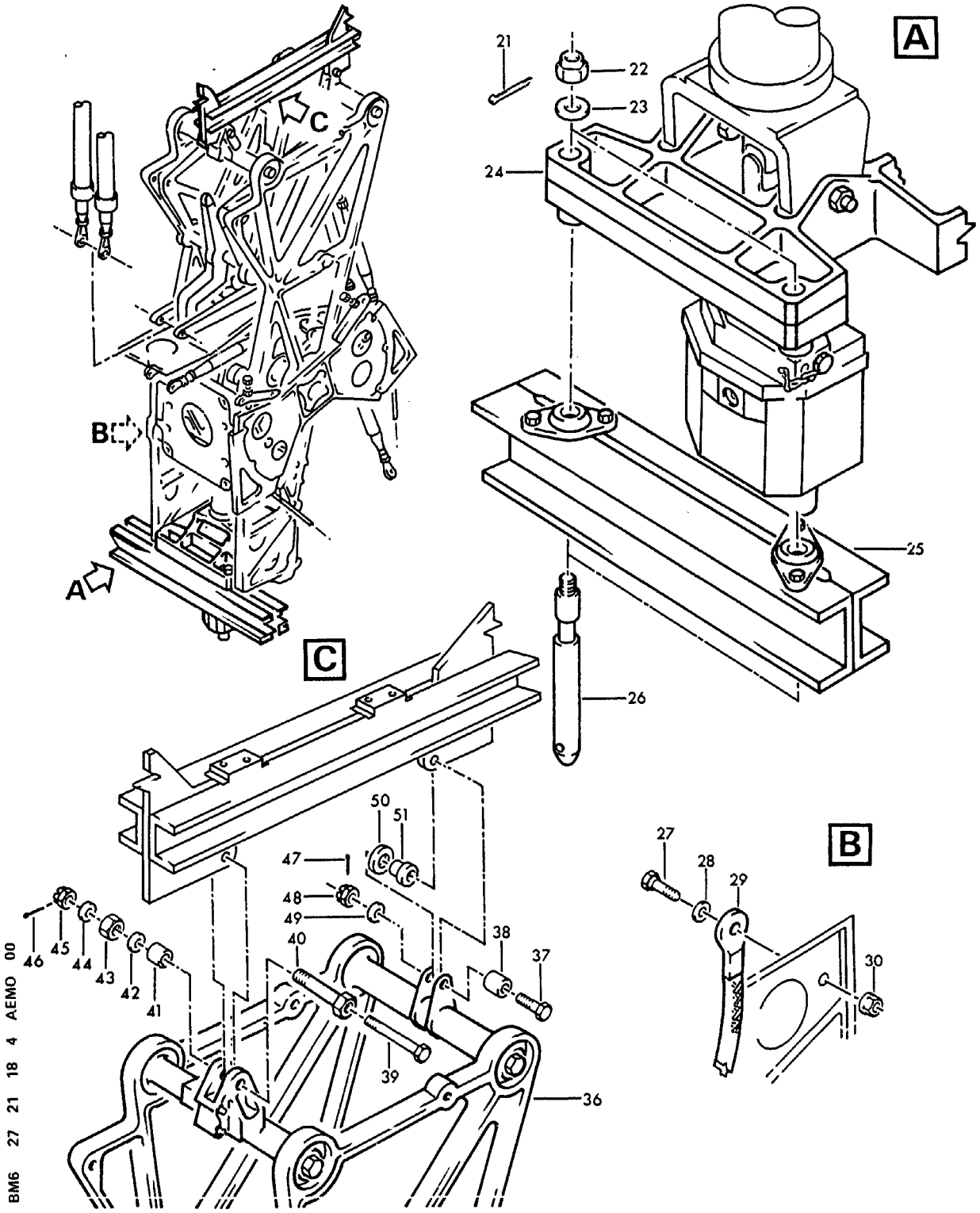
Rigging Points - Rudder Control
Figure 401

(10)Disconnect electrical connectors, secure to airframe structure and install blanking caps:
(a)At variable stop actuator.
(b)At variable stop transducer unit.
(c)At rudder trim actuator.
(11)With rigging pins and locking tool installed and with cable tension slackened (Ref. 27-20-00, P. Block 401), disconnect cable ends of rudder control cables from retaining notches of rudder cable quadrant and secure rudder control cables to airframe structure.
(12)Secure cable adjusters to rudder cable quadrant temporarily.
(13)Secure cover (18) and pushrods (67, 80) to rudder control frame temporarily.
(14)Removal of rudder control frame (Ref. Fig. 403).
(a)Remove nut (30), bolt (27), washer (28), and disconnect bonding strap (29).
(b)Remove cotter pins (21), nuts (22) and washers (23).
(c)Press out retaining pins (26) downwards.
(d)Support rudder control frame (36).
CAUTION : RUDDER CONTROL FRAME ASSEMBLY WEIGHS APPROXIMATELY 26 kg (57.3 lb.).
(e)Remove cotter pin (46), nut (45), washer (44) and bolt (39).
(f)Remove nut (43), washer (42), hollow pin (40) and bush (41).
(g)Remove cotter pin (47), nut (48), cupwasher (49), bolt (37) and bush (38).
(h)Lower rudder control frame (36) and remove bush (51) and washer (50).
CAUTION : TWO MECHANICS MUST BE POSITIONED AFT AND ONE MECHANIC FORWARD OF THE RUDDER CONTROL FRAME.
(j)Lower, tilt and lift rudder control frame (36) aft. Then remove, with lower part first, in forward direction.

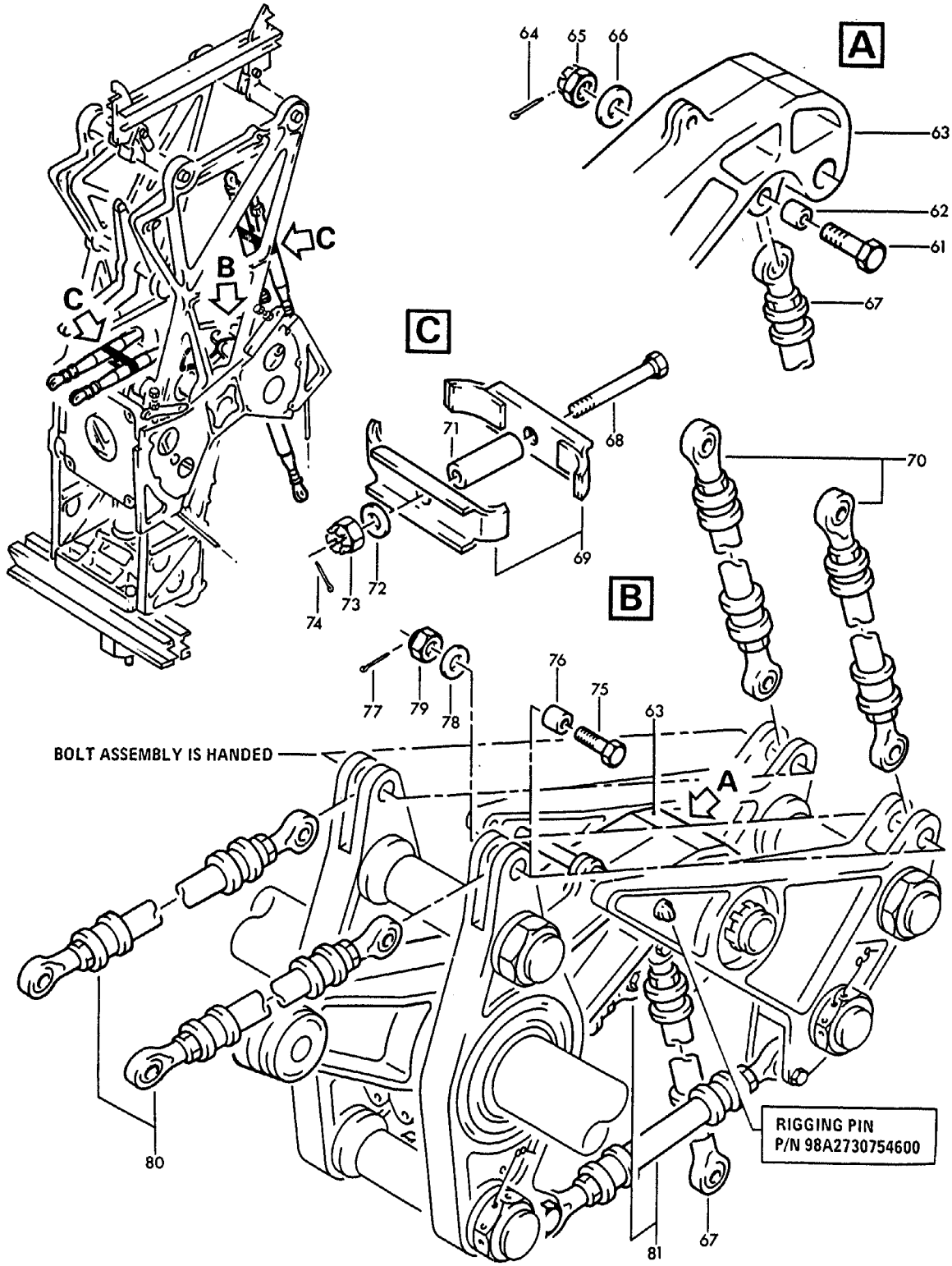
C. Preparation for Installation (Ref. Fig. 402, 404)
(1)For removal and installation of artificial feel and trim unit (17) refer to 27-23-11, P. Block 401.
(2)For removal and installation of variable stop unit (15) refer to 27-23-22, P. Block 401.
(3)For removal and installation of rudder trim actuator (12) refer to 27-22-23, P. Block 401.
(4)Removal of cover and pushrods.
(a)Remove cotter pins (6), nuts (7), washers (8), bolts (9) and cover (18).
CAUTION : DO NOT DISTURB PRE-ADJUSTED LENGTHS OF PUSHRODS (81).
(b)Remove cotter pin (64), nut (65), washer (66), bolt (61), bush (62) and pushrod (67).
(c)Remove cotter pins (77), nuts (79), washers (78), bolts (75), bushes (76) and pushrods (70, 80).
(d)Measure and record positions of clamps (69) for subsequent installation.
(e)Remove cotter pins (74), nuts (73), washers (72), bolts (68), clamps (69) and spacers (71).
NOTE : For installation of pushrods (67, 70, 80) and cover (18), refer to Para. 3.D.(13).



Rudder Control Frame - Connections
Figure 402



Rudder Control Frame
Figure 403



BM6 27 21 18 4 AGMO 00

Main Bellcrank - Pushrods
Figure 404

D. Installation
(1)Coat all bolts and threaded parts with corrosion preventive paste (Mat. No. 05-002).
(2)Make certain that retaining pins (26) are not installed.
(3)Installation of rudder control frame (Ref. Fig. 403).
(a)Position and support rudder control frame (36).
(b)Install washer (50) and bushes (51, 38).
(c)Align holes and install bolt (37), cupwasher (49) and nut (48).
(d)Install bush (41), align holes and install hollow pin (40), washer (42) and nut (43).
(e)Align holes of base attachments (24, 25) and install retaining pins (26) from below.
(f)Install washers (23), nuts (22) and safety nuts (22) with cotter pins (21).
(g)TORQUE nut (43) to between 1.0 and 1.1 m.daN (88.5 and 97.4 lbf.in.).
(h)TORQUE nut (48) to between 2.0 and 2.2 m.daN (177 and 195 lbf.in.) and safety with cotter pin (47).
(j)Install bolt (39), washer (44) and nut (45).
(k)TORQUE nut (45) to between 1.62 and 1.78 m.daN (143.4 and 157.5 lbf.in.) and safety with cotter pin (46).
(l)Install bonding strap (29) with bolt (27), washer (28) and nut (30). For electrical bonding refer to 20-28-11, P. Block 1.
(4)Connect rudder control cables to rudder cable quadrant, and tension the cables, check correct routing of cables and remove locking tool and rigging pins installed at Para. B.(11) (Ref. 27-20-00, P. Block 401).
(5)Remove blanking caps and connect the following electrical connectors (Ref. Fig. 402):
(a)At variable stop actuator - LH: 300CY-A, RH: 300CY-B.
(b)At variable stop transducer unit - 301CY-A.
(c)At rudder trim actuator - 8CG-A.
(6)Install platform and ladder (Ref. Fig. 402).
(7)Position pushrods (14), and install bushes (4) and bolts (5).
(8)If bolts (5) cannot be easily inserted, adjust length of pushrods (14) and install washers (3) and nuts (2).
(9)TORQUE nuts (2) to between 0.21 and 0.23 m.daN (18.6 and 20.4 lbf.in.) and safety with cotter pins (1).
(10)Install autopilot yaw actuator (16) (Ref. 22-13-27, P. Block 401) and connect bonding strap.
(11)Tighten first clamp attaching hydraulic lines of autopilot yaw actuator (16).
(12)Install yaw damper actuator (13) (Ref. 22-23-22, P. Block 401) and make certain that hydraulic lines are installed. Connect electrical looms to platform supports and connect bonding strap. Do not install cover (18).
(13)Installation of pushrods and cover (Ref. Fig. 404, 402).
CAUTION : DO NOT DISTURB PRE-ADJUSTED LENGTHS OF PUSHRODS (81).
(a)Position pushrods (67, 70, 80), bushes (62, 76), and install bolts (61, 75).
(b)If bolts (61, 75) cannot be easily installed, adjust lengths of push-rods (67, 70, 80).
(c)Install washers (66, 78) and nuts (65, 79).

(d)TORQUE nuts (65, 79) to between 0.21 and 0.23 m.daN (18.6 and 20.4 lbf.in.), and safety with cotter pins (64, 77).
(e)Install clamps (69) at recorded positions with spacers (71), bolts (68), washers (72) and nuts (73).
(f)TORQUE nuts (73) to 0.43 m.daN (38 lbf.in.), and safety with cotter pins (74).
(g)Position cover (18), install washers (11), bolts (10) and safety with lockwire.
(h)Install bolts (9), washers (8) and nuts (7).
(j)TORQUE nuts (7) to 0.42 m.daN (37 lbf.in.), and safety with cotter pins (6).

(14)Remove hydraulic fluid container and make certain that all excess fluid is cleaned off all components.
(15)Remove rigging pins P/N 98A27207601000, P/N 98A27307545000, P/N 98A27307546000, P/N 98A27307547000 and P/N 98A27901006000 (Qty. 2).
(16)Remove safety clips and tags, and close circuit breakers 5CY1, 305CY1, 306CY1, 305CY2, 5CY2, 1CG, 1CB and 2CB.
(17)Make certain that travel ranges of rudder controls are clear of tools and miscellaneous items of equipment.

E. Adjustment/Test
(1)Adjust cable tension of rudder control cables (Ref. 27-20-00, P. Block 501).
(2)Carry out functional tests of rudder mechanical control (Ref. 27-21-00, P. Block 501), and rudder trim control (Ref. 27-22-00, P. Block 501).
(3)Carry out test of autopilot yaw actuator (Ref. 22-13-27, P. Block 401).
(4)Carry out operational test of yaw damper actuator (Ref. 22-26-00, P. Block 501).
(5)Carry out artificial feel and rudder travel limiting functional test (Ref. 27-23-00, P. Block 501).
(6)Check that hydraulic connections are free from leaks.

F. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)On rudder control frame, check coating of moisture-removing oil (Mat. No. 05-027) for good condition and renew as necessary (Ref. 51-75-10, P. Block 801).
(3)Remove floor panels P/N 98A53207606000.
(4)Close access door 312AR.
(5)Install access panel support struts and close trailing edge access panel 325DL (Ref. 55-33-13, P. Block 401).
(6)Remove warning notices.
(7)Remove access platforms.

RUDDER - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

CAUTION : DURING REMOVAL/INSTALLATION OF RUDDER AVOID DAMAGE TO SURFACE PROTECTION ON RUDDER HINGE ARMS.

1. Reasons for the Job

A. Removal for replacement

B. Replacement of vertical stabilizer spar box

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platforms, 2.65 m to 16 m (8.7 ft. to 52.5 ft.)
B. 98A27003000000	Extractors
C. 98A27203001000	Blanking Plates - Rudder Spar Box
D. 98A27307547000	Rigging Pin - Bellcrank Assembly, Rudder Servo Controls
E. 98A27407530000	Fixture - Hinge Arms and Servo Controls, Rudder
F. 98A27901006000	Pin - Rigging, Rudder Control (Qty. 2)
**ON A/C 001-005, 101-200,	
G. 98A55308440000	Sling - Removal and Installation, Rudder
H. 98A55308741000	Sling - Removal and Installation, Rudder
**ON A/C 006-100,	
G. 98A55308440000	Sling - Removal and Installation, Rudder
H. 98A55308741000	Sling - Removal and Installation, Rudder
**ON A/C ALL	
J. SL90-315-1-0000	Wrenches - Notched, Tightening of Nuts (for STA-LOK Locking System NSA5454)
K. SL90-315-3750	Wrenches - Notched, Tightening of Nuts (for STA-LOK Locking System NSA5454)
L. SL90-314-3750	Tool - Extraction, Lockwashers

ITEM	DESIGNATION
	(for STA-LOK Locking System NSA5454)
M. SL90-313-3750	Tool - Installation, Lockwashers (for STA-LOK Locking System NSA5454)
N. SL90-314-1-0000	Tool - Extraction, Lockwashers (for STA-LOK Locking System NSA5454)
P. SL90-313-1-0000	Tool - Installation, Lockwashers (for STA-LOK Locking System NSA5454)
Q.	Crane, Minimum Height 19 m (62 ft.) (Rudder and Sling Weight approx. 281 kg (620 lb.)
R.	Rubber Mat
S.	Torque Wrench between 0.33 and 3.0 m.daN (2.43 to 22 lbf.ft.)
T.	Cotter Pins
U.	Adhesive Tape
V.	Circuit Breaker Safety Clips
W.	Warning Notices
X. Material No. 04-004	Common Greases (Ref. 20-31-00)
**ON A/C 001-005, 101-200,	
Y. Material No. 05-002	Special Materials (Ref. 20-31-00)
**ON A/C 006-100,	
X. Not applicable	
Y. Not applicable	
**ON A/C 001-005, 101-200,	
Z. Material No. 05-027	Special Materials (Ref. 20-31-00)
AA.Material No. 05-052	Special Materials (Ref. 20-31-00)
AB.Material No. 09-008	Sealants (Ref. 20-31-00)
AC.Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
AD.Material No. 16-003	Structure Paints (Ref. 20-31-00)
Referenced Procedures	
- 11-20-00, P. Block 1	Exterior Placards and Markings
- 20-21-16, P. Block 1	STA-LOK Nuts and Lockwashers
- 20-28-11, P. Block 1	Electrical Bonding
- 23-61-11, P. Block 401	Static Discharger
- 24-41-00, P. Block 301	AC External Power Control
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 27-21-23, P. Block 401	Servo Control Actuating Spring Rod
- 27-25-00, P. Block 501	Control Surface Position Indicating (Rudder)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 51-75-10, P. Block 801	Repair of Paint Coatings
- 51-76-10, P. Block 801	Repair of Sealing

- 53-10-71, P. Block 401 Rudder Fairings
- 55-33-13, P. Block 401 Trailing Edge Access Panels
- 55-36-45, P. Block 401 Rudder Hinge Arm No. 4
- 55-42-13, P. Block 401 Rudder Leading Edge Access Panels
- 55-46-13, P. Block 401 Rudder Hinge Bearing No. 4
- 55-46-13, P. Block 801 Rudder Hinge Bearing No. 4

R
R

**ON A/C 006-100,

ITEM	DESIGNATION
Y. Material No. 05-027	Special Materials (Ref. 20-31-00)
Z. Material No. 05-052	Special Materials (Ref. 20-31-00)
AA.Material No. 09-008	Sealants (Ref. 20-31-00)
AB.Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
AC.Material No. 16-003	Structure Paints (Ref. 20-31-00)
Referenced Procedures	
- 11-20-00, P. Block 1	Exterior Placards and Markings
R - 20-21-16, P. Block 1	STA-LOK Nuts and Lockwashers
- 20-28-11, P. Block 1	Electrical Bonding
- 23-61-11, P. Block 401	Static Discharger
- 24-41-00, P. Block 301	AC External Power Control
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 27-21-23, P. Block 401	Servo Control Actuating Spring Rod
- 27-25-00, P. Block 501	Control Surface Position Indicating (Rudder)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 51-75-10, P. Block 801	Repair of Paint Coatings
- 51-76-10, P. Block 801	Repair of Sealing
- 53-10-71, P. Block 401	Rudder Fairings
- 55-33-13, P. Block 401	Trailing Edge Access Panels
- 55-42-13, P. Block 401	Rudder Leading Edge Access Panels
- 55-46-13, P. Block 401	Rudder Hinge Bearing No. 4
- 55-46-13, P. Block 801	Rudder Hinge Bearing No. 4

**ON A/C ALL

3. Procedure

A. Job Set-Up (Ref. Fig. 401, 402)

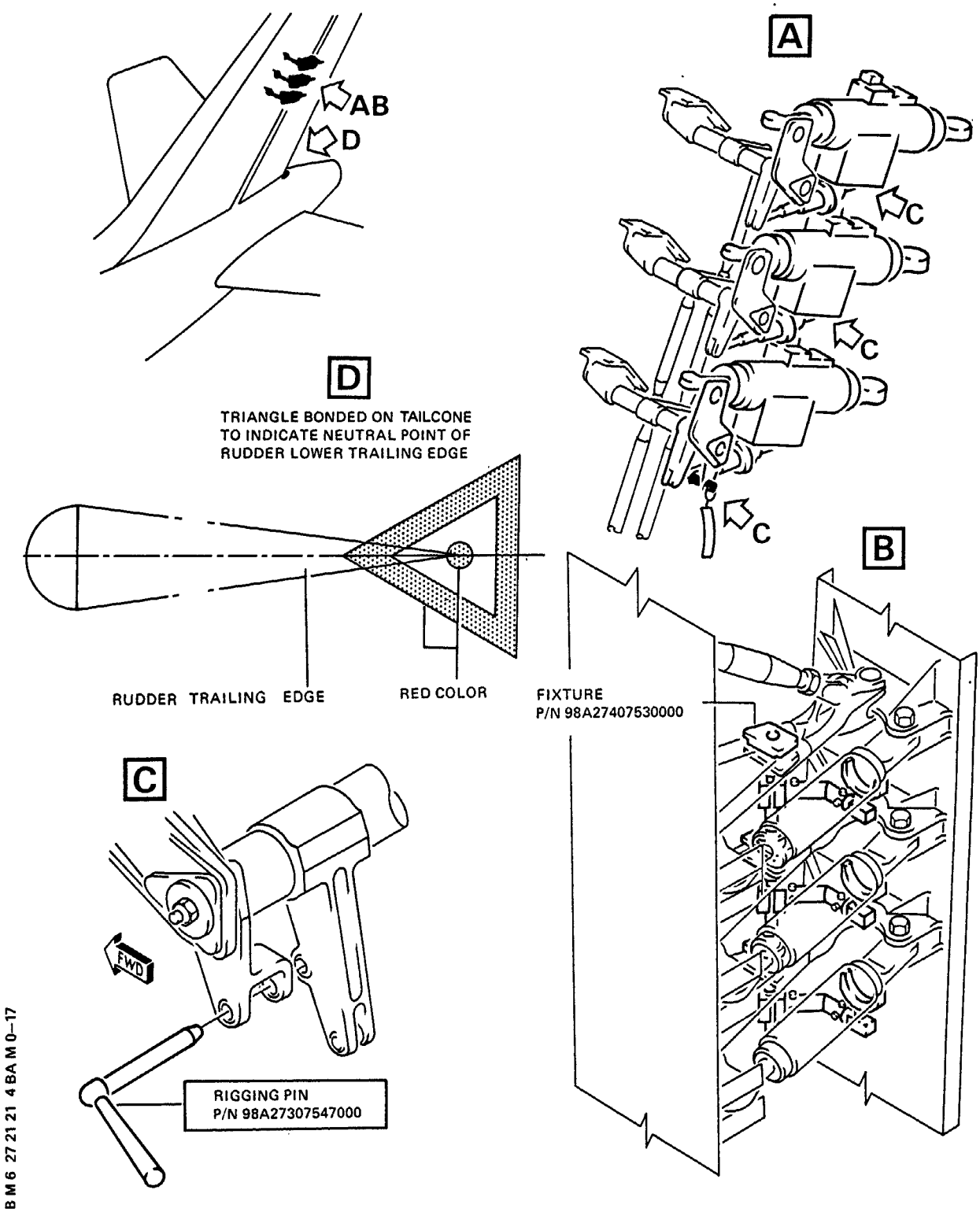
R WARNING : MAKE SURE THAT YOU GIVE THE CORRECT SUPPORT TO THE RUDDER DURING
R ITS MOVEMENT.
R THE RUDDER WEIGHS APPROX. 200KG (441LBS).
R ACCIDENTAL MOVEMENT OF THE RUDDER CAN KILL OR INJURE PERSONS.
R CAUTION : DO NOT ATTACH THE RUDDER SLING TO DAMAGED HOISTING POINTS.
R THIS CAN CAUSE DAMAGE TO THE RUDDER SLING .BEFORE YOU ATTACH
R THE RUDDER SLING, DO A CHECK OF THE HOISTING POINT FOR:
R - SIGNS OF ACCIDENTAL DAMAGE
R - SIGNS OF CRACKS
R - GENERAL CONDITION.

(1)Make certain that rudder trim control is set to zero.
(2)Make certain that rudder pedals are set to neutral and install rigging pins P/N 98A27901006000 (Qty. 2) in rudder control bellcranks on control mechanism mounting beam in avionics compartment.
(3)Open, safety and tag the following circuit breakers:

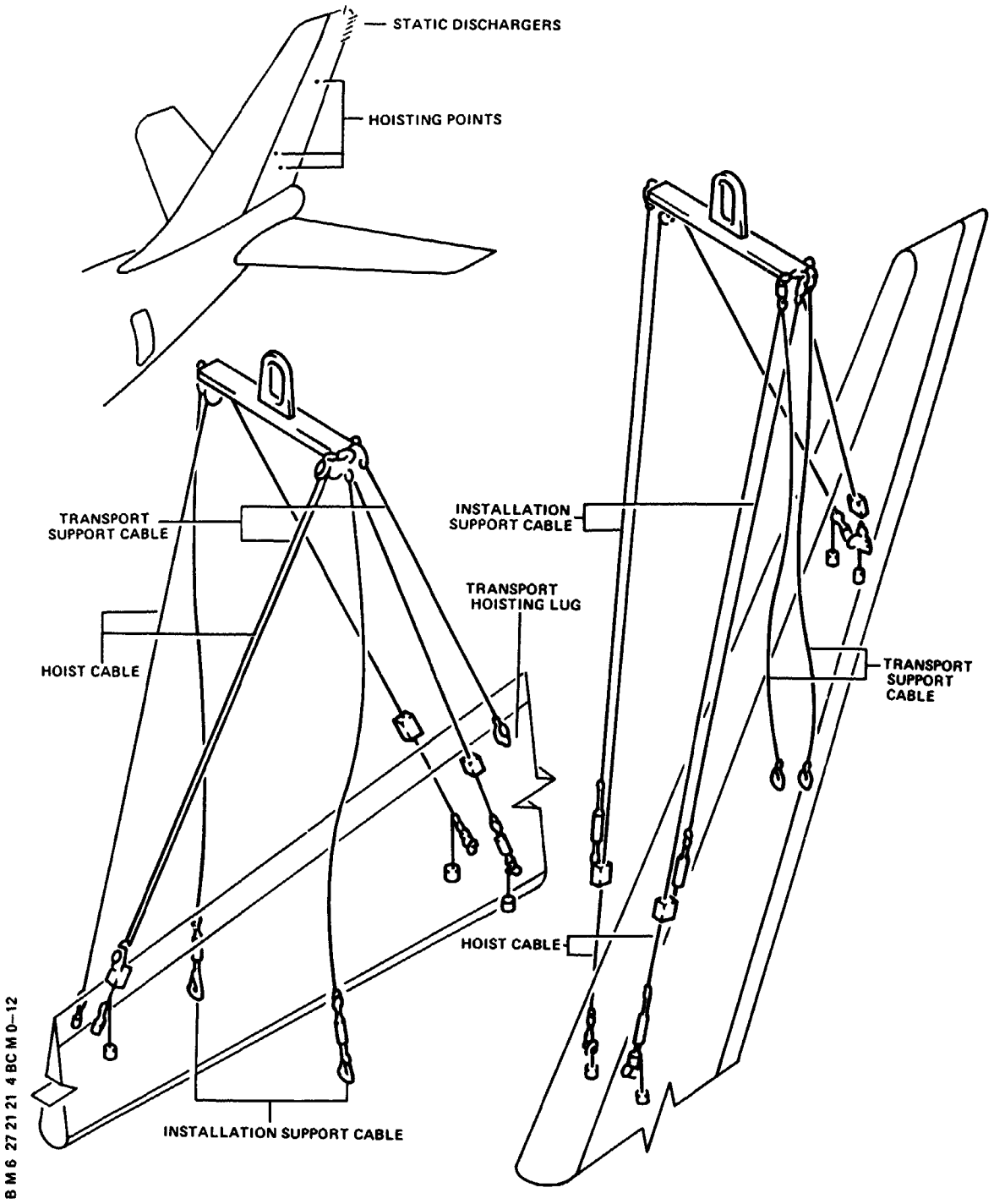
PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27
133VU	FLT CTL/SERVO CTL/& THS/HYD/SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL/& THS/JAM/DET	2CB	332/U64
133VU	CTL/SURF/POS	1CT	334/S61

**ON A/C 001-005, 102-200,

(4)Display warning notices in flight compartment prohibiting operation of flight controls.
(5)Position access platforms.
(6)Remove all LH and RH trailing edge access panels (Ref. 55-33-13, P. Block 401).
CAUTION : SUPPORT STRUTS ARE LOCATED WITHIN THE TRAVEL RANGE OF THE SERVO CONTROLS. SUPPORTS COULD BE DAMAGED DURING RUDDER MOVEMENT.
(7)At hinges no. 2 and 3, remove access panel support struts (Ref. Fig. 405) (Ref. 55-33-13, P. Block 401).
(8)Remove all LH and RH leading edge access panels (Ref. 55-42-13, P. Block 401).
(9)Install blanking plates P/N 98A27203001000 at rudder spar box.
(10)Install rigging pin P/N 98A27307547000 in rudder control drive shaft at RIB 8.



Rigging Points and Fixture
Figure 401



Sling Attachment
Figure 402

(11)At hinges no. 2, 3 and 4, loosen clips of electrical harness and install fixture P/N 98A27407530000 between hinge arms.
NOTE : Install the three elements of the fixture in the following order: lower, center, upper.
(12)Make certain that each servo control is supported by fixture cradle.
(13)Remove self-adhesive discs covering rudder hoisting points.

**ON A/C 006-101,

(4)Display warning notices in flight compartment prohibiting operation of flight controls.
(5)Position access platforms.
(6)Remove all LH and RH trailing edge access panels (Ref. 55-33-13, P. Block 401).
CAUTION : SUPPORT STRUTS ARE LOCATED WITHIN THE TRAVEL RANGE OF THE SERVO CONTROLS. SUPPORTS COULD BE DAMAGED DURING RUDDER MOVEMENT.
(7)At hinges no. 2 and 3, remove access panel support struts (Ref. 55-33-13, P. Block 401).
(8)Remove all LH and RH leading edge access panels (Ref. 55-42-13, P. Block 401).
(9)Install blanking plates P/N 98A27203001000 at rudder spar box.
(10)Install rigging pin P/N 98A27307547000 in rudder control drive shaft at RIB 8.
(11)At hinges no. 2, 3 and 4, loosen clips of electrical harness and install fixture P/N 98A27407530000 between hinge arms.
NOTE : Install the three elements of the fixture in the following order: lower, center, upper.
(12)Make certain that each servo control is supported by fixture cradle.
(13)Remove self-adhesive discs covering rudder hoisting points.

**ON A/C 001-005, 101-200,

(14)Remove hoisting lugs and install LH transport hoisting lug in reverse position.
(15)Position crane and attach rudder sling P/N 98A55308440000 or P/N 98A55308741000.
NOTE : The rudder can be removed in vertical position or with rotation in the horizontal position.
The P/N 98A55308440000 is used for removal in vertical position.
The P/N 98A55308741000 is used for removal with rotation in horizontal position.

**ON A/C 006-100,

(14)Remove blanking plugs from rudder hoisting points.
R (15)Position crane and attach rudder sling P/N 98A55308440000 or
R P/N 98A55308741000.
R NOTE : The rudder can be removed in vertical position or with rotation
R in the horizontal position.
R The P/N 98A55308440000 is used for removal in vertical position.

R The P/N 98A55308741000 is used for removal with rotation in
R horizontal position.

**ON A/C ALL

(16)Remove rudder fairings (Ref. 53-10-71, P. Block 401).
(17)Install rubber mat between rudder and fuselage.

**ON A/C 001-005, 102-200,

B. Removal (Ref. Fig. 403, 405, 408)
(Ref. Fig. 411)

**ON A/C 006-100,

B. Removal (Ref. Fig. 404, 406, 409)
(Ref. Fig. 412)

**ON A/C 101-101,

B. Removal (Ref. Fig. 404, 407, 410)
(Ref. Fig. 412)

**ON A/C 006-100,

(Ref. Fig. 404)
(Ref. Fig. 404)

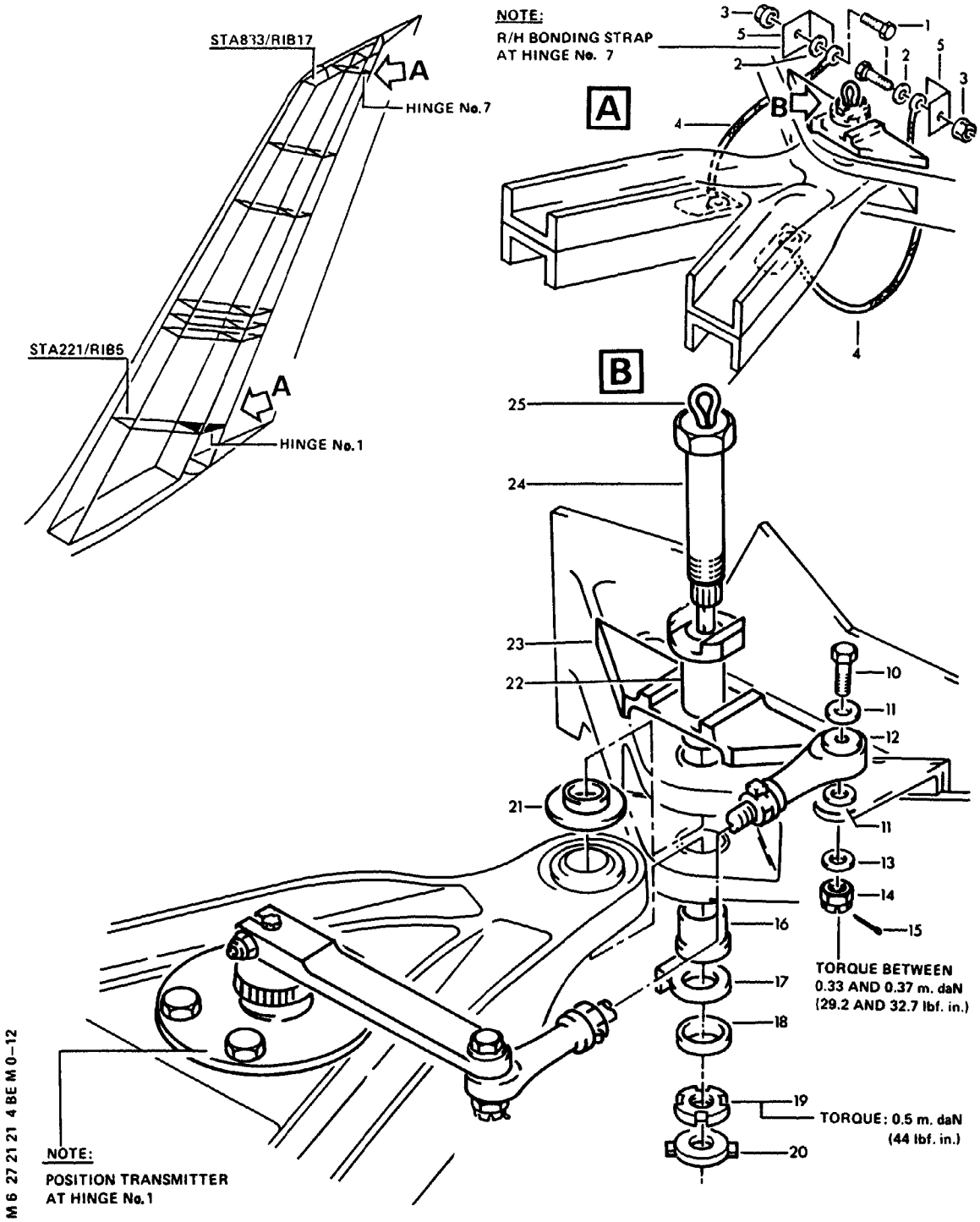
**ON A/C 001-005, 101-200,

CAUTION : AS CERTAIN BOLTS, BUSHES, ETC. ARE SIMILAR, IT IS ESSENTIAL TO IDENTIFY THE COMPONENTS FOR EACH HINGE IN ORDER TO AVOID ANY ERRORS ON INSTALLATION. USE A SEPARATE BAG PER HINGE TO CONTAIN ALL ASSOCIATED BOLTS, BUSHES, NUTS, ETC.

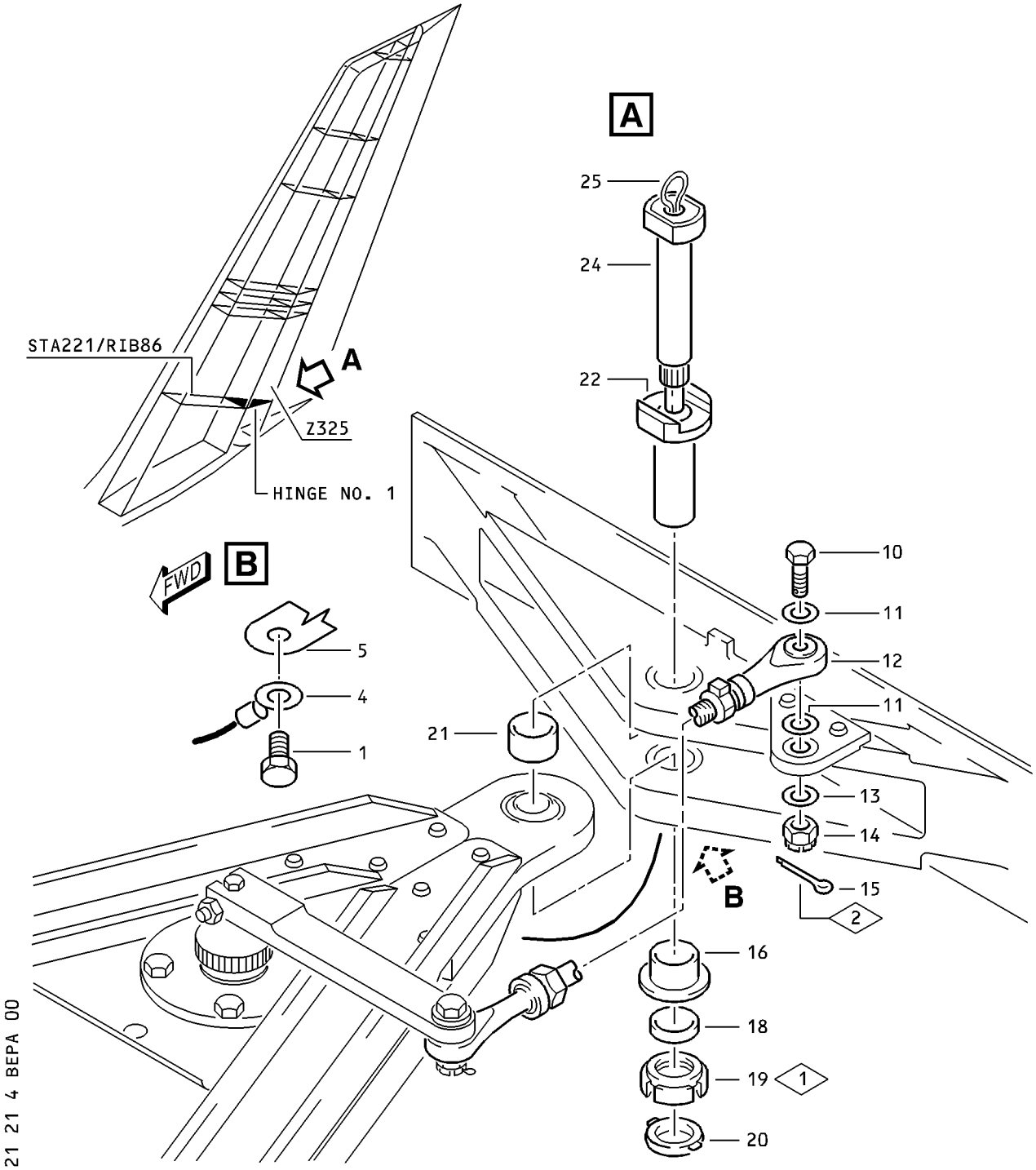
NOTE : Use STA-LOK extractor P/N SL90-314-3750 to remove lockwashers of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 1 and 5 to 7.
Use STA-LOK extractor P/N SL90-314-1-0000 to remove lockwashers of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 2 to 4 and on servo controls.

NOTE : Use STA-LOK notched wrench P/N SL90-315-3750 for ring nuts of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms No. 1 and 5 to 7. Use STA-LOK notched wrench P/N SL90-315-1-0000 for ring nuts of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 2 to 4 and on servo controls.

(1)At hinge no. 1:
(a)Remove cotter pin (15), nut (14), washer (13), bolt (10), washers (11) and disconnect push rod (12).
(2)At hinge no. 1 and 7:
(a)Remove nut (3), bolt (1), washer (2) and disconnect bonding strap (4).
NOTE : There are two bonding straps at hinge no. 7.
(b)Remove cotter pin (25), lockwasher (20), ring nut (19), cupwasher (18) and bonding terminal (17) but do not remove bolt (24) at this stage.
(3)At hinges no. 6 and 5:
(a)Remove nut (8), bolt (6), washer (7) and disconnect bonding strap (9).
(b)Remove lockwasher (87), ring nut (86), cupwasher (84) and bonding

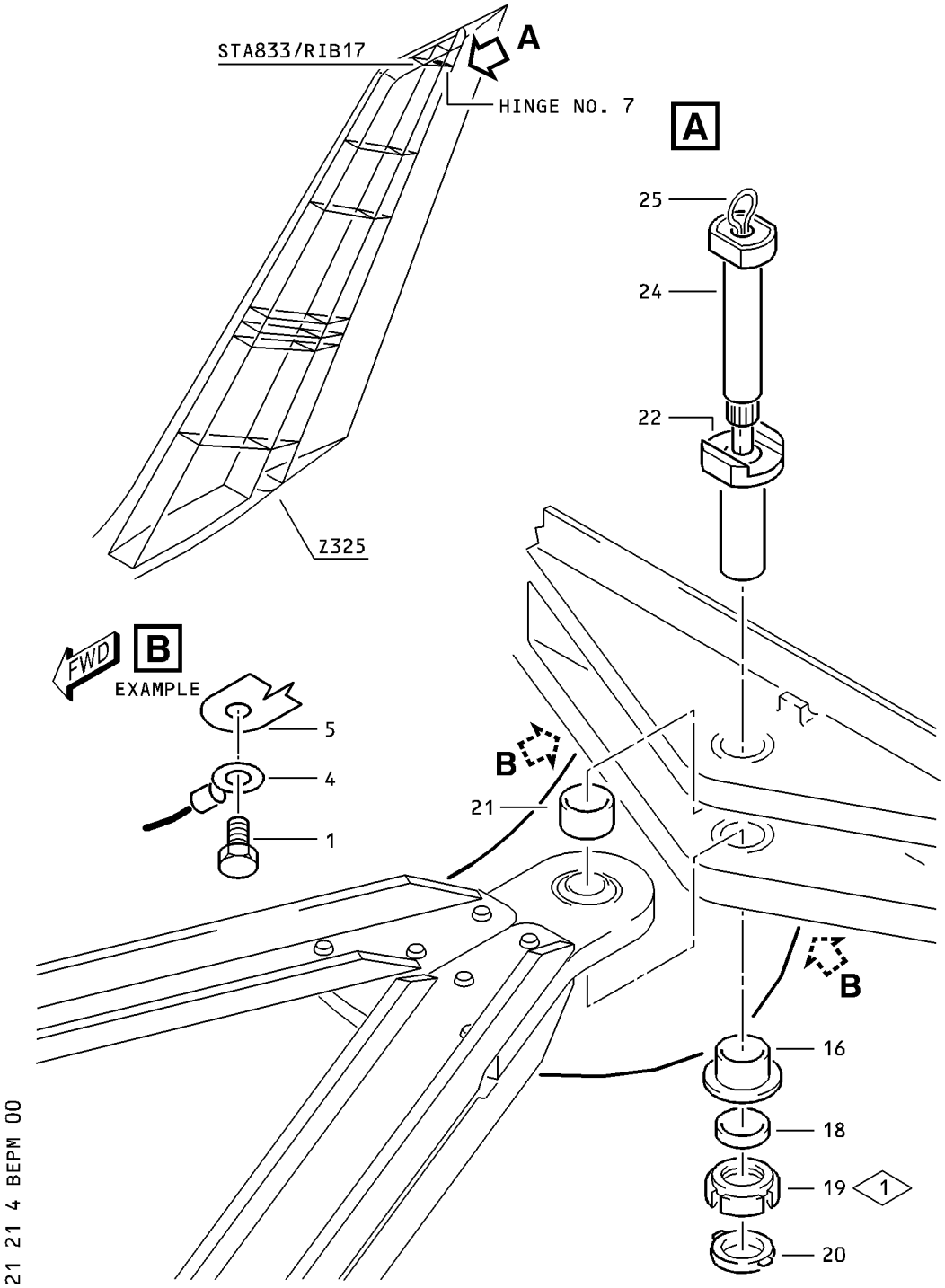


Rudder Position Transmitter, Hinges No. 1 and 7
Figure 403



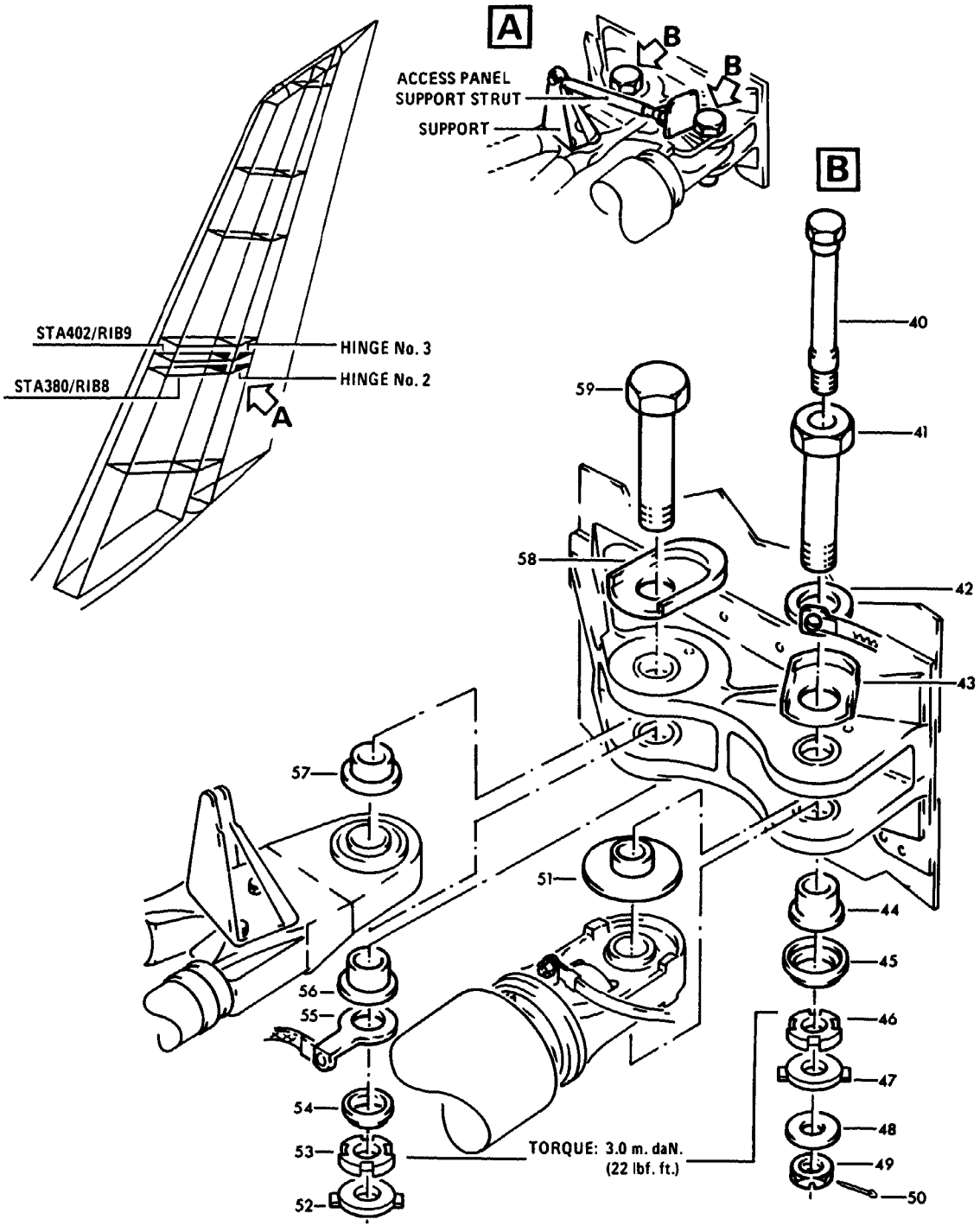
NOTE: <1> TORQUE: 0.5 m.daN (44.0 lbf. in.)
<2> TORQUE BETWEEN 0.33 AND 0.37 m.daN (29.2 AND 32.7 lbf. in.)

Rudder Position Transmitter, Hinges No. 1 and 7
Sheet 1 of 2
Figure 404

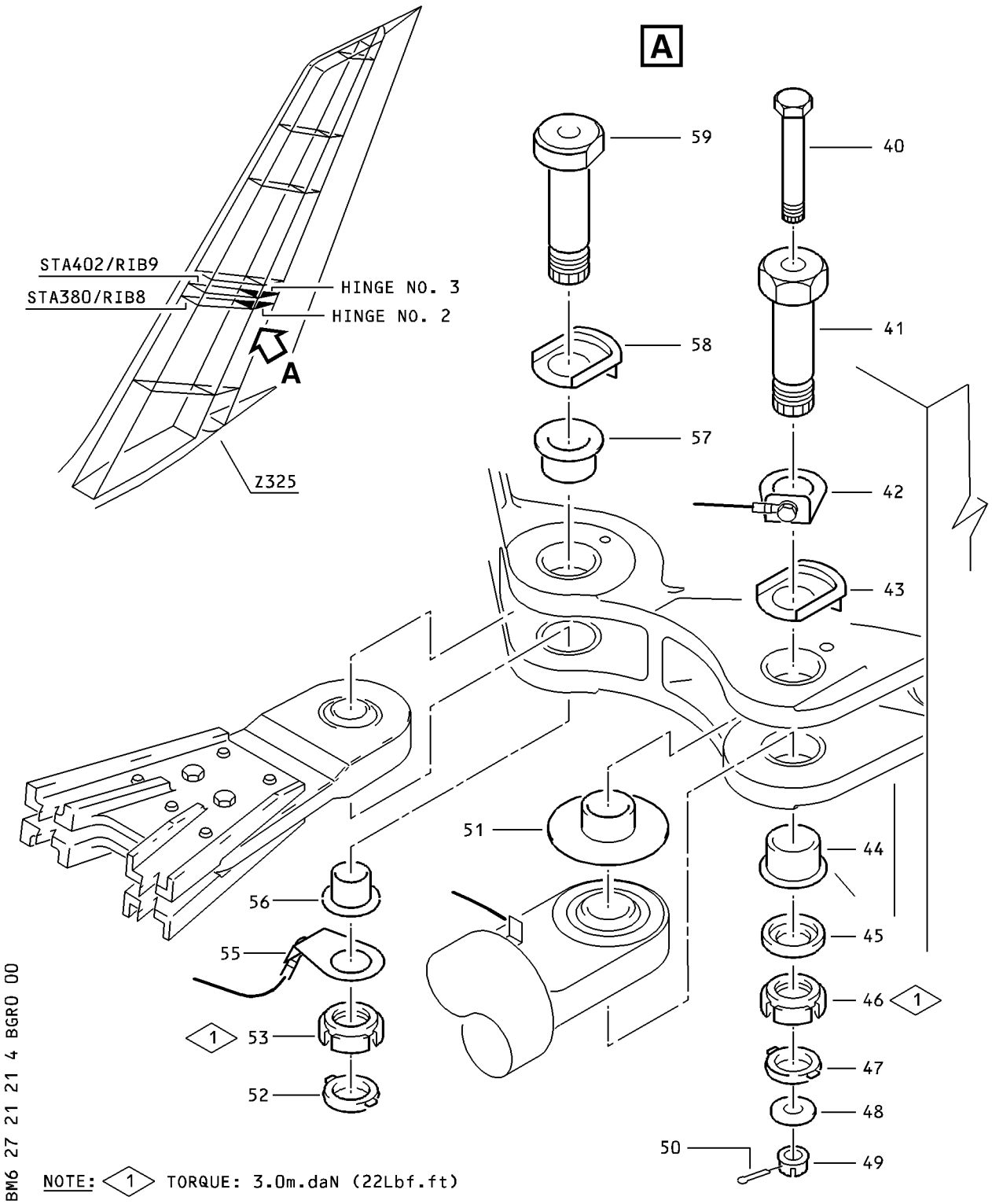


BM6 27 21 21 4 BEPM 00

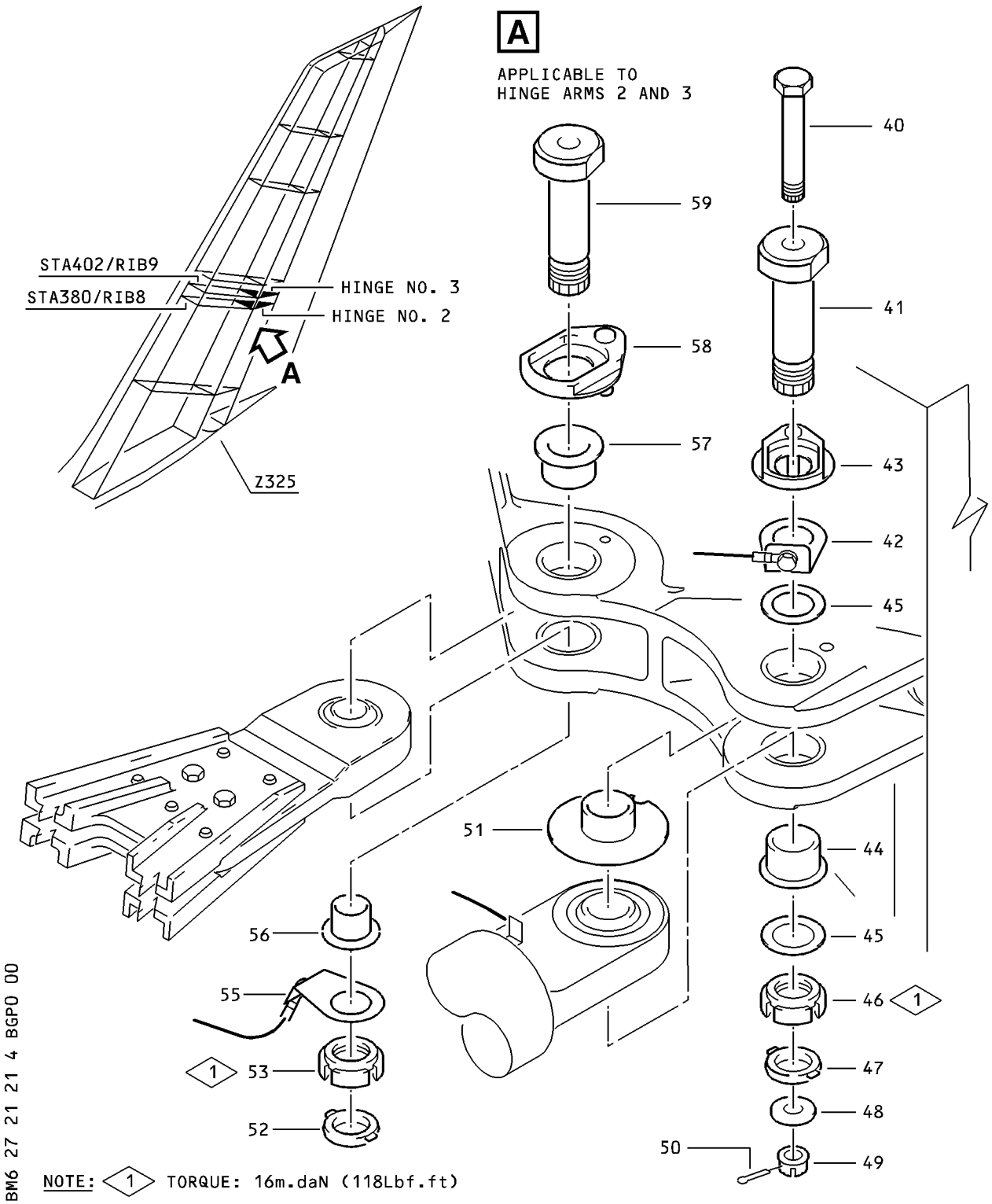
Rudder Position Transmitter, Hinges No. 1 and 7
Sheet 2 of 2
Figure 404



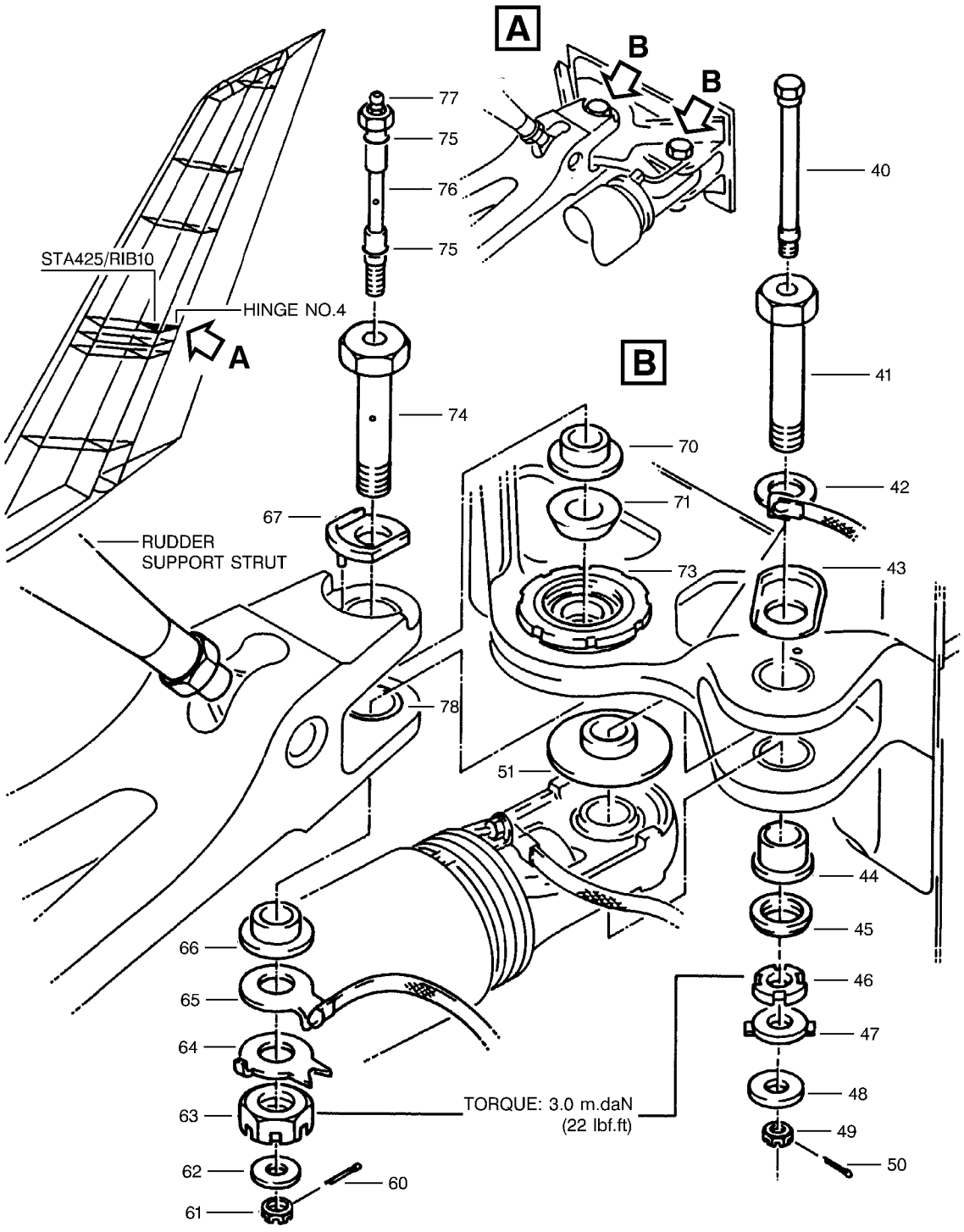
Servo Controls, Hinges No. 2 and 3
Figure 405



Servo Controls, Hinges No. 2 and 3
Figure 406

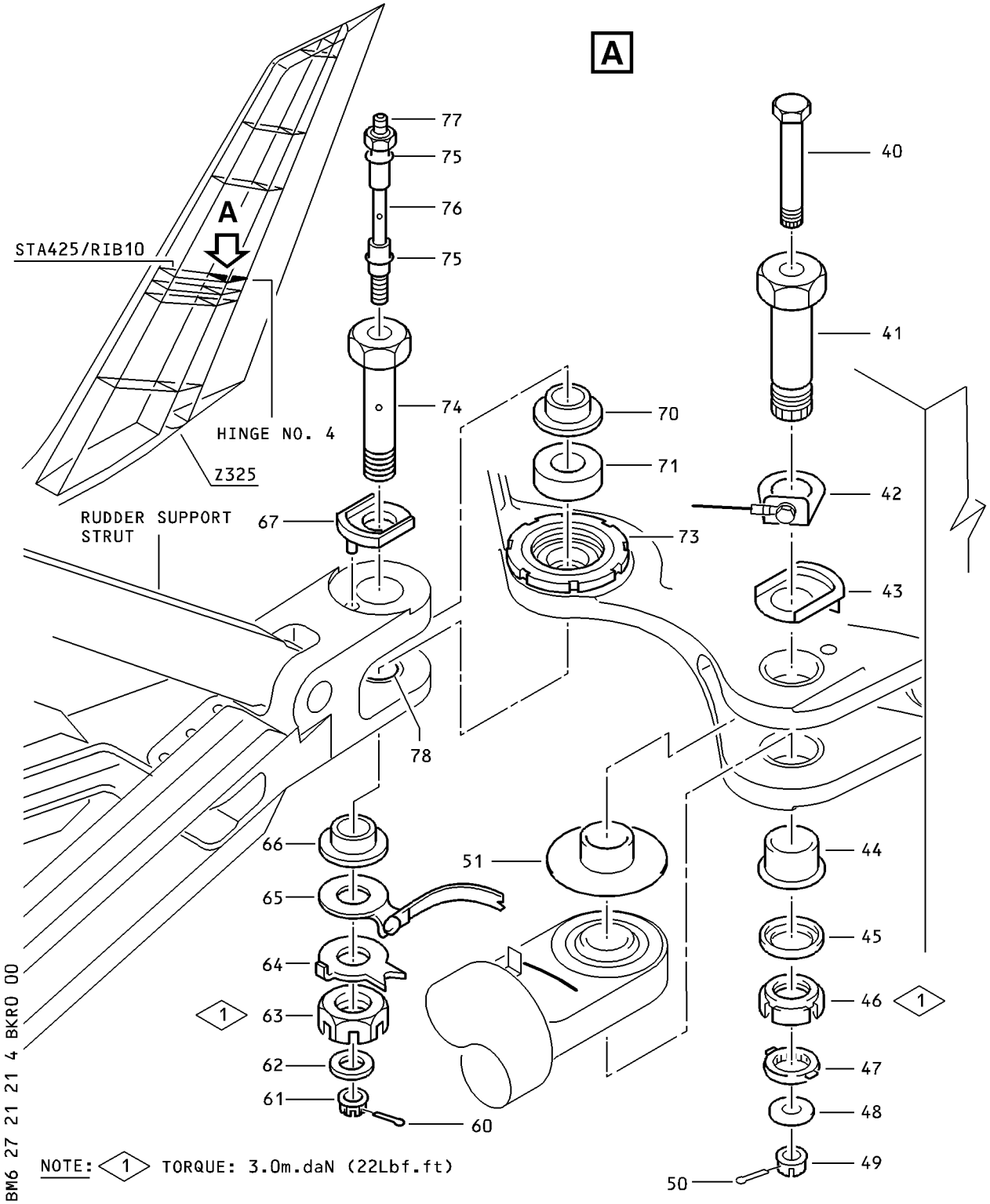


Servo Controls, Hinges No. 2 and 3
Figure 407

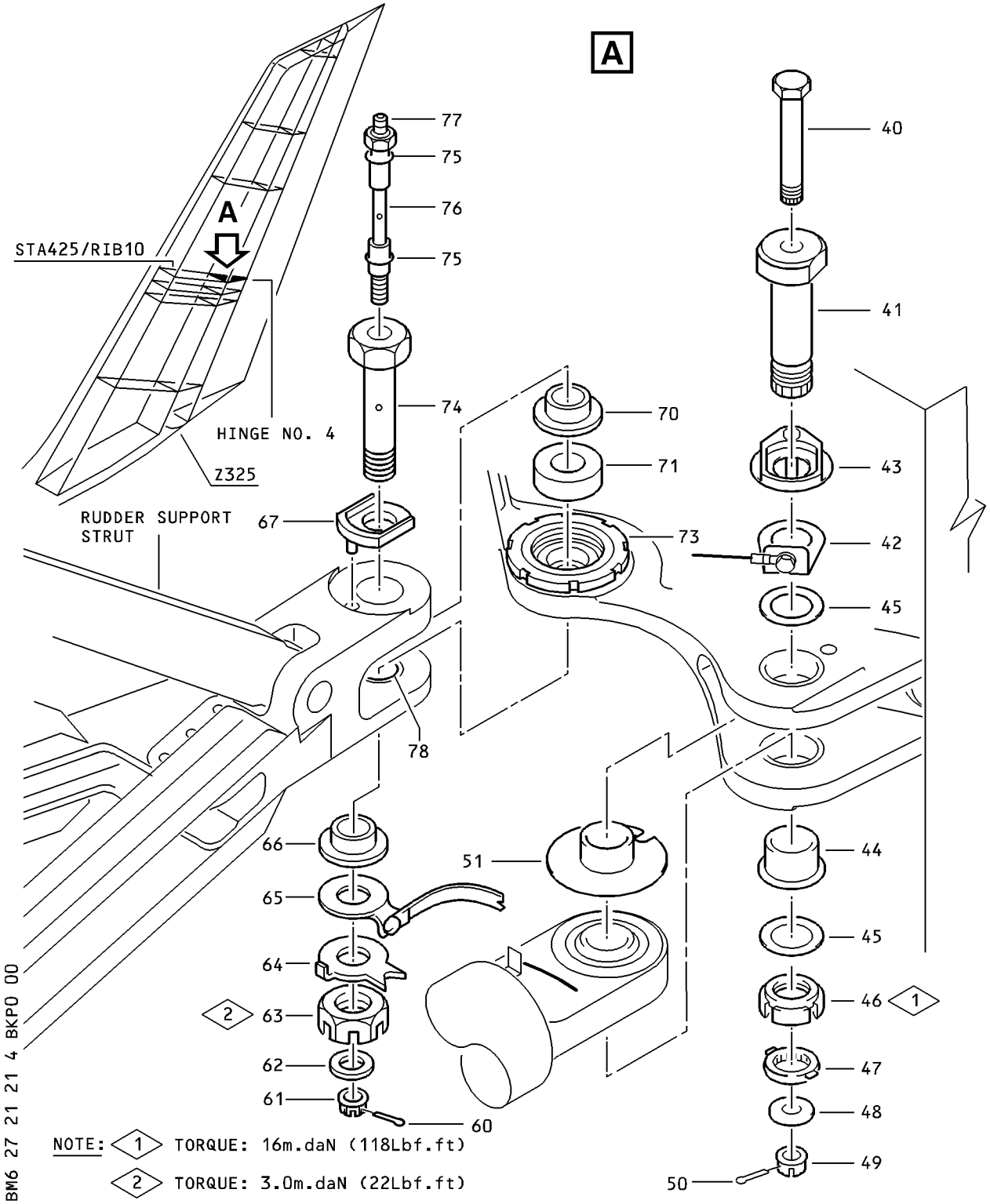


BM6 27 21 21 4 BKM0 00

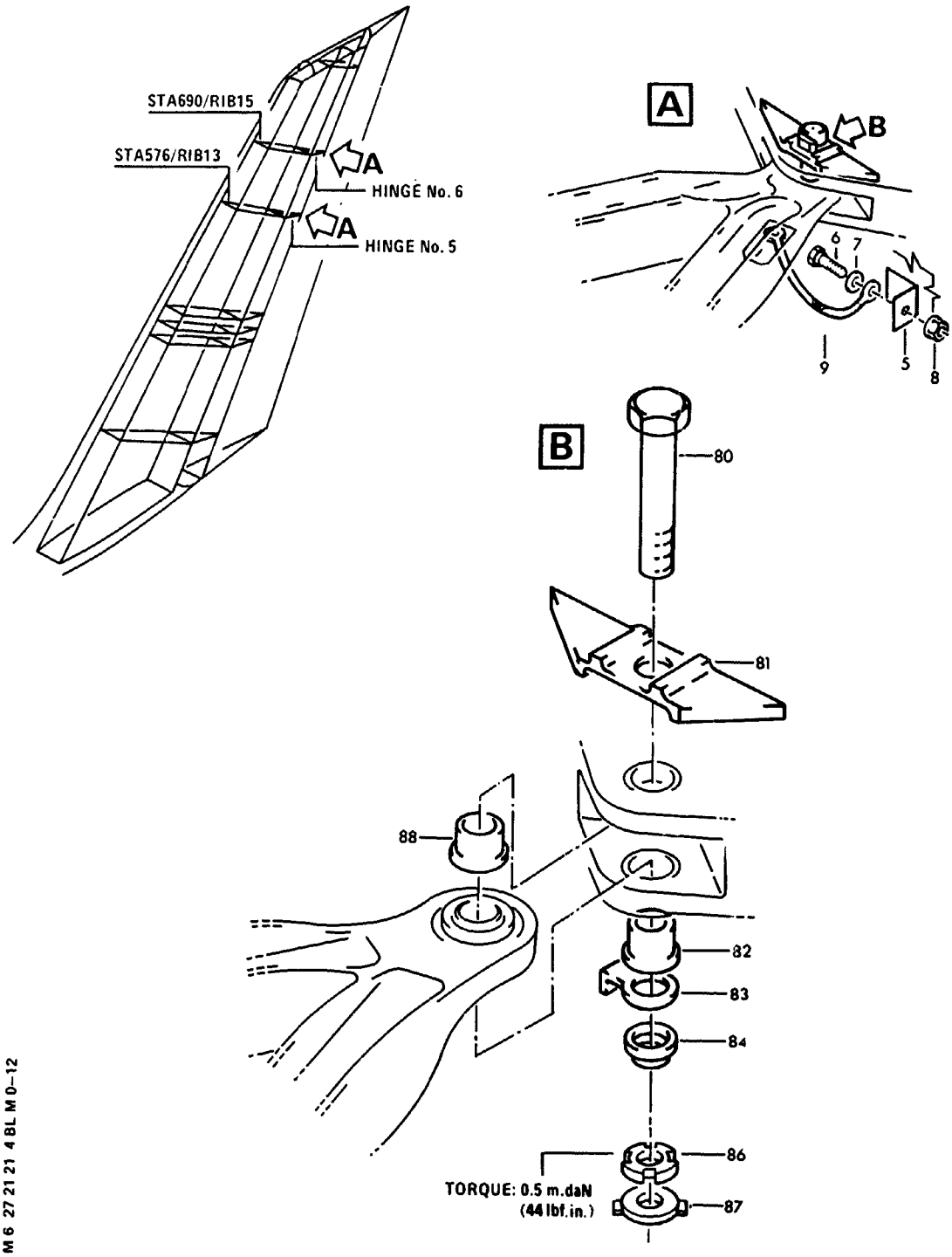
Servo Control, Hinge No. 4
Figure 408



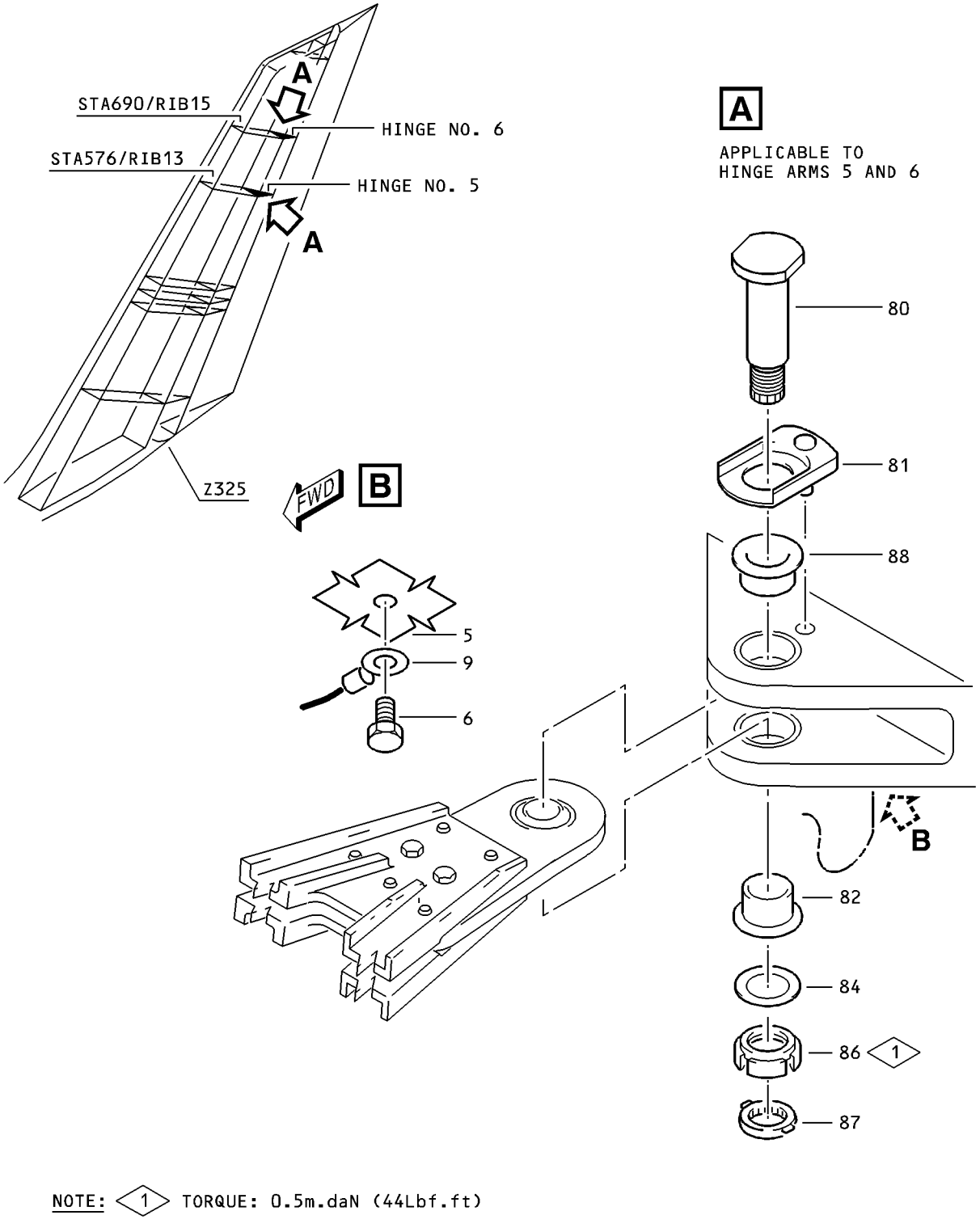
Servo Control, Hinge No. 4
Figure 409



Servo Control, Hinge No. 4
Figure 410



Hinges No. 5 and 6
Figure 411



NOTE: <1> TORQUE: 0.5m.daN (44Lbf.ft)

Hinges No. 5 and 6
Figure 412

terminal (83).
(c)Remove bolt (80) and locking plate (81).

**ON A/C 006-100,

CAUTION : AS CERTAIN BOLTS, BUSHES, ETC. ARE SIMILAR, IT IS ESSENTIAL TO IDENTIFY THE COMPONENTS FOR EACH HINGE IN ORDER TO AVOID ANY ERRORS ON INSTALLATION. USE A SEPARATE BAG PER HINGE TO CONTAIN ALL ASSOCIATED BOLTS, BUSHES, NUTS, ETC.

NOTE : Use STA-LOK extractor P/N SL90-314-3750 to remove lockwashers of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 1 and 5 to 7.
Use STA-LOK extractor P/N SL90-314-1-0000 to remove lockwashers of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 2 to 4 and on servo controls.

NOTE : Use STA-LOK notched wrench P/N SL90-315-3750 for ring nuts of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 1 and 5 to 7. Use STA-LOK notched wrench P/N SL90-315-1-0000 for ring nuts of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 2 to 4 and on servo controls.

(1)At hinge no. 1:
(a)Remove cotter pin (15), nut (14), washer (13), bolt (10), washers (11) and disconnect push rod (12).
(2)At hinges no. 1 and 7:
(a)Remove bolt (1) and disconnect bonding strap (4).
NOTE : There are two bonding straps at hinge no. 7.
(b)Remove cotter pin (25), lockwasher (20), ring nut (19) and washer (18), but do not remove bolt (24) at this stage.
(3)At hinges No. 5 and 6:
(a)Remove bolt (6) and disconnect bonding strap (9).
(b)Remove lockwasher (87), ring nut (86) and washer (84).
(c)Remove bolt (80) and locking device (81).

**ON A/C 001-100, 102-200,

(4)At hinges no. 2, 3 and 4:
(a)Remove cotter pin (50), nut (49), washer (48) and bolt (40).
(b)Remove lockwasher (47), ring nut (46) and cupwasher (45).
(c)Using extractor P/N 98A27003000200 (part of P/N 98A27003000000) remove bolt (41).
(d)Remove bonding terminal (42) and locking device (43).

**ON A/C 101-101,

(4)At hinges no. 2, 3 and 4:
(a)Remove cotter pin (50), nut (49), washer (48) and bolt (40).
(b)Remove lockwasher (47), ring nut (46) and washer (45).
(c)Using extractor P/N 98A27003000200 (part of P/N 98A27003000000) remove bolt (41).
(d)Remove locking device (43) bonding terminal (42) and washer (45).

**ON A/C 001-005, 101-200,

(5)At hinges no. 3 and 2:
(a)Remove lockwasher (52), ring nut (53), cupwasher (54) and bonding terminal (55).
(b)Remove bolt (59) and locking device (58).
(6)At hinge no. 4:
(a)Remove cotter pin (60), nut (61) and washer (62).
(b)Release tab washer (64), remove nut (63), tab washer (64) and bonding terminal (65).
(c)Remove bolts (74, 76) and locking device (67).

**ON A/C 006-100,

(5)At hinges no. 3 and 2:
(a)Remove lockwasher (52), ring nut (53), and bonding terminal (55).
(b)Remove bolt (59) and locking device (58).
(6)At hinge no. 4:
(a)Remove cotter pin (60), nut (61) and washer (62).
(b)Release tab washer (64), remove nut (63), tab washer (64) and bonding terminal (65).
(c)Remove bolts (74, 76) and locking device (67).

**ON A/C 001-005, 101-200,

(7)Tension applicable rudder sling P/N 98A55308440000 or P/N 98A55308741000, to remove load from hinges.

**ON A/C 006-100,

R (7)Tension rudder sling P/N 98A55308440000 or P/N 98A55308741000,
R to remove load from hinges.

**ON A/C 001-005, 101-200,

(8)At hinges no. 1 and 7:
(a)Remove bolt (24), sleeve (22) and locking plate (23).
(9)Move rudder aft and down in 90 degree direction from rudder axis until touching rubber mat.
(10)Move the rudder.
(a)For P/N 98A55308440000 move the rudder to the left of aircraft center line, then aft and away from the vertical stabilizer.
(b)For P/N 98A55308741000:
- move the rudder to the left of aircraft center line, then aft and away from the vertical stabilizer.
- rotate the rudder in the horizontal position.

WARNING : MAKE SURE THAT YOU GIVE THE CORRECT SUPPORT TO THE RUDDER DURING ITS MOVEMENT.
THE RUDDER WEIGHS APPROX. 200KG (441LBS).
ACCIDENTAL MOVEMENT OF THE RUDDER CAN KILL OR INJURE PERSONS.

CAUTION : DO NOT ATTACH THE RUDDER SLING TO DAMAGED HOISTING POINTS.
THIS CAN CAUSE DAMAGE TO THE RUDDER SLING .BEFORE YOU ATTACH THE RUDDER SLING, DO A CHECK OF THE HOISTING POINT FOR:
- SIGNS OF ACCIDENTAL DAMAGE
- SIGNS OF CRACKS
- GENERAL CONDITION.

(11)Use the hoisting sling and lower the rudder carefully into an applicable rudder support (transport box).

(12)Remove bushes and cone and identify with correct hinge position.

(a)At hinges no. 1 and 7, remove bushes (16, 21).

(b)At hinges no. 2 and 3, remove bushes (44, 51) and (56, 57).

(c)At hinge no. 4, remove bushes (44, 51), (66, 70) and cone (71), but do not remove bush (78).

(d)At hinges no. 5 and 6, remove bushes (82, 88).

C. Preparation for Installation

(1)On Replacement Rudder (Ref. Fig. 402)

**ON A/C 006-100,

(8)At hinges no. 1 and 7:

(a)Remove bolt (24) and sleeve (22).

(9)Move rudder aft and down in 90 degree direction from rudder axis until touching rubber mat.

(10)Move the rudder to the left of aircraft center line, then aft and away from the vertical stabilizer.

WARNING : MAKE SURE THAT YOU GIVE THE CORRECT SUPPORT TO THE RUDDER DURING ITS MOVEMENT.
THE RUDDER WEIGHS APPROX. 200KG (441LBS).
ACCIDENTAL MOVEMENT OF THE RUDDER CAN KILL OR INJURE PERSONS.

CAUTION : DO NOT ATTACH THE RUDDER SLING TO DAMAGED HOISTING POINTS.
THIS CAN CAUSE DAMAGE TO THE RUDDER SLING .BEFORE YOU ATTACH THE RUDDER SLING, DO A CHECK OF THE HOISTING POINT FOR:
- SIGNS OF ACCIDENTAL DAMAGE
- SIGNS OF CRACKS
- GENERAL CONDITION.

(11)Use the hoisting sling and lower the rudder carefully into an applicable rudder support (transport box).

(12)Remove bushes and cone and identify with correct hinge position.

(a)At hinges no. 1 and 7, remove bushes (16, 21).

(b)At hinges no. 2 and 3, remove bushes (44, 51) and (56, 57).

(c)At hinge no. 4, remove bushes (44, 51), (66, 70) and cone (71), but do not remove bush (78).

(d)At hinges no. 5 and 6, remove bushes (82, 88).

C. Preparation for Installation
(1)On Replacement Rudder (Ref. Fig. 402)

**ON A/C 001-005, 101-200,

WARNING : MAKE SURE THAT YOU GIVE THE CORRECT SUPPORT TO THE RUDDER DURING ITS MOVEMENT.
THE RUDDER WEIGHS APPROX. 200KG (441LBS).
ACCIDENTAL MOVEMENT OF THE RUDDER CAN KILL OR INJURE PERSONS.

CAUTION : DO NOT ATTACH THE RUDDER SLING TO DAMAGED HOISTING POINTS.
THIS CAN CAUSE DAMAGE TO THE RUDDER SLING .BEFORE YOU ATTACH THE RUDDER SLING, DO A CHECK OF THE HOISTING POINT FOR:
- SIGNS OF ACCIDENTAL DAMAGE
- SIGNS OF CRACKS
- GENERAL CONDITION.

(a)Remove hoisting lugs.

CAUTION : MAKE SURE THAT THE THREADS OF THE SLING ATTACHMENT BOLTS AND THE THREAD OF THE HOISTING LUG ARE FULLY INSTALLED IN THE HOISTING POINTS. IF THESE PARTS ARE NOT CORRECTLY INSTALLED, THE RUDDER CAN BE DAMAGED.

(b)Reverse and install LH transport hoisting lug.
(c)Position crane and attach applicable rudder sling P/N 98A55308440000 or P/N 98A55308741000.

NOTE : The P/N 98A55308440000 is used if the rudder was removed in vertical position.
The P/N 98A55308741000 is used if the rudder was removed with rotation in horizontal position.

**ON A/C 006-100,

WARNING : MAKE SURE THAT YOU GIVE THE CORRECT SUPPORT TO THE RUDDER DURING ITS MOVEMENT.
THE RUDDER WEIGHS APPROX. 200KG (441LBS).
ACCIDENTAL MOVEMENT OF THE RUDDER CAN KILL OR INJURE PERSONS.

CAUTION : DO NOT ATTACH THE RUDDER SLING TO DAMAGED HOISTING POINTS.
THIS CAN CAUSE DAMAGE TO THE RUDDER SLING .BEFORE YOU ATTACH THE RUDDER SLING, DO A CHECK OF THE HOISTING POINT FOR:
- SIGNS OF ACCIDENTAL DAMAGE
- SIGNS OF CRACKS
- GENERAL CONDITION.

(a)Remove blanking lugs.

CAUTION : MAKE SURE THAT THE THREADS OF THE SLING ATTACHMENT BOLTS AND THE THREAD OF THE HOISTING LUG ARE FULLY INSTALLED IN THE HOISTING POINTS. IF THESE PARTS ARE NOT CORRECTLY INSTALLED, THE RUDDER CAN BE DAMAGED.

(b)Position crane.
R (c)Attach rudder sling P/N 98A55308440000 or P/N 98A55308741000.
R NOTE : The P/N 98A55308440000 is used if the rudder was removed in
R vertical position.
R The P/N 98A55308741000 is used if the rudder was removed with
R rotation in horizontal position.

**ON A/C ALL

(d)Remove all LH and RH access panels (Ref. 55-42-13, P. Block 401).
(e)Install blanking plates P/N 98A27203001000 at rudder spar box.
(2)Transfer static dischargers from rudder to replacement rudder (Ref. 23-61-11, P. Block 401).
(3)Clean hinges, bolts, sleeves and bushes with cleaning agent (Mat. No. 11-004) and allow to dry.
(4)Around work area, carry out visual inspection to make certain that structure, paintwork, rudder control surface, hinge arms, bonding strap attachments etc. are free from damage.

**ON A/C 001-005, 102-200,

(5)Ensure good condition of bolts, sleeves, bushes, bearings and locking components. For replacement of damaged hinge bearing no. 4 (73) (Ref. Fig. 408) refer to 55-46-13, P. Block 401.
NOTE : The installation of a spherical roller bearing is preferable to the installation of a self-lubricating Teflon bearing. For replacement of a self-lubricating Teflon bearing by a spherical roller bearing refer to 55-46-13, P. Block 801.
(6)Apply grease (Mat. No. 04-004) to bolts, sleeves and bushes.
(7)Remove old sealant from locking devices (43, 58, 67) and from relevant spigot holes, apply sealant (Mat. No. 09-008) to spigots of locking devices (Ref. 51-76-10, P. Block 801) and install as follows:
(Ref. Fig. 405, 408)
(a)At hinges no. 2 and 3 install locking devices (43, 58).
(b)At hinge no. 4 install locking devices (43, 67).
(8)Install and secure temporarily with adhesive tape, cone and upper bushes as follows:
(Ref. Fig. 403, 405, 408)
(Ref. Fig. 411)
(a)At hinges no. 1 and 7 install bush (21).
(b)At hinges no. 2 and 3 install bushes (51, 57).
(c)At hinge no. 4 install cone (71) and bushes (70, 51).
(d)At hinges no. 5 and 6 install bush (88).

**ON A/C 006-100,

(5)Ensure good condition of bolts, sleeves, bushes, bearings and locking components. For replacement of damaged hinge bearing no. 4 (73) (Ref. Fig. 409) refer to 55-46-13, P. Block 401.
NOTE : The installation of a spherical roller bearing is preferable to the installation of a self-lubricating Teflon bearing. For replacement of a self-lubricating Teflon bearing by a spherical roller bearing refer to 55-46-13, P. Block 801.
(6)Apply grease (Mat. No. 04-004) to bolts, sleeves and bushes.
(7)Remove old sealant from locking devices (43, 58, 67) and from relevant spigot holes, apply sealant (Mat. No. 09-008) to spigots of locking

devices (Ref. 51-76-10, P. Block 801) and install as follows:
(Ref. Fig. 406, 409)
(a)At hinges no. 2 and 3 install locking devices (43, 58).
(b)At hinge no. 4 install locking devices (43, 67).
(8)Install and secure temporarily with adhesive tape, cone and upper bushes as follows:
(Ref. Fig. 404, 406, 409)
(Ref. Fig. 412)
(a)At hinges no. 1 and 7 install bush (21).
(b)At hinges no. 2 and 3 install bushes (51, 57).
(c)At hinge no. 4 install cone (71) and bushes (70, 51).
(d)At hinges no. 5 and 6 install bush (88).

**ON A/C 101-101,

(5)Ensure good condition of bolts, sleeves, bushes, bearings and locking components. For replacement of damaged hinge bearing no. 4 (73) (Ref. Fig. 410) refer to 55-46-13, P. Block 401.
NOTE : The installation of a spherical roller bearing is preferable to the installation of a self-lubricating Teflon bearing. For replacement of a self-lubricating Teflon bearing by a spherical roller bearing refer to 55-46-13, P. Block 801.
(6)Apply grease (Mat. No. 04-004) to bolts, sleeves and bushes.
(7)Remove old sealant from locking devices (43, 58, 67, 81) and from relevant spigot holes, apply sealant (Mat. No. 09-008) to spigots of locking devices (Ref. 51-76-10, P. Block 801) and install as follows:
(Ref. Fig. 410, 412, 407)
(a)At hinges no. 2 and 3 install locking devices (43, 58).
(b)At hinge no. 4 install locking devices (43, 67).
(c)At hinges no. 5 and 6 install locking devices (81).
(8)Install and secure temporarily with adhesive tape, cone and upper bushes as follows:
(Ref. Fig. 407, 412, 410)
(Ref. Fig. 404)
(a)At hinges no. 1 and 7 install bush (21).
(b)At hinges no. 2 and 3 install bushes (51, 57).
(c)At hinge no. 4 install cone (71) and bushes (70, 51).
(d)At hinges no. 5 and 6 install bush (88).

**ON A/C 001-005, 102-200,

D. Installation (Ref. Fig. 402, 403, 405)
(Ref. Fig. 408, 411)

**ON A/C 006-100,

D. Installation (Ref. Fig. 402, 404, 406)
(Ref. Fig. 412, 409)

**ON A/C 101-101,

D. Installation (Ref. Fig. 407, 404, 402)
(Ref. Fig. 410, 412)

**ON A/C 001-005, 101-200,

(1)Using crane, hoist and position rudder aft of vertical stabilizer.
CAUTION : A MECHANIC SHALL BE DELEGATED AT EACH HINGE, TO ALIGN AXIS OF HINGE ARMS AND SERVO CONTROLS WITH HINGE FITTINGS ON RUDDER.
CAUTION : AVOID DAMAGE TO SURFACE PROTECTION ON RUDDER HINGE ARMS.
(2)Move rudder to left of aircraft center line and then forward.
(3)Align rudder with aircraft center line and align holes in hinge arms and servo controls with holes in hinge fittings on rudder.
CAUTION : PAY SPECIAL ATTENTION TO THE DIFFERENT HINGE COMPONENTS.
NOTE : Bonding terminals (17, 83) are provided to be used for rudder without bonding terminal (5).
NOTE : Use STA-LOK notched wrench P/N SL90-315-3750 to tighten ring nuts of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 1 and 5 to 7.
Use STA-LOK notched wrench P/N SL90-315-1-0000 to tighten ring nuts of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 2 to 4 and on rudder servo controls.
NOTE : Use STA-LOK installation tool P/N SL90-313-3750 to install lockwashers of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 1 and 5 to 7. Use STA-LOK installation tool P/N SL90-313-1-0000 to install lockwashers of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 2 to 4 and on rudder servo controls.

(4)At hinges no. 1 and 7:
(a)Install bush (16), locking plate (23), sleeve (22) and bolt (24).
(b)Install bonding terminal (17), cupwasher (18) and ring nut (19).
(5)At hinges no. 5 and 6:
(a)Install bush (82), locking plate (81) and bolt (80).
(b)Install bonding terminal (83), cupwasher (84), and ring nut (86).
(6)At hinges no. 2 and 3:
(a)Make certain that locking device (58) is correctly installed.
(b)Install bush (56), bolt (59), bonding terminal (55), cupwasher (54) and nut (53).
(7)At hinge no. 4 with spherical roller bearing (73).
CAUTION : ATTACH BOLTS MUST HAVE GREASE FACILITIES.
(a)Make certain that locking device (67) and bush (78) are correctly installed.
(b)Install bush (66), bolt (74), bonding terminal (65), tab washer (64) and nut (63).
(c)TORQUE nut (63) to 3.0 m.daN (22 lbf. ft.) and safety with tab-washer (64).
(d)Ensure good condition of packings (75) and install bolt (76), washer (62) and nut (61).

(e)Finger-tighten nut (61) and safety with cotter pin (60).
(f)Press grease (Mat. No. 04-004) into grease nipple (77) to lubricate spherical roller bearing (73).

(8)TORQUE and safety ring nuts as follows:
(a)At hinges no. 1 and 7 TORQUE ring nut (19) to 0.5 m.daN (44 lbf.in.), install lockwasher (20) and safety with cotter pin (25).
(b)At hinges no. 5 and 6 TORQUE ring nut (86) to 0.5 m.daN (44 lbf.in.) and install lockwasher (87).

**ON A/C 006-100,

(1)Using crane, hoist and position rudder aft of vertical stabilizer.
CAUTION : A MECHANIC SHALL BE DELEGATED AT EACH HINGE, TO ALIGN AXIS OF HINGE ARMS AND SERVO CONTROLS WITH HINGE FITTINGS ON RUDDER.
CAUTION : AVOID DAMAGE TO SURFACE PROTECTION ON RUDDER HINGE ARMS.
(2)Move rudder to left of aircraft center line and then forward.
(3)Align rudder with aircraft center line and align holes in hinge arms and servo controls with holes in hinge fittings on rudder.
CAUTION : PAY SPECIAL ATTENTION TO THE DIFFERENT HINGE COMPONENTS.
NOTE : Use STA-LOK notched wrench P/N SL90-315-3750 to tighten ring nuts of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 1 and 5 to 7.
Use STA-LOK notched wrench P/N SL90-315-1-0000 to tighten ring nuts of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 2 to 4 and on rudder servo controls.
NOTE : Use STA-LOK installation tool P/N SL90-313-3750 to install lockwashers of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 1 and 5 to 7. Use STA-LOK installation tool P/N SL90-313-1-0000 to install lockwashers of STA-LOK locking system NSA5454 (Ref. 20-21-16, P. Block 1) on rudder hinge arms no. 2 to 4 and on rudder servo controls.
(4)At hinges no. 1 and 7:
(a)Install bush (16), sleeve (22) and bolt (24).
(b)Install washer (18) and ring nut (19).
(5)At hinges no. 5 and 6:
(a)Install bush (82), locking device (81) and bolt (80).
(b)Install washer (84), and ring nut (86).
(6)At hinges no. 2 and 3:
(a)Make certain that locking device (58) is correctly installed.
(b)Install bush (56), bolt (59), bonding terminal (55) and nut (53).
(7)At hinge no. 4 with spherical roller bearing (73).
CAUTION : ATTACH BOLTS MUST HAVE GREASE FACILITIES.
(a)Make certain that locking device (67) and bush (78) are correctly installed.
(b)Install bush (66), bolt (74), bonding terminal (65), tab washer (64) and nut (63).
(c)TORQUE nut (63) to 3.0 m.daN (22 lbf. ft.) and safety with tab-washer (64).
(d)Ensure good condition of packings (75) and install bolt (76), washer (62) and nut (61).

(e)Finger-tighten nut (61) and safety with cotter pin (60).
(f)Press grease (Mat. No. 04-004) into grease nipple (77) to lubricate spherical roller bearing (73).

(8)TORQUE and safety ring nuts as follows:
(a)At hinges no. 1 and 7 TORQUE ring nut (19) to 0.5 m.daN (44 lbf.in.), install lockwasher (20) and safety with cotter pin (25).
(b)At hinges no. 5 and 6 TORQUE ring nut (86) to 0.5 m.daN (44 lbf.in.) and install lockwasher (87).

**ON A/C 001-100, 102-200,

(c)At hinges no. 2 and 3 TORQUE ring nut (53) to 3.0 m.daN (22 lbf.ft.) and install lockwasher (52).

**ON A/C 101-101,

(c)At hinges no. 2 and 3 TORQUE ring nut (53) to 16.0 m.daN (118 lbf.ft.) and install lockwasher (52).

**ON A/C 001-100, 102-200,

(9)At hinges no. 4, 3 and 2 connect servo controls.
(a)Make certain that locking device (43) is correctly installed.
(b)Install bush (44), bonding terminal (42), bolt (41), cupwasher (45) and ring nut (46).

**ON A/C 101-101,

(9)At hinges no. 4, 3 and 2 connect servo controls.
(a)Position washer (45) bonding terminal (42) and install locking device (43).
(b)Install bush (44), bolt (41), washer (45) and ring nut (46).

**ON A/C 001-100, 102-200,

(c)TORQUE ring nut (46) to 3.0 m.daN (22 lbf.ft.) and install lockwasher (47).

**ON A/C 101-101,

(c)TORQUE ring nut (46) to 16.0 m.daN (118 lbf.ft.) and install lockwasher (47).

**ON A/C 001-005, 101-200,

(d)Install bolt (40), washer (48) and nut (49).
(e)Finger-tighten nut (49) and safety with cotter pin (50).

(10)At hinge connections no. 1 thru 7:
(a)Apply moisture removing oil (Mat. No. 05-027) thinly to all visible cadmium-plated steel parts (Ref. 51-75-10, P. Block 801).

(11)Connect bonding straps. For electrical bonding refer to 20-28-11, P. Block 1.
(a)At hinges no. 5 and 6 install bonding strap (9) with bolt (6), washer (7) and nut (8).
(b)At hinges no. 1 and 7 install bonding strap (4) with bolt (1), washer (2) and nut (3).
NOTE : There are two bonding straps at hinge no. 7.
(c)Apply clear nylon coating (Mat. No. 16-003) to bonding connections (Ref. 51-76-10, P. Block 801).
(12)At hinge no. 1 connect rudder position transmitter.
(a)Position pushrod (12) and install bolt (10), washers (11, 13) and nut (14).
(b)TORQUE nut (14) to between 0.33 and 0.37 m.daN (29.2 and 32.7 lbf.in.) and safety with cotter pin (15).
(13)Remove fixture P/N 98A27407530000 from between hinges no. 2, 3 and 4.
(14)Position and tighten clips of electrical harness at hinges no. 2, 3 and 4.

**ON A/C 006-100,

(d)Install bolt (40), washer (48) and nut (49).
(e)Finger-tighten nut (49) and safety with cotter pin (50).
(10)At hinge connections no. 1 thru 7:
(a)Apply moisture removing oil (Mat. No. 05-027) thinly to all visible cadmium-plated steel parts (Ref. 51-75-10, P. Block 801).
(11)Connect bonding straps. For electrical bonding refer to 20-28-11, P. Block 1.
(a)At hinges no. 5 and 6 install bonding strap (9) with bolt (6) at bonding terminal (5).
(b)At hinges no. 1 and 7 install bonding strap (4) with bolt (1) at bonding terminal (5).
NOTE : There are two bonding straps at hinge no. 7.
(c)Apply clear nylon coating (Mat. No. 16-003) to bonding connections (Ref. 51-76-10, P. Block 801).
(12)At hinge no. 1 connect rudder position transmitter.
(a)Position pushrod (12) and install bolt (10), washers (11, 13) and nut (14).
(b)TORQUE nut (14) to between 0.33 and 0.37 m.daN (29.2 and 32.7 lbf.in.) and safety with cotter pin (15).
(13)Remove fixture P/N 98A27407530000 from between hinges no. 2, 3 and 4.
(14)Position and tighten clips of electrical harness at hinges no. 2, 3 and 4.

**ON A/C 001-005, 101-200,

(15)Remove applicable sling P/N 98A55308440000 or P/N 98A55308741000 from rudder.
(16)Remove LH transport hoisting lug and degrease all hoisting lugs with cleaning agent (Mat. No. 11-004).
(17)Apply corrosion-preventive paste (Mat. No. 05-002) to all hoisting lugs and install with lugs turned inwards and flush with rudder skin.

**ON A/C 006-100,

(15)Not applicable.
R (16)Remove sling P/N 98A55308440000 or P/N 98A55308741000.
(17)Install blanking plugs flush with rudder skin.

**ON A/C ALL

(18)Install self-adhesive discs (Mat. No. 05-052) over hoisting points (Ref. 11-20-00, P. Block 1).
(19)Make certain that travel ranges of rudder and actuators are clear of tools and miscellaneous items of equipment.
(20)Remove rubber mat from between rudder and fuselage.
(21)Install rudder fairings (Ref. 53-10-71, P. Block 401).

**ON A/C 001-005, 101-200,

(a)If a new rudder is installed adjust gap between bottom of rudder and rudder fairing by support strut at hinge no. 4 (Ref. 55-36-45, P. Block 401).

**ON A/C ALL

(22)Remove safety clips and tags, and close circuit breakers 1CB, 2CB, 1CT, and 1CG.
(23)Remove rigging pin P/N 98A27901006000 (Qty. 2).

E. Adjustment/Test
(1)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)Connect hydraulic ground power cart and pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(4)Make certain that B/G/Y pushbutton switches on SERVO CTL section of panel 428VU are pressed in (legends OFF).
(5)Install rigging pin P/N 98A27307547000 in rudder control drive shaft at RIB 8 if not already installed.
(6)Check that rudder is in neutral position with each hydraulic system as follows:
(a)Check that rudder is in neutral corresponding with marking on tailcone.
(b)On SERVO CTL section of panel 428VU:
- press pushbutton switch G
- release pushbutton switches B and Y.
(c)Check that rudder has not moved from neutral.
(d)If rudder has moved, adjust actuating spring rod (Ref. 27-21-23, P. Block 401).
(e)Repeat steps (a) thru (d) with B hydraulic systems.
(f)Repeat steps (a) thru (d) with Y hydraulic systems.
(7)Remove rigging pin P/N 98A27307547000.

(8)Carry out functional test of rudder (Ref. 27-21-00, P. Block 501).
(9)Carry out adjustment of rudder position indicating system (Ref. 27-25-00, P. Block 501).
(10)Carry out functional test of rudder position indicating system (Ref. 27-25-00, P. Block 501).
(11)If a new rudder has been installed, carry out system test of rudder (Ref. 27-21-00, P. Block 501).
NOTE : If only the rudder is replaced, without any action in the rudder control system, steps concerning measurement of pedal forces can be ignored.

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove blanking plates P/N 98A27203001000 from rudder spar box.
(3)Install all LH and RH leading edge access panels (Ref. 55-42-11, P. Block 401).
(4)At hinges no. 2 and 3 install access panel support struts (Ref. 55-33-13, P. Block 401).
(5)Install all LH and RH trailing edge access panels (Ref. 55-33-13, P. Block 401).
(6)Remove warning notices.
(7)Remove access platforms.

SERVO CONTROL ACTUATING SPRING ROD - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

NOTE : The servo control actuating spring rods are identical in design and function. Only one is described and illustrated.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 11 m (36 ft.)
B. 98A27307547000	Rigging Pin - Bellcrank Assembly, Rudder Servo Controls
C. 98A27901006000	Pin - Rigging, Rudder Control (Qty. 2)
D.	Torque Wrench, 0.23 m.daN (20.4 lbf.in.)
E.	Cotter Pins
F.	Corrosion-Resistant Steel Lockwire, 0.8 mm (0.032 in.) dia.
G.	Circuit Breaker Safety Clips
H.	Warning Notice
J.	Tape measure
K. Material No. 04-004	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 27-25-00, P. Block 501	Control Surface Position Indicating (Rudder)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 55-33-13, P. Block 401	Trailing Edge Access Panels

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Make certain that rudder pedals are set at neutral, and install rigging pins P/N 98A27901006000 (Qty. 2) in the rudder control bellcranks on control bellcranks located under each set of rudder pedals in the avionics compartment.
(3)Make certain that rudder trim control is set at zero.
(4)Display warning notice in flight compartment prohibiting operation of flight controls.
(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM SLOW	1CG	201/J27
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

WARNING : DO NOT PRESSURIZE HYDRAULIC SYSTEMS BEFORE ALL SERVO ACTUATING SPRING RODS ARE INSTALLED, TO PREVENT SUDDEN MOVEMENT OF RUDDER BY UNCONTROLLED SERVO ACTUATORS.

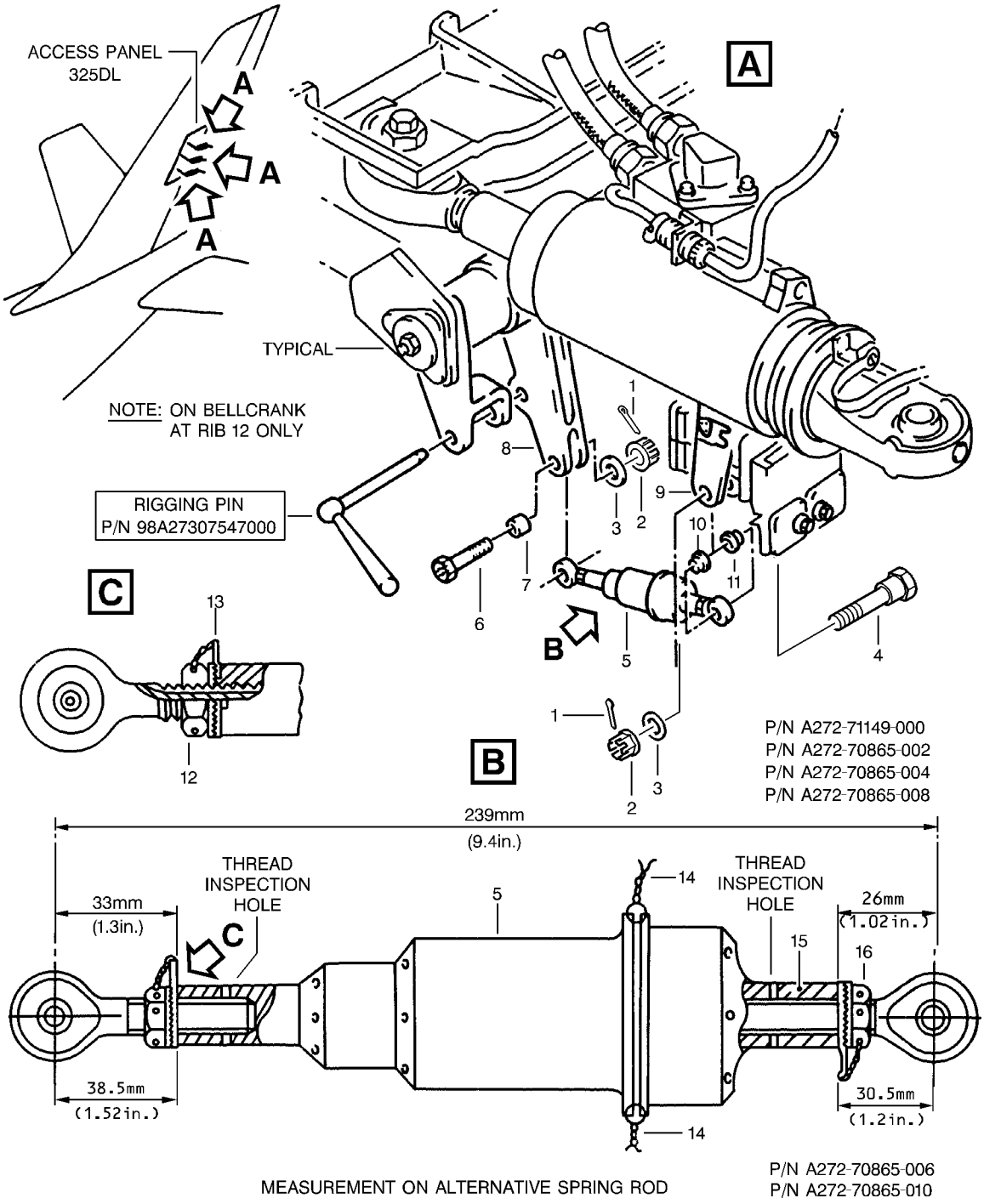
(6)Display warning notice, prohibiting repressurization of hydraulic systems.
(7)Open trailing edge access panel 325DL and remove access panel support struts (Ref. 55-33-13, P. Block 401).
(8)Install rigging pin P/N 98A27307547000 into the lower rudder servo springrod input bellcrank.

B. Removal (Ref. Fig. 401)
(1)Remove cotter pins (1), nuts (2) and washers (3).
(2)Support spring rod (5) and remove bolts (6, 4).
(3)Remove spring rod (5) and bush (7).
(4)In lever (9), secure loose bushes (10, 11) temporarily.

C. Preparation for Installation (Ref. Fig. 401)
(1)Measure and record distance between rod end centers of removed spring rod (5).
NOTE : Distance between rod end centers should be approx. 239 mm (9.4 in.).

R On spring rods A272-70865-002, A272-70865-004, A272-70865-008
R or reworked spring rod A272-71149-000:
Rod end measurements of 26 mm (1.02 in.) and 33 mm (1.3 in.) should be observed.

R On alternative spring rod A272-70865-006 or A272-70865-010:
Rod end measurements of 30.5 mm (1.2 in.) and 38.5 mm (1.52 in.) should be observed.



BM6 27 21 23 4 AAM0 06

Servo Control Actuating Spring Rod
Figure 401

R

(2)Adjust replacement spring rod (5), as previously recorded but do not tighten nut (12).
(3)Check that spring rod is free from axial play.
(4)Check that spring rod engagement threshold is between 13 and 17 daN (29.2 and 38.2 lbf.).
(5)Check that lockwires (14) are in position and in good condition.
(6)Check that drain holes are clear.

D. Installation (Ref. Fig. 401)
(1)Coat all bolts and threaded parts with grease (Mat. No. 04-004).
(2)Make certain that rudder is in neutral position.
(3)Check that bushes (10) and (11) are in place in servo control input lever.
(4)Position spring rod (5) with larger diameter towards servo control input lever (9) and install bush (7), bolts (4, 6), washers (3) and nut (2).
(5)TORQUE nuts (2) to between 0.21 and 0.23 m.daN (18.6 and 20.4 lbf.in.) and safety with cotter pins (1).

E. Adjustment Test (Ref. Fig. 401)
NOTE : If the three spring rods have been replaced, or the reference neutral position triangle is missing, carry out adjustment of rudder to neutral (Ref. 27-21-00, P. Block 501).
(1)Remove safety clips and tags, and close circuit breakers 1CB, 2CB, 1CG.
(2)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Make certain that travel ranges of rudder and actuators are clear of tools and miscellaneous items of equipment.
(5)Make certain that rigging pin P/N 98A27307547000 is installed into the lower rudder servo springrod input bellcrank.
(6)Remove rigging pins P/N 98A27901006000 (Qty. 2) from the rudder control bellcranks located under each set of rudder pedals in the avionics compartment.
(7)Connect hydraulic ground power cart and pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(8)Make certain that B/G/Y pushbutton switches on SERVO CTL section of panel 428VU are pressed in (legends OFF).
(9)Test of servo controls
NOTE : Upper servo control - B pushbutton switch.
Center servo control - G pushbutton switch.
Lower servo control - Y pushbutton switch.

ACTION	RESULT
1. Check that rudder is in neutral as previously recorded.	
2. On SERVO CTL section of panel 428VU: - press pushbutton switch G. - release pushbutton switches B and Y.	Check that rudder trailing edge is in line with or in limits of the reference triangle NSA 950200 located

ACTION	RESULT
	on the rear cone. NOTE : Maximum tolerance of the rudder trailing edge is 1 mm (0.039 in.) either side of the triangle axes.
If the rudder trailing edge is not within the reference triangle tolerance adjust the corresponding actuating spring rod (5) (Ref. Para. F.)	
3. On SERVO CTL section of panel 428VU: - press pushbutton switch B. - release pushbutton switch G.	Check that rudder trailing edge is in line with or in limits of the reference triangle NSA 950200 located on the rear cone. NOTE : Maximum tolerance of the rudder trailing edge is 1 mm (0.039 in.) either side of the triangel axes.
If the rudder trailing edge is not within the reference triangle tolerance adjust the corresponding actuating spring rod (5) (Ref. Para. F.)	
4. On SERVO CTL section of panel 428VU: - press pushbutton switch Y. - release pushbutton switch B.	Check that rudder trailing edge is in line with or in limits of the reference triangle NSA 950200 located on the rear cone. NOTE : Maximum tolerance of the rudder trailing edge is 1 mm (0.039 in.) either side of the triangel axes.
If the rudder trailing edge is not within the reference triangle tolerance adjust the corresponding actuating spring rod (5) (Ref. Para. F.)	
5. Remove rigging pin P/N 98A27307547000.	
6. On SERVO CTL section of panel 428VU: - press pushbutton switch G. - release pushbutton switch Y.	
7. Move rudder fully left.	Check that rudder full deflection and neutral is

ACTION	RESULT
	1057 mm ± 34 mm (41.22 in. ± 1.34 in.).
- release pedals.	Check that rudder returns to neutral.
8. Move rudder fully right.	Check that rudder full deflection and neutral is 1057 mm ± 34 mm (41.22 in. ± 1.34 in.).
-release pedals.	Check that rudder returns to neutral.
9. Repeate steps 7 and 8 with G and B hydraulic system.	Same result.

(10)Make certain that hydraulic flexible hoses of rudder servo controls do not chafe on rear spar of vertical stabilizer spar box.
(11)Carry out functional test of position indicating system (Ref. 27-25-00, P. Block 501).

F. Adjust actuating spring rod (5) for the servo control which gives an incorrect neutral position as follows:
(1)Cut and remove lockwire from nut (12).
(2)Loosen nut (12) and serrated locking device (13).
NOTE : Make sure that both spring rod eye ends are held in a fixed and correctly aligned position before turning the spring rod body so that they do not move at all. Do not allow the eye ends to rotate back and forth as this may damage the bearings.
(3)Adjust length by rotating spring rod body, until rudder is in neutral position.
(4)Engage serrated locking device (13) and tighten nut (12).
(5)Make certain that rod end threads are visible through inspection holes.
(6)Safety nut (12) with lockwire to serrated locking device (13).

G. Close-Up
(1)Shut down and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(2)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Install access panel support struts and close trailing edge access panel 325DL (Ref. 55-33-13, P. Block 401).
(5)Remove warning notices.
(6)Remove access platform.

CRANK HANDLE - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROL.

1. Equipment and Materials

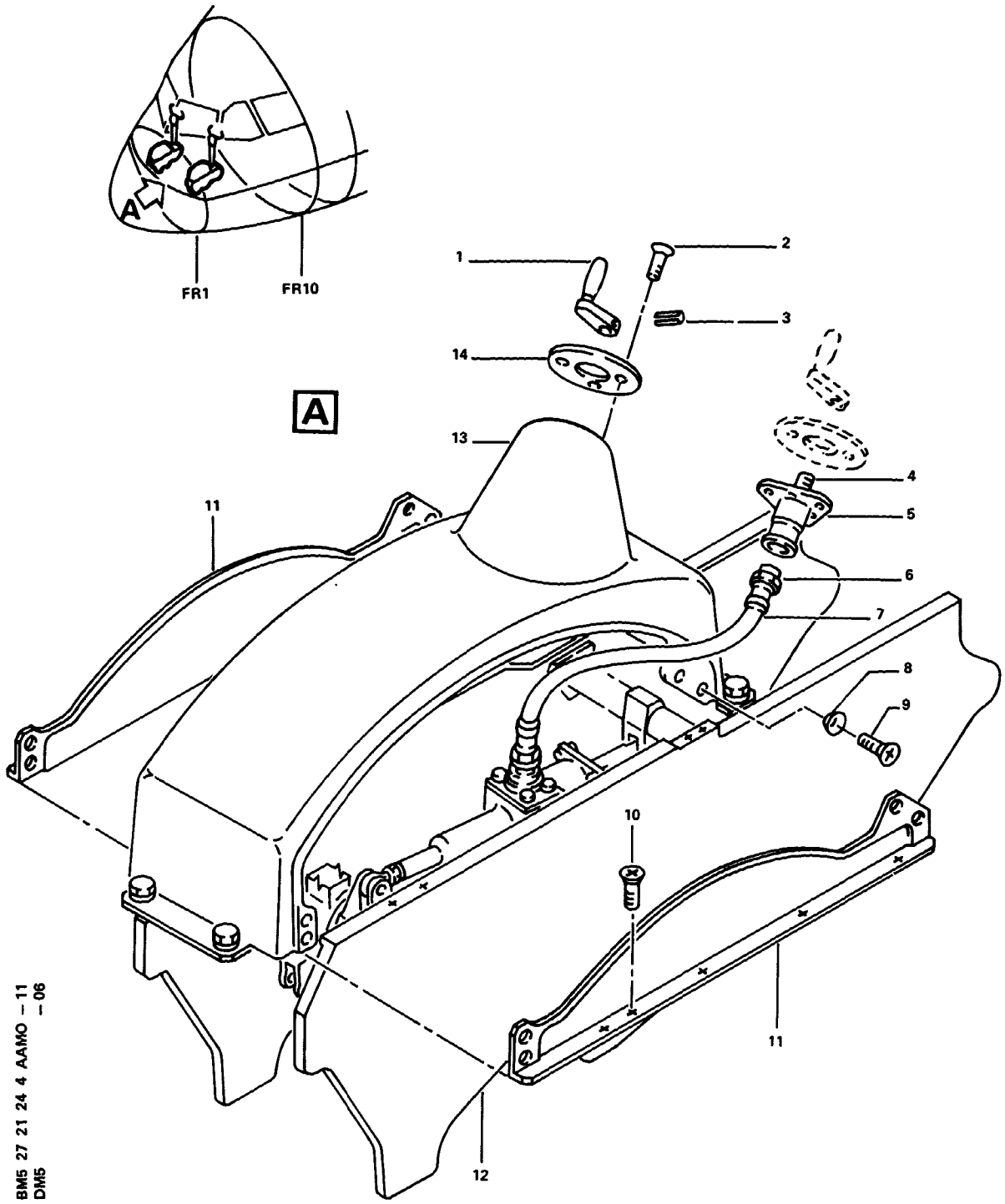
ITEM	DESIGNATION
A.	Lockwire, Corrosion Resistant Steel, Dia. 0.8 mm (0.032 in.)
B. Material No. 04-004	Common Greases (Ref. 20-31-00)
C.	Access Platform 5.75 m (8 ft. 10 in.)
D.	Warning Notice

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Open forward passenger/crew door.
(3)On overhead panel, display warning notice prohibiting hydraulic system pressurization.

B. Removal (Ref. Fig. 401)
(1)Drive out cotter pin (3).
(2)Remove crank handle (1).
(3)Remove attaching screws (10) from side plates (11) on beam (12) ; remove attaching screws (9) from side plates (11) on housing (13). Retain washers (8). Remove side plates (11).
(4)Support equipped sleeve (5).
(5)Remove attaching screws (2) from cover plate (14) on housing (13).
(6)Remove cover plate (14).
(7)Remove lockwire, remove nut (6) connecting flexible control cable to equipped sleeve (5).
(8)Remove equipped sleeve (5).

C. Installation
NOTE : Coat threads of nuts, screws and parts with grease No.04-004.
(1)Connect flexible control cable (7) to equipped sleeve (5).



Crank Handle
Figure 401

(2)Install and wirelock nut (6) connecting flexible control cable (7) to sleeve (5).
(3)Position equipped sleeve (5), cover plate (14) and install on housing (13) with screws (2). Tighten screws (2).
(4)Position side plates (11) and install on beam (12) with screws (10) and on housing (13) with washers (8) and screws (9).
(5)Install crank handle (1) to driving pin (4).
(6)Insert cotter pin (3).

D. Test
Operate control from stop to stop. Check for smooth operation.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)On overhead panel, remove warning notice.
(3)Close forward passenger/crew door
(4)Remove access platform

FLEXIBLE DRIVE SHAFT - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

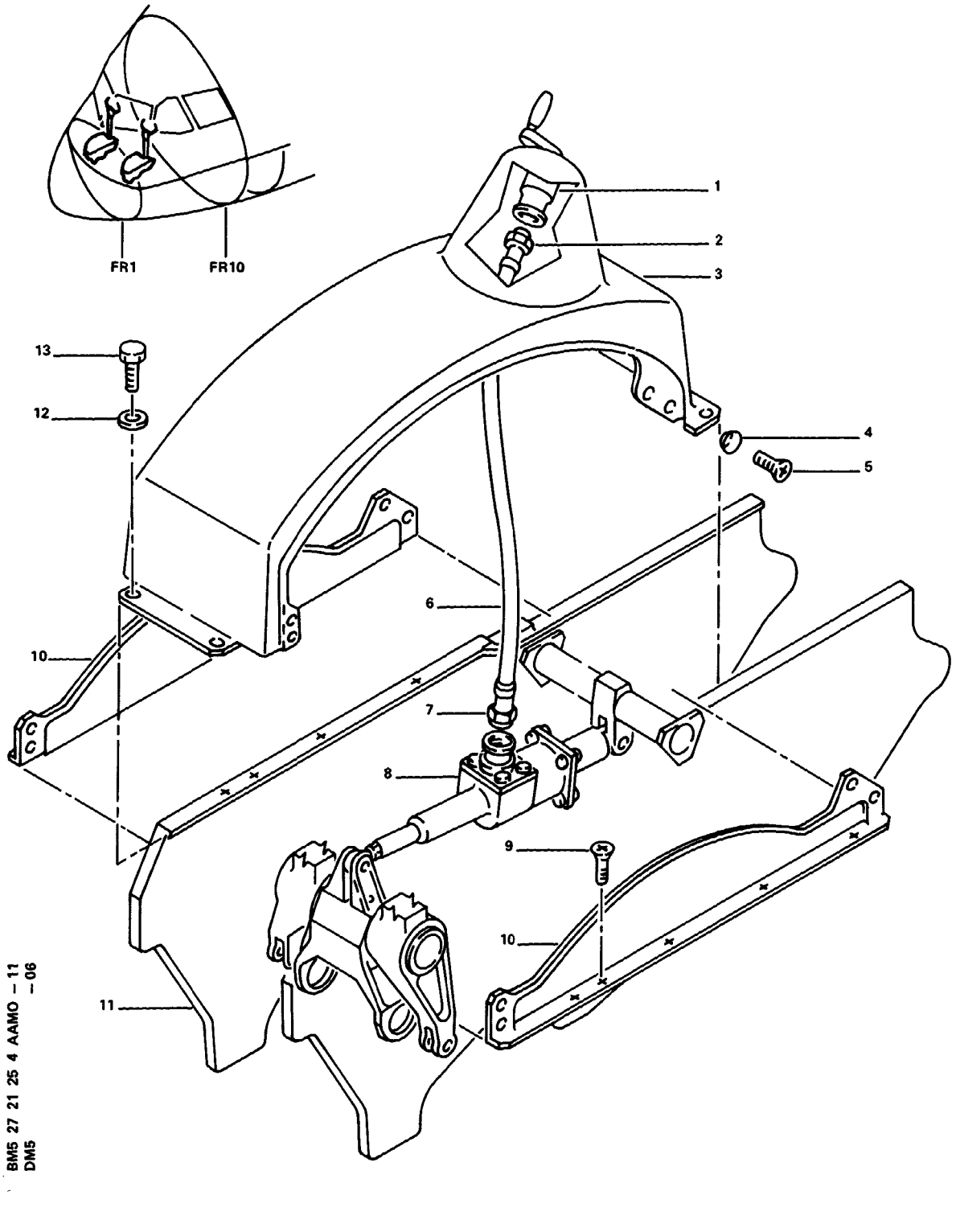
ITEM	DESIGNATION
A.	Lockwire, Corrosion-Resistant Steel Dia. 0.8 mm (0.032 in.)
B. Material No. 04-004	Common Greases (Ref. 20-31-00)
C.	Access Platform 5.75 m (8 ft. 10 in.)
D.	Warning Notice Prohibiting Hydraulic System Pressurization

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Open Fwd passenger/crew door.
(3)On overhead panel, display warning notice prohibiting hydraulic system pressurization.

B. Removal (Ref. Fig. 401)
(1)On housing (3), remove attaching screws (5) from side plates (10); on beam (11) remove attaching screws (9) from side plates (10). Retain washers (4).
(2)Remove side plates (10).
(3)Remove lockwire, remove nut (7) connecting flexible control cable (6) to screwjack (8). Disengage end of flexible control cable (6).
(4)Remove attaching screws (13) from housing (3). Retain washers (12).
(5)Remove housing (3).
(6)Remove lockwire, remove nut (2) connecting flexible control cable (6) to crank handle assembly (1).
(7)Remove flexible control cable (6).

C. Installation
NOTE : Coat threads of screws, nuts and parts with grease No.04-004.
(1)Connect flexible control cable (6) to crank handle assembly (1).
(2)Install nut (2) and lockwire.



Flexible Drive Shaft
Figure 401

(3)Position housing (3) on beam (11).
(4)Connect flexible control cable (6) to screwjack (8).
(5)Install nut (7) and lockwire.
(6)Install housing (3) with screws (13) and washers (12).
(7)Position side plates (10) and install on beam (11) with attaching screws (5), washers (4) and screws (9).

D. Test
Operate control from stop to stop, and check for smooth operation.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)On overhead panel, remove warning notice.
(3)Close access door.
(4)Remove access platform.

YAW/BRAKE BELLCRANK - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A27901006000	Pin - Rigging, Rudder Control
B. 98A27901002000	Pin - Rigging, Rudder Control
C. Material No. 04-004	Common Greases (Ref. 20-31-00)
D.	Access Platform (2.65 m to 5.50 m) (8 ft.-8 in.to 18 ft.)
E.	Warning Notice Prohibiting Pressurization of Hydraulic System and Operation of Pedals
F.	Lockwire - Corrosion Resistant Steel Dia 0.8 mm (0.032 in.)
G.	Circuit Breaker Safety Clips
Referenced Procedures	
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 27-31-31, P. Block 401	Forward Detent Bellcrank

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Open access door 121BL.
(3)On RUD TRIM section of panel 408VU
- Make certain that rudder trim is in neutral position.
(4)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27

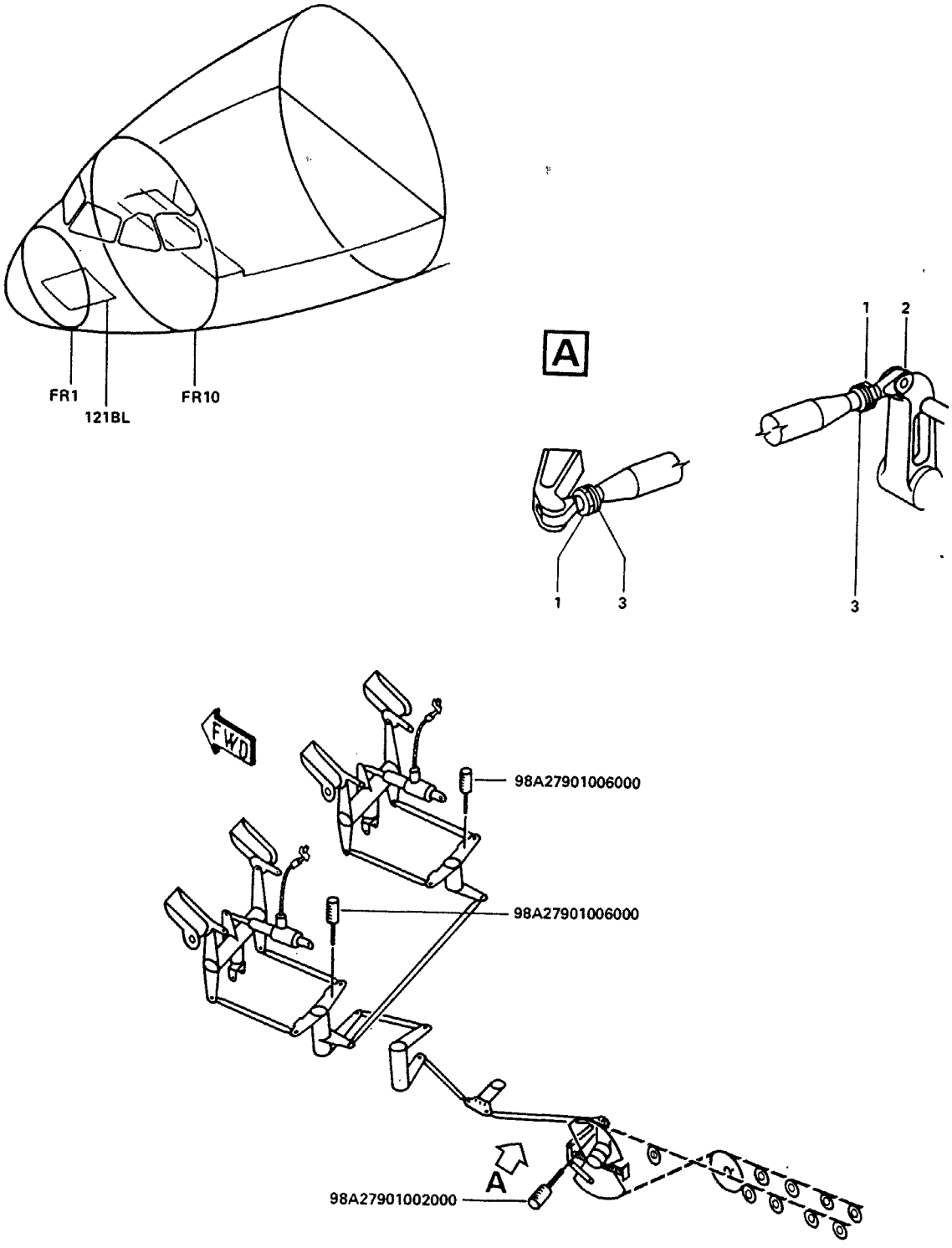
(5)Display a warning notice on overhead panel, in flight compartment, prohibiting pressurization of hydraulic system and another warning

notice prohibiting operation of pedals.
(6)In avionics compartment, lock tension regulator input lever with rigging pin 98A27901002000.
(7)Support pedals using adequate means.

B. Removal (Ref. Fig. 401, 402)
NOTE : The removal/installation procedure described here concerns Captains yaw/brake bellcrank assembly. The same removal/installation procedure is used for First Officer's yaw/brake bellcrank assembly except for the disconnection of yaw control rod.
NOTE : Stow the various disconnected control rods to an adjacent component preventing them from being damaged.
(1)Remove cotter pins, remove nuts (33) and retain washers (35). Support control rods (37) and remove shouldered pins (36). Clear control rods (37).
(2)Remove cotter pins, remove nuts (31) and retain washers (32). Support control rods (34) and remove shouldered pins (43). Clear control rods (34).
(3)At Captain's side, remove nut (15) and retain washer (14). Support control rod (13) and remove shouldered pin (12). Clear control rod (13).
(4)Remove cotter pin, remove nut (19) and retain washer (20). Support control rod (16) and remove shouldered pin (11). Clear control rod (16).
(5)Remove cotter pins, remove nuts (38) and retain washers (39). Support control rods (40) and remove shouldered pins (24). Clear control rods (40).
(6)At both sides of control mechanism mounting beam (42), remove cotter pins, remove nuts (29) and retain washers (28).
(7)Hold support spacer (22).
(8)Remove bolts (23) then sleeve (41).
(9)At Captain's side, remove bolts (26) to remove detent bellcrank (30) or, at First Officer's side, to remove pitch control bellcrank (30) (Ref. 27-31-31, P. Block 401).
(10)Remove yaw/brake bellcrank

C. Preparation of Replacement Component
Check that all replacement yaw/brake bellcrank assemblies are equipped with bushes.

D. Installation
NOTE : Bolts are to be lubricated using material No. 04-004.
(1)Position yaw/brake bellcrank assembly.
(2)At both sides of control mechanism mounting beam, insert sleeves (27) and (41). Install detent bellcrank (30) at Captain's side or pitch control bellcrank (30) at First Officer's side (Ref. 27-31-31 P. Block 401).
(3)Secure sleeves (27) and (41) and support spacer (22) to mounting beam (42) with bolts (23) and (26).
(4)Install washers (28) on bolts (23) and (26). Tighten nuts (29) and safety with cotter pins.
(5)Install control rods (34). Install shouldered pins (43) washers (32) and nuts (31). Tighten nuts and safety with cotter pins.
(6)Install control rods (37). Install shouldered pins (36) washers (35) and



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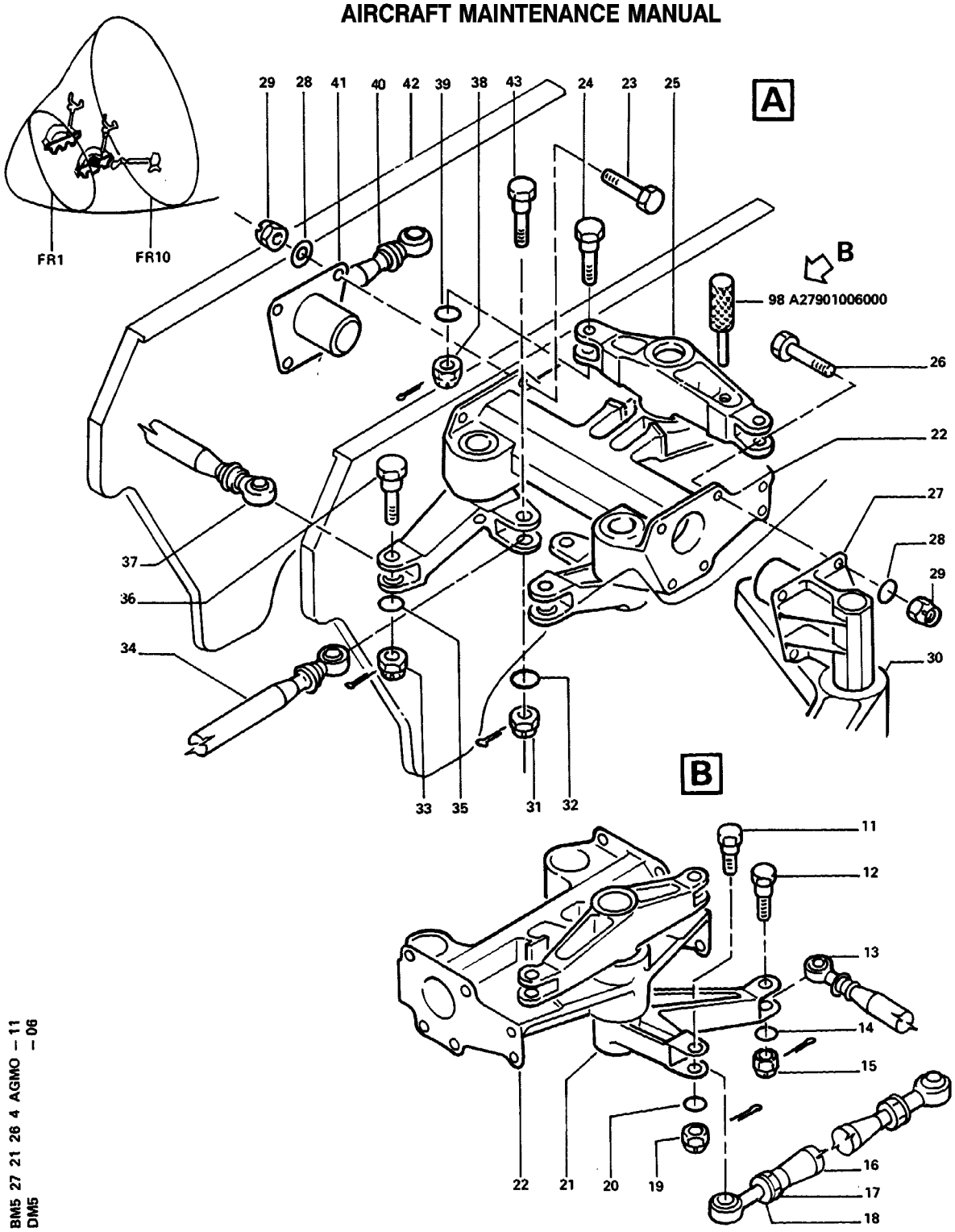
Location of Components and Rigging Points
Figure 401



Yaw/Brake Bellcrank
Figure 402

nuts (33). Tighten nuts and safety with cotter pins.
(7)Lock yaw control bellcrank (25) to support spacer (22) with rigging pin 98A27901006000 (Captain's and First Officer's sides).
(8)Install control rods (40). Install shouldered pins (24), washers (39) and nuts (38). Tighten nuts and safety with cotter pins.
(9)Install interconnecting rod (16).
(10)Connect interconnecting rod (16) to yaw control bellcrank (21) with shouldered pin (11). If necessary, adjust length of rod as follows :
- cut and remove lockwires, loosen nuts (17) and disengage lock washers (18). Act on control rod body until free insertion of shouldered pin (11) is obtained.
(11)Engage lock washers (18), tighten nuts (17) and wirelock.
(12)Install washer (20) and nut (19) on shouldered pin (11). Tighten nut and safety with cotter pin.
(13)At Captain's side, install control rod (13) and insert shouldered pin (12).
(14)If necessary, adjust as follows :
-cut and remove lockwires, loosen nuts (1) and disengage lock washers (3). Act on adjustable control rod (2) body until free insertion of shouldered pin (12) is obtained.
(15)Engage lock washers (3), tighten nuts (1) and wirelock.
(16)Install washer (14) and nut (15) on shouldered pin (12). Tighten nut and safety with cotter pin.
(17)Remove safety clips and tags and close circuit breaker 1CG.

E. Test
Perform functional test as described in 27-21-00 P. Block 501.

F. Close-Up
(1)Remove device used for supporting pedals.
(2)Remove all rigging pins.
(3)Remove warning notices.
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(5)Close access door 121BL.
(6)Remove access platform.

**ON A/C ALL

R

1. General (Ref. Fig. 003)

**ON A/C ALL

R

(Ref. Fig. 002)

**ON A/C ALL

Rudder trim control is electrically signalled. An electrical trim actuator 8CG, installed in the tail cone area drives a trim screwjack via a rotary shaft and universal joints.
The actuator is controlled from control panel 408VU located at the rear part of the center pedestal, at a constant speed.
A reset function initiated by pressing RESET pushbutton switch 6CG on the control panel allows rudder trim position to be nulled through the EFCU.
A RUD TRIM position indicator 7CG is also provided on the control panel.

**ON A/C ALL

R

When Yaw Autopilot is engaged, the flight controls inhibit rudder trim.

**ON A/C ALL

2. Component Location

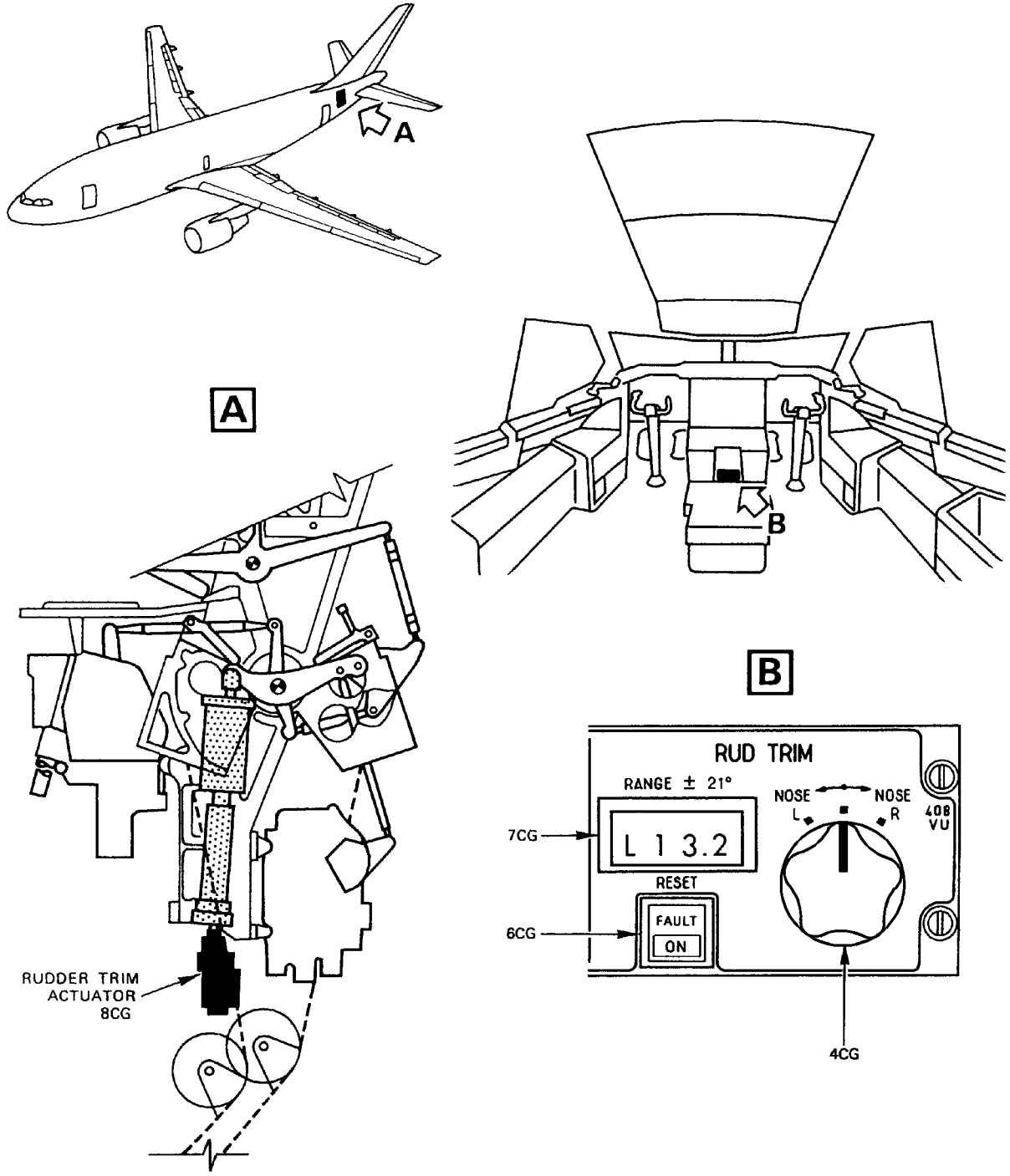
**ON A/C ALL

R

(Ref. Fig. 001)

**ON A/C ALL

R



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Component Location
Figure 001

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
316CA	RELAY - FLIGHT CONTROL RUD TRIM INHIBITION	90VU	122	121BL	
317CA	RELAY - FLIGHT CONTROL RUD TRIM INHIBITION	90VU	122	121BL	
4CG	SWITCH - RUD TRIM CTL	408VU	211	121BL	
6CG	P/BSW - RUD TRIM/RESET	408VU	211	121BL	
7CG	INDICATOR - RUD TRIM	408VU	211	121BL	
8CG	ACTUATOR - RUDDER TRIM		311	312AR	27-22-23

**ON A/C ALL

3. Component Description

A. Rudder Trim Actuator 8CG
One 28VDC electric motor is fitted in the actuator, directly coupled to the reduction gear. It is energized when rudder travel is selected.
- The motor is a permanent magnet motor with on-off control. A strong dynamic braking effect is obtained by shorting the windings of the motor when it is de-energized (no static braking on the actuator itself : trim irreversibility is provided by the screwjack downstream of the actuator).
- Rotary stops limit output shaft rotation within the range allowed by the screw.
- When the electric motor is energized, it is protected by a torque limiter when the stops are reached (motor rotation is not stopped).
- The actuator includes a position transducer which delivers rudder trim position signals to associated electrical circuits. The transducer is a special RVDT, of the same type as those installed in the two transducer units used for electrical roll control (Ref. 27-61). The electrical characteristics of the RVDT are monitored by associated computer circuits.
- A rigging pin is used to set the output shaft at mid angular travel (zero trim position and also zero reference for transducer setting).

**ON A/C ALL

R

(Ref. Fig. 002)

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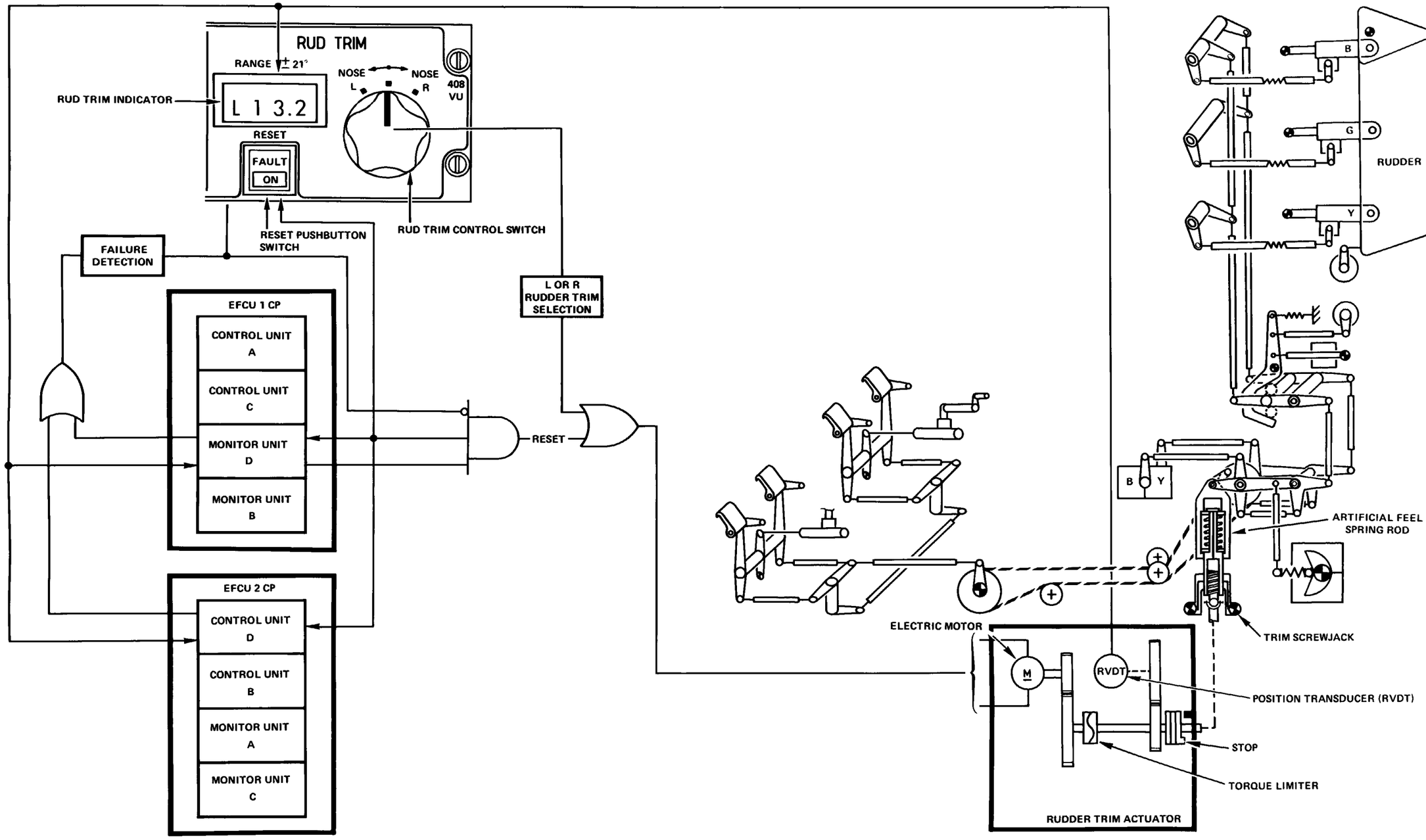

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Trim (Rudder)
Figure 002

B. Control Panel

The **RUD TRIM** panel includes :

- **RUD TRIM** control switch **4CG**
- **RESET** pushbutton switch **6CG**
- **RUD TRIM** indicator **7CG**

(1)**RUD TRIM** control switch

This is a three position rotary switch spring-loaded to the neutral position (center). The direction of rudder trim travel depends on the direction of **RUD TRIM** control switch rotation.

(2)**RESET** pushbutton switch

A RESET pushbutton switch allows rudder trim to be automatically reset to zero. During reset, the switch is magnetically latched and the lower **ON** (white) legend is illuminated. When reset is achieved the pushbutton switch releases and the **ON** legend goes off. (The **RESET** pushbutton switch may also be released by a second push action).

The upper legend **FAULT** (amber), indicates failure of the reset function or of the actuator position transducer.

(3)Rudder trim position indicator

Rudder trim travel is displayed on a digital indicator resolution : 1/10°) together with the direction (L or R).

The electronic circuits associated with the indicator are also designed to deliver a 0 + 5V rudder trim position signal to the **AIDS**.

R

4. Trim Actuator Motor Normal Control

The control switch does not directly energize the electric motor, but the windings of power relays **12CG, 13CG,** each rotating the motor in a given direction. The direction of rotation depends on the relative polarity of the two terminals of the windings.

The + 28V and ground reference are simultaneously applied to, or cut off from the motor windings and power relay windings to prevent runaway caused by an undue + 28V or ground on a control wire.

Manual control has priority over the reset function : this means that if during reset the crew moves the control switch out of the neutral position, reset is stopped, the **RESET** pushbutton switch releases and the actuator operates in keeping with the control switch position selected by the crew.

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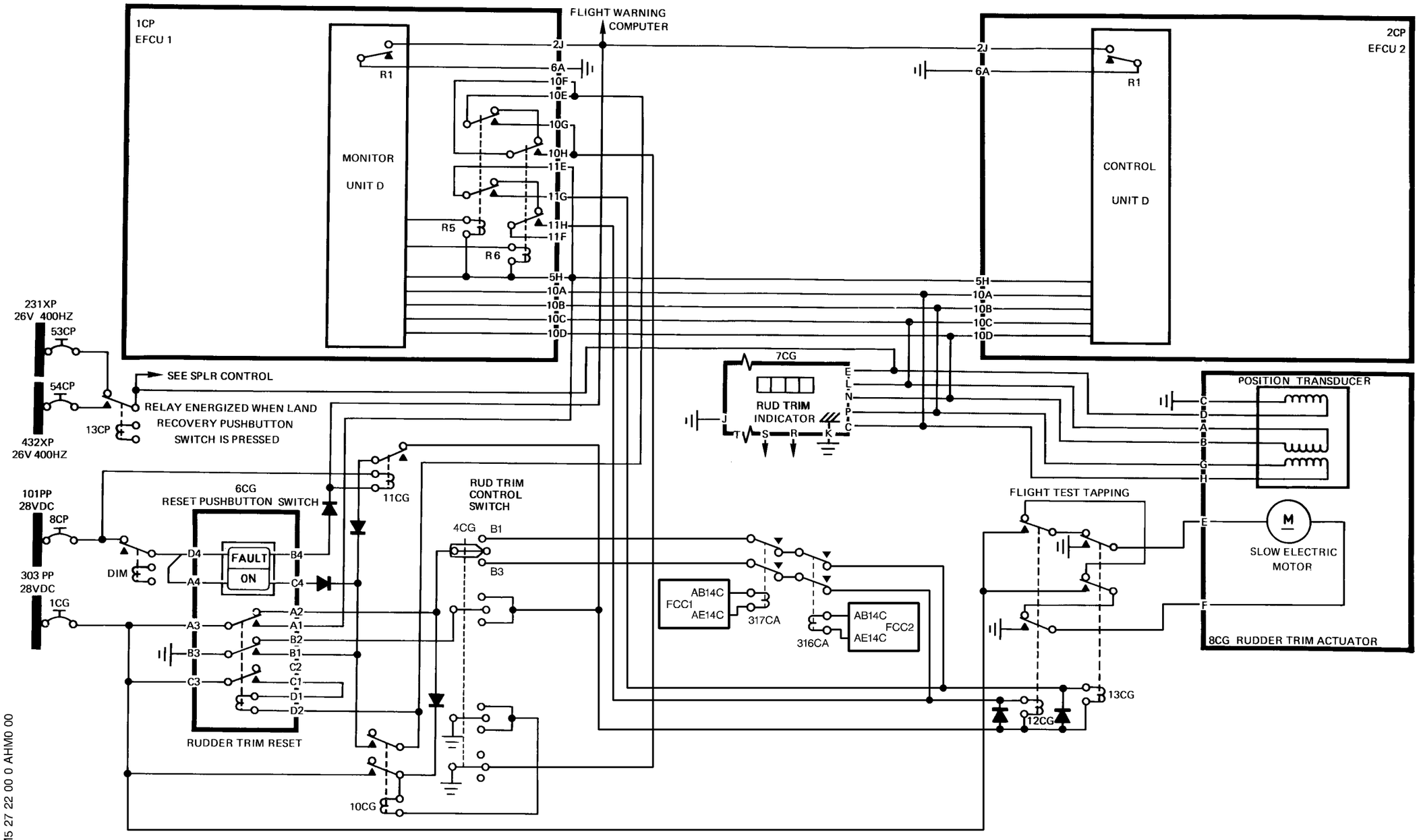

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Trim (Rudder)
Figure 003

5. Reset Function

Reset is achieved by the electric motor. The associated power relays (12CG, 13CG) are then controlled by monitor unit D in EFCU 1.
Rudder trim position is computed in control unit D (EFCU 2) and monitor unit D (EFCU 1) from signals delivered by the transducer in the trim actuator.
Reset starts when the RESET pushbutton switch is pressed. The magnetically latching coil is energized by the EFCU until neutral position is reached, when the EFCU stops reset. (Reset may also be stopped by pressing the RESET pushbutton switch again before neutral is reached).
Reset function is monitored by the two EFCUs. When a failure occurs, a ground signal is delivered in parallel by control and monitor units D to the coil of relay 11CG and to the FAULT legend of the RESET pushbutton switch.
Relay 11CG cancels the reset signal to the EFCUs and the ground reference to the power relay coils. The reset action is then stopped, the RESET pushbutton switch releases, but the FAULT legend remains on.

NOTE : In the event of rudder trim runaway occurring owing to the control switch jamming out of the neutral position, reset is selected, but to prevent continual recurrence of the runaway, the RESET pushbutton switch will not release when the rudder has returned to neutral position. This is achieved by the logic taking into account the fact that the control switch is not in neutral position when reset is selected : relay 10CG is energized when reset is not selected and the control switch is out of the neutral position ; it is self held. If reset is then selected, a permanent ground reference is applied to the self holding coil which remains energized even when the reset operation is finished.

NOTE : This failure may be simulated by moving the control switch out of its neutral position, holding it, and then simultaneously pressing the RESET pushbutton switch. The operator must check that the trim position then returns to neutral (zero on the position indicator) and that the pushbutton switch remains in (ON legend illuminated).

6. Leading Particulars

- Output shaft angular travel : 12.138 ± 0.4 revolutions
- Rudder travel : ± 21°
- Deflection speed : 1.2 ± 0.2°/s (under output torque of 0.5 mN/ 0.37 lbf.ft.)
- Maximum breakout torque of torque limiter : 12.6 mN (9.3 lbf.ft.)
- Maximum duration of torque limiter operation without damage : 3 minutes.
- Neutral position error after reset action : ± 0.2°.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS

1. Operational Test

A. Reason for the job

R (1)Operational test of rudder trim
R (2)Operational test of control switch jamming detection circuit
R (3)Operational test of manual control priority

**ON A/C ALL

R (4)Operational test of rudder trim inhibition.

**ON A/C ALL

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 34-25-00, P. Block 501	Inertial Reference System

C. Procedure

(1)Job set-up

(a)Initial conditions

- Energize aircraft electrical circuits (Ref. 24-41-00, P. Block 301).
- Make certain that electronics racks ventilation is correct.
- Make certain that overhead panel circuit breakers are closed, particularly those associated with AFS, NAVIGATION and ADS.
- Make certain that L/G PROX DET & RELAYS SYS1 and SYS2 circuit

breakers on panel 133VU are closed.
(b)Pressurize Green, Blue and Yellow hydraulic systems (Ref. 29-21-00, P. Block 301, 29-22-00, P. Block 301 and 29-23-00, P. Block 301).
(c)Make certain that Air Data System (ADS) operates.
(d)Make certain that Electronic Flight Instrument System (EFIS) operates and adjust PDF and ND image brightness on panels 412VU and 413VU.
(e)Align IRS (Ref. 34-25-00, P. Block 501) (do the ALIGN procedure until the red HDG flags on NDs go out of view; present position entering is not necessary).
(f)On overhead panel, make certain that PITCH TRIM 1 and YAW DAMPER 2 are engaged.
(g)On panel 22VU, make certain that circuit breaker 5RK is closed.
(h)Extend slats to 15/0 position (Ref. 27-80-00, P. Block 301).

D. Test
(1)Operational test of rudder trim

ACTION	RESULT
1. On **ANN LT** section of panel **436VU** - place selector switch in **TEST** position.	On **RUD TRIM** section of panel **408VU** - **FAULT** and **ON** legends come on
2. On **ANN LT** section of panel **436VU** - place selector switch in **BRT** position	On **RUD TRIM** section of panel **408VU** - **FAULT** and **ON** legends go off.
3. On panel **133VU** - open circuit breaker **70CP EFCU/ NORM SUPPLY/SPLR 5;** location **333/T65**	On **RUD TRIM** section of panel **408VU** - **FAULT** legend comes on.
4. On **ANN LT** section of panel **436VU** - place selector switch in **DIM** position.	On **RUD TRIM** section of panel **408VU** - **FAULT** legend dims.
5. On **ANN LT** section of panel **436VU** - place selector switch in **BRT** position.	- **FAULT** legend resumes normal brightness.
6. Close circuit breaker **70CP**	On **RUD TRIM** section of panel **408VU** - **FAULT** legend goes off after one second
7. On **RUD TRIM** section of panel **408VU** - place and hold control switch in full **NOSE** L position.	- On **RUD TRIM** indicator, numbers are displayed successively to reach value L21 ± 1° - On right **ECAM** display unit, on **FLT CTL** page, bug shifts to the left on **RUD** scale.
8. Release control switch	It automatically returns to neutral position - L21 ± 1° remains displayed on **RUD TRIM** indicator - On right **ECAM** display unit, bug remains to the left.
9. On **RUD TRIM** section of panel **408VU** - press **RESET** pushbutton switch	- Corresponding **ON** legend comes on - On **RUD TRIM** indicator, numbers are displayed until zero ± 0.2° value is reached. - when zero ± 0.2° value is reached, **ON** legend goes off. - On right **ECAM** display unit on **RUD**

ACTION	RESULT
	scale, bug shifts to zero.
10.On **RUD TRIM** section of panel 408VU - place and hold control switch in full **NOSE R** position	- on **RUD TRIM** indicator, numbers are displayed until **R21** ± 1° value is reached. - on right **ECAM** display unit, on **RUD** scale, bug shifts to the right.
11.Release control switch.	It automatically returns to neutral position - On **RUD TRIM** indicator, **R21** ± 1° value remains displayed - On right **ECAM** display unit, on **RUD** scale, bug remains to the right.
12.On **RUD TRIM** section of panel 408VU - press **RESET** pushbutton switch	- Corresponding **ON** legend comes on. - On **RUD TRIM** indicator, numbers are displayed until zero ± 0.2° value is reached. - when zero ± 0.2° value is reached, **ON** legend goes off. - On right **ECAM** display unit, on **RUD** scale, bug returns to zero position.

R (2)Operational Test of Control Switch Jamming Detection Circuit

NOTE : Only the test on the left side is performed. It is the same on the right side.

ACTION	RESULT
1. On **RUD TRIM** section of panel 408VU - place and hold control switch in full **NOSE** L position	- On **RUD TRIM** indicator, numbers are displayed from 0 to value L21 ± 1° - On right **ECAM** display unit, bug shifts to the left.
2. On **RUD TRIM** section of panel 408VU - maintain control switch in **NOSE** L position - press **RESET** pushbutton switch	- Corresponding **ON** legend comes on - on right **ECAM** display unit, on **RUD** scale, bug returns to zero. - On **RUD TRIM** indicator numbers are displayed from L21 ± 1° to 0 ± 0.2° - Corresponding **ON** legend remains on.
3. On **RUD TRIM** section of panel 408VU - release control switch	- Control switch returns to neutral - **ON** legend goes off.

(3)Operational test of manual control priority

NOTE : Only the test on the left side is performed. It is the same on the right side.

ACTION	RESULT
1. On **RUD TRIM** section of panel 408VU - place and hold control switch in full **NOSE** L position	- On **RUD TRIM** indicator numbers are displayed from 0 to value L21 ± 1° - On right **ECAM** display unit, on **RUD** scale, bug shifts to the left.
2. Release control switch	- Control switch returns to neutral
3. On **RUD TRIM** section of panel 408VU - press **RESET** pushbutton switch	- Corresponding **ON** legend comes on - On **RUD TRIM** indicator numbers are displayed from L21 ± 1° to 0 ± 0.2°
4. Place and hold control switch in full **NOSE** L position before trim returns to zero	- **ON** legend goes off - On **RUD TRIM** indicator numbers are displayed to value L21 ± 1° - On right **ECAM** display unit, on **RUD** scale, bug shifts to the left
5. On **RUD TRIM** section of panel 408VU - place and hold control switch in full **NOSE R** position until indicator displays zero. - release control switch	- On **RUD TRIM** indicator numbers are displayed from L21 ± 1° to 0 ± 0.2° - On right **ECAM** display unit, on **RUD** scale, bug returns to zero.

**ON A/C ALL

R (4)Operational test of rudder trim inhibition with autopilot engaged in **CMD**
R and slats extended (15/0)

NOTE : This test must be performed with **AP1** engaged in **CMD** then with **AP2**.

ACTION	RESULT
1. On **RUD TRIM** section of panel 408VU - place and hold control switch in **NOSE** L (or **NOSE R**) R position until indicator displays 15°.	
R 2. On Flight Control Unit (FCU) - place **AP1** (2) lever in **ON**	Lever remains in this position

ACTION	RESULT
position	On FCU : R - green CWS legend of the CWS/CMD R pushbutton switch comes on. On PFDs : - amber CWS1(2) indication appears.
- press CWS/CMD pushbutton switch	On this pushbutton switch : R - green CWS legend goes off R - green CMD legend comes on. On PFDs : - white CMD1(2) indication appears. - amber CWS1(2) indication disappears.

R NOTE : When AP1(2) is engaged in CMD, yaw axis is active,
when AP1(2) is engaged in CWS, yaw axis is not active.

3. Extend slats to 15/0 position.

4. On RUD TRIM section of panel 408VU

- place and hold control switch in NOSE L (or NOSE R) position.	- on RUD TRIM indicator, the displayed value does not change - on right ECAM display unit, on RUD scale, bug stays at the original position
- release control switch	- control switch returns to neutral position.

5. On RUD TRIM section of panel 408VU

- press RESET pushbutton switch	- corresponding ON legend comes on - on RUD TRIM indicator, numbers decrease.

6. Before trim reaches zero :
On RUD TRIM section of panel 408VU

- press to release RESET pushbutton switch	- corresponding ON legend goes off
- place and hold control switch in NOSE L (or NOSE R) position	- on RUD TRIM indicator, numbers stop and stay at the value reached at that time
- release control switch	- control switch returns to neutral position.

7. On RUD TRIM section of panel 408VU

- press RESET pushbutton switch	- corresponding ON legend comes on - on RUD TRIM indicator,

ACTION	RESULT
	numbers decrease until 0 ± 0.2 degree is reached. - **ON** legend goes off - on right **ECAM** display unit, on **RUD** scale, bug stays at the position reached at that time.

8. Repeat test with trim in opposite direction **(NOSE R)**.

9. Retract slats to 0/0 position.

R **ON A/C ALL

E. Close-Up
(1)Shut down pressurization of hydraulic systems
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Restore system and aircraft to normal operating condition.

2. Functional Test

A. Reason for the Job
Make certain that rudder deflects when rudder trim control switch is operated.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
(1)Job set-up
(a)Initial conditions :
- Correct electrical power supply (Ref. 24-41-00, P. Block 301).
- Forward services ventilation system in operation.
- Overhead and lateral panel circuit breakers closed, particularly those associated with FLT CTL (133VU) and ECAM (21VU).
- Aircraft on ground (circuit breakers L/G PROX DET & RELAYS SYS1 and SYS2 closed on panel 133VU).

(b)Pressurize Green, Blue and Yellow hydraulic systems using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU, make certain that G, B and Y pushbutton switches are pressed and corresponding legends are off.
(d)Make certain that flap and slat control lever is in 1st notch position. (slats and flaps retracted).
(e)On panel 11VU
On ECAM control panel
- press F/CTL pushbutton switch; FLT CTL page appears on right ECAM display unit.
- using RIGHT DISPLAY knob adjust brightness on right ECAM display unit.

(f)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.

D. Test
(1)Test

ACTION	RESULT
1. On RUD TRIM section of panel 408VU - place and hold control switch in full NOSE L position	- On RUD TRIM indicator, numbers are displayed until L21 ± 1° value is reached.

ACTION	RESULT
	- On right ECAM display unit, on FLT CTL page, bug on RUD scale shifts to the left.
2. On RUD TRIM section of panel 408VU - place and hold control switch in full NOSE R position	- On RUD TRIM indicator, numbers are displayed from L21 ± 1° value through 0 to R21 ± 1° value - Rudder deflects from the left to the right through 0. - On right ECAM display unit, on RUD scale, bug shifts from the left through 0 to the right.
3. Place and hold control switch in full NOSE L position until zero value is displayed on RUD TRIM indicator	- Rudder returns to zero ± 0.2° position - On right ECAM display unit, on RUD scale, bug returns to zero.

E. Close-Up
(1)Shut down pressurization of hydraulic systems
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301)
(3)Restore system and aircraft to normal operating conditions.

3. System Test

A. Reason for the Job
Measurement of rudder deflection with respect to trim

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27308005000	Protractor - Control surface Deflection
or	
TR12-18	Rigmaster System
TR31	Rigmaster System Protractor
or	
3028000	Clinometer
98A27203500000	Measurement Base - Flight Control Surface Deflection
(2)98A27307545000	Rigging Pin - Cable Quadrant, Rudder Mechanical Controls
(3)98A27207601000	Rigging Pin - Variable Stop Unit - Rudder Mechanical Controls
(4)43938	Pin - Rigging, Rudder and Aileron Trim Actuators
(5)	Access Platform 5.5 m (18 ft.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
(1)Job set-up
(a)Initial conditions :
- Correct electrical power supply (Ref. 24-41-00, P. Block 301).
- Forward services ventilation system in operation.
- Overhead and lateral panel circuit breakers closed, particularly those associated with FLT CTL (133VU) and ECAM (21VU).
- Aircraft on ground (circuit breakers L/G PROX DET & RELAYS SYS1 and SYS2 closed on panel 133VU).

(b)Pressurize Green, Blue and Yellow hydraulic systems using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU
- make certain that G, B and Y pushbutton switches are pressed in and legends off.

(d)Make certain that flap and slat control lever is in first notch position (slats and flaps retracted).
(e)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.
(f)On ECAM control panel

- press F/CTL pushbutton switch to display FLT CTL page on right ECAM display unit.
- using RIGHT DISPLAY knob adjust brightness on right ECAM display unit

(g)Install access platforms
(h)Open access door 312AR.
(j)Immobilize cable quadrant with rigging pin 98A27307545000.
(k)Immobilize variable stop lever with rigging pin 98A27207601000.
(l)Immobilize rudder trim actuator with rigging pin 43938.
R (g)Install protractors 98A27308005000 or tools TR12-18 and TR31 or
R clinometer 3028000 and flight control surface deflection measurement
R base 98A27203500000.
NOTE : Make certain that head piece of protractor is perpendicular to stabilizer trailing edge.
(n)Remove all rigging pins

D. Test
(1)Measurement of rudder deflection

ACTION	RESULT
1. On RUD TRIM section of panel 408VU - place and hold control switch in full NOSE L position	On RUD TRIM section of panel 408VU On RUD TRIM indicator, numbers are displayed until L21 ± 1° value is reached.
2. On RUD TRIM section of panel 408VU - place and hold control switch in full NOSE R position	On RUD TRIM section of panel 408VU On RUD TRIM indicator, numbers are displayed until R21 ± 1° value is reached. Total Trim operation time is : 30 s < t < 42 s
3. On RUD TRIM section of panel 408VU press RESET pushbutton switch	- corresponding ON legend comes on then goes off when RESET function is achieved On RUD TRIM indicator, numbers are displayed until zero ± 0.2° value is reached.
4. On RUD TRIM section of panel 408VU - place and hold control switch in full NOSE L position	On RUD TRIM indicator, numbers are displayed until L21± 1° value is reached.
5. Press RESET pushbutton switch	- corresponding ON legend comes on, then goes off when RESET function is achieved On rud trim indicator, numbers are displayed until zero ± 0.2° value is reached.

E. Close-Up

R (1)Remove protractor 98A27308005000 or TR12-18 and TR31 or
R clinometer 3028000 and flight control surface deflection measurement
R base 98A27203500000.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Close access door 312AR.
(4)Remove access platforms and safety barriers.
(5)Shut down pressurization of hydraulic systems.
(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(7)Restore system and aircraft to normal operating condition.

Ref. 27-12-00, P. Block 601.

RUDDER TRIM CONTROL SWITCH (4CG)
REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

1. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-42-00, P. Block 301	AC External Power Control
- 27-22-00, P. Block 501	Trim (Rudder) - Adjustment/Test
- 27-12-31, P. Block 401	Aileron/Rudder Trim Control Panel

2. Procedure

A. Job Set-Up
(1)Energize the ground service network (Ref. 24-42-00, P. Block 301).
(2)In flight compartment, on electrical center pedestal 11VU, gain access to panel 408VU.
(3)Display warning notices prohibiting operation of aileron and rudder controls.
(4)Remove panel 408VU and disconnect electrical connectors (Ref. 27-12-31, P. Block 401).

B. Removal

(Ref. Fig. 401)

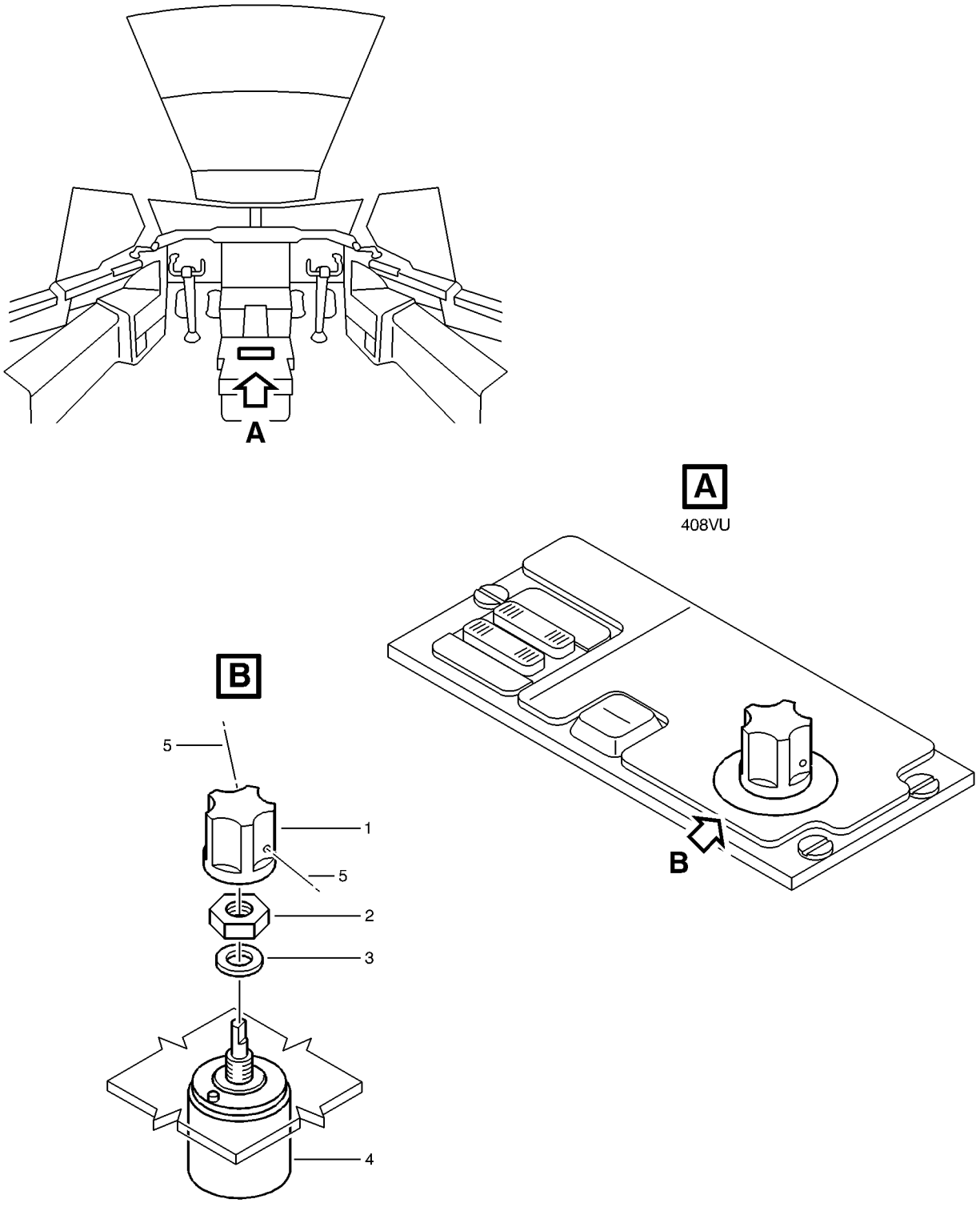
R **ON A/C ALL

R Post SB 27-2087 For A/C ALL

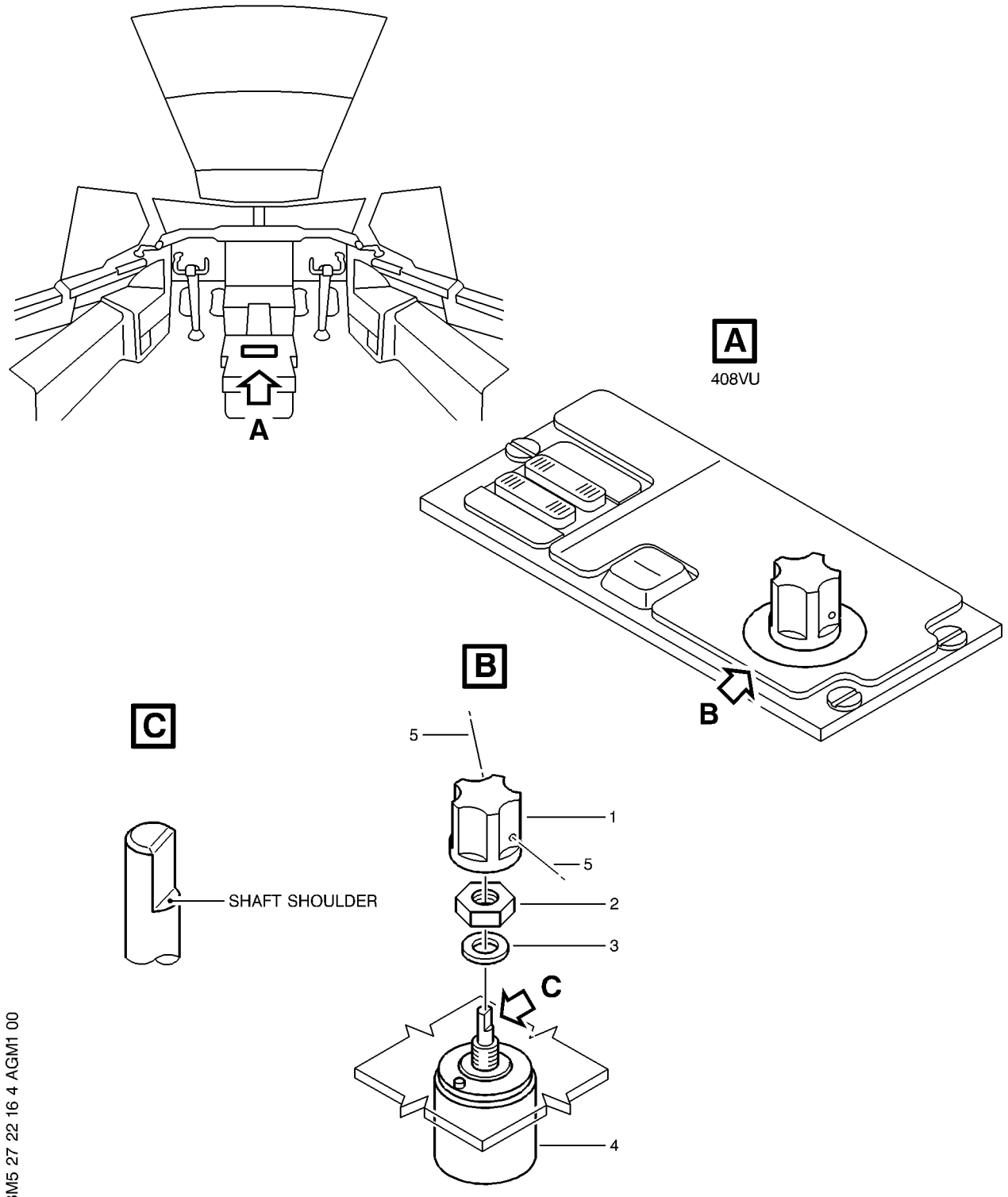
(Ref. Fig. 402)

R **ON A/C ALL

NOTE : The following actions must be performed outside the aircraft.
(1)Loosen the two screws (5) from knob (1).
(2)Remove knob (1) from shaft of control switch (4).
(3)Remove nut (2) and washer (3).
(4)Make a mark on each wire of control switch (4) and unsolder wires. If necessary, cut tie wraps of control switch harness.
(5)Remove control switch (4CG) (4).



Rudder Trim Control Switch
Figure 401



Rudder Trim Control Switch
Figure 402

C. Installation

NOTE : The following actions must be performed outside the aircraft.

(1)Clean component interface and/or adjacent area.
(2)Do a visual inspection of component interface and/or adjacent area.
(3)On rear of control switch (4), solder each wire in its original position (Refer to marks), if necessary, install new tie wraps on control switch harness.
(4)Install control switch (4) on structural panel 408VU.
(5)Make sure that the locating pin of the control switch is in its housing.
(6)Install washer (3) and nut (2) on shaft of control switch.
(7)TORQUE nut (2) to between 0.8 and 1 m.daN (70.79 and 88.49 lbf.in).
(8)Install knob (1) on shaft.
(9)Tighten the two screws (5) on knob (1).
(10)Using a feeler gage, check that clearance between panel 408VU and rudder trim knob is between 0.5 and 2.1 mm (0.019 in. and 0.0826 in.) all around knob circumference. If at any point, clearance is below 0.5 mm (0.019 in.) or above 2.1 mm (0.0826 in.), slacken control knob attachment screws to get correct clearance, and tighten them.

R **ON A/C ALL

R Post SB 27-2087 For A/C ALL

C. Installation

NOTE : The following actions must be performed outside the aircraft.

(1)Clean component interface and/or adjacent area.
(2)Do a visual inspection of component interface and/or adjacent area.
(3)On rear of control switch (4), solder each wire in its original position (Refer to marks) ; if necessary, install new tie wraps on control switch harness.
(4)Install control switch (4) on structural panel 408VU.
(5)Make sure that the locating pin of the control switch is in its housing.
(6)Install washer (3) and nut (2) on shaft of control switch.
(7)TORQUE nut (2) to between 0.8 and 1 m.daN (70.79 and 88.49 lbf.in).
(8)Install knob (1) on shaft.

NOTE : The knob must be in contact with the shoulder to have the correct clearance between the knob and the panel (see detail C).

(9)Tighten the two screws (5) on knob (1).
(10)Using a feeler gage, check that clearance between panel 408VU and rudder trim knob is between 0.5 and 2.1 mm (0.019 in. and 0.0826 in.) all around knob circumference.

R **ON A/C ALL

D. Close-Up
(1)Connect electrical connectors and install panel 408VU (Ref. 27-12-31, P. Block 401, Para. Installation).
(2)Perform operational test of rudder trim (Ref. 27-22-00, P. Block 501).
(3)Make sure that working area is clean and clear of tools and miscellaneous items of equipment.
(4)De-energize aircraft electrical network (Ref. 24-42-00, P. Block 301).
(5)Remove warning notice.

RUDDER TRIM INDICATOR (7CG) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
CAUTION : AFTER REMOVAL OF RUDDER TRIM INDICATOR, INSTALL A PROTECTIVE SCREEN ON FRONT FACE OF THE INDICATOR. DAMAGE TO MAGNETIC WHEEL INDICATORS CAN OCCUR IF YOU TOUCH THEM.

1. Equipment and Materials

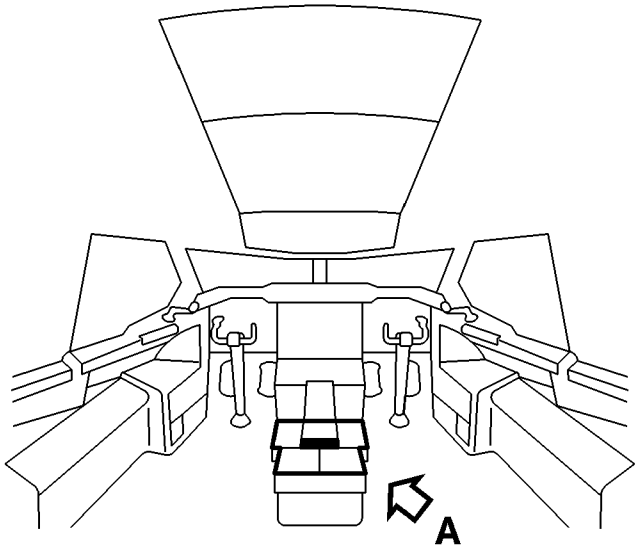
ITEM	DESIGNATION
Referenced Procedures	
- 24-42-00, P. Block 301	AC External Power Control
- 27-12-00, P. Block 501	Trim (Aileron)
- 27-12-31, P. Block 401	Aileron/Rudder Trim Control Panel
- 27-22-00, P. Block 501	Trim (Rudder)

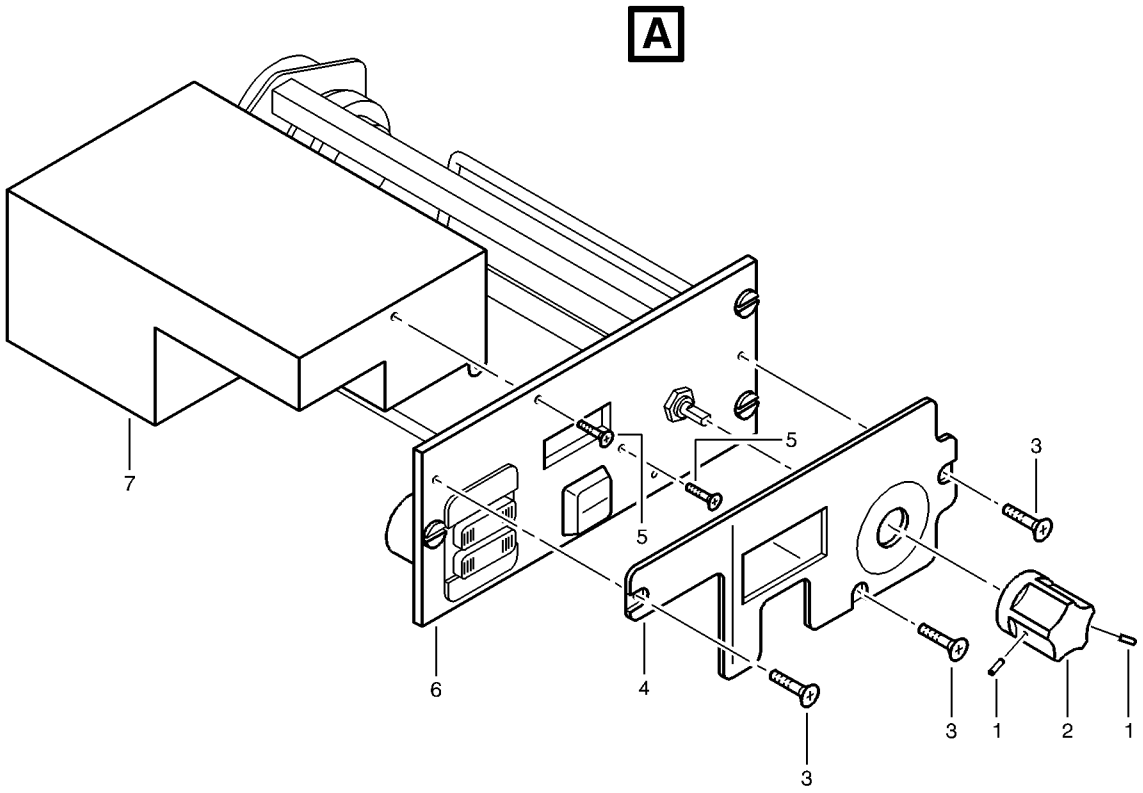
2. Procedure

A. Job Set-Up
(1)Energize the ground service network (Ref. 24-42-00, P. Block 301).
(2)In flight compartment, on electrical center pedestal 11VU, gain access to panel 408VU.
(3)Display warning notices prohibiting operation of aileron and rudder controls.
(4)Remove panel 408VU and disconnect electrical connectors (Ref. 27-12-31, P. Block 401).

B. Removal
(Ref. Fig. 401)
NOTE : The following actions must be performed outside the aircraft.
(1)Loosen the two screws (1) from knob (2).
(2)Remove knob (2) from the shaft of control switch.
(3)Remove the three screws (3) from integrally lighted plate (4).
(4)Remove integrally lighted plate (4).
(5)Remove the two screws (5).
(6)Remove rudder trim indicator (7) from structural panel 408VU (6).
(7)Install protective screen with its two storage screws on rudder trim indicator front face.

C. Installation
NOTE : The following actions must be performed outside the aircraft.
(1)Clean component interface and/or adjacent area.
(2)Perform inspection of component interface and/or adjacent area.
(3)Remove protective screen and its two storage screws from rudder trim indicator front face and retain.
(4)Position rudder trim indicator (7) on structural panel 408VU (6).
(5)Install and tighten the two screws (5).





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Rudder Trim Control Switch (7CG)
Figure 401

(6)Position integrally lighted plate (4).
(7)Install and tighten the three screws (3).
(8)Install knob (2) on the shaft of control switch.
(9)Tighten the two screws (1) on knob (2).

D. Close-Up
(1)Connect electrical connectors and install panel 408VU (Ref. 27-12-31, P. Block 401, Para. Installation).
(2)Perform operational test of aileron trim (Ref. 27-12-00, P. Block 501).
(3)Perform operational test of rudder trim (Ref. 27-22-00, P. Block 501).
(4)Make sure that working area is clean and clear of tools and miscellaneous items of equipment.
(5)De-energize aircraft electrical network (Ref. 24-42-00, P. Block 301).
(6)Remove warning notices.

RUDDER TRIM ACTUATOR 8CG - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18 ft.)
B. 43938	Pin - Rigging, Rudder and Aileron Trim Actuators
C. 98A27307545000	Rigging Pin - Cable Quadrant, Rudder Mechanical Controls
D. 98A27307546000	Rigging Pin - Main Bellcrank, Rudder Mechanical Controls
E. 98A27901006000	Pin - Rigging, Rudder Control (Qty. 2)
F.	Blanking Caps - Electrical Connector
G.	Torque Wrench, up to 0.1 m.daN (0.738 lbf.ft.)
H.	Warning Notices
J.	Cotter Pins
K.	Corrosion-Resistant Steel Lockwire, 0.5 mm (0.02 in.) dia.
L. Material No. 04-004	Common Greases (Ref. 20-31-00)
M. Material No. 05-002	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 27-22-00, P. Block 501	Trim (Rudder)

R
R
R

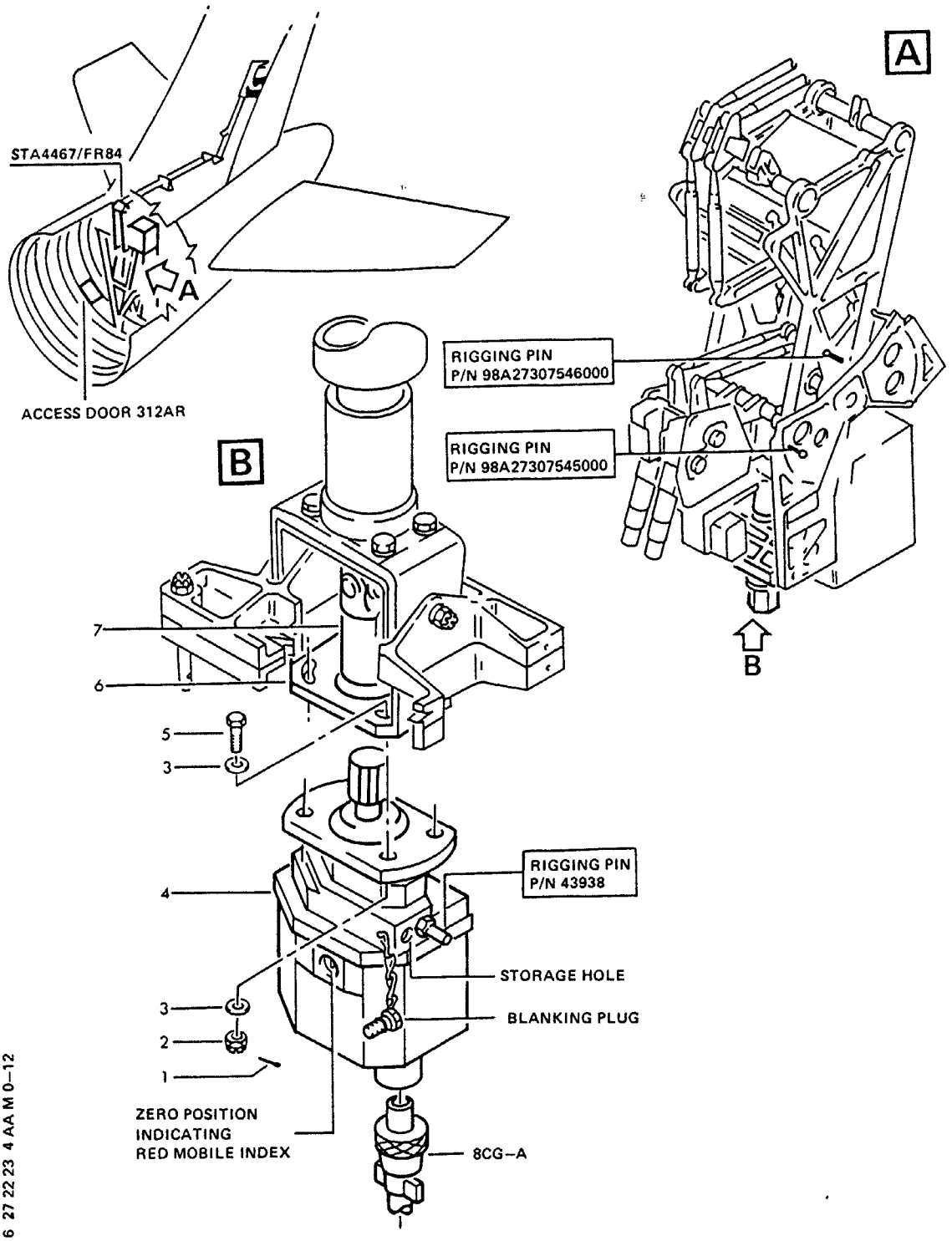
2. Procedure

A. Job Set-Up (Ref. Fig. 401)
(1)Position access platform.
(2)Make certain that rudder trim is set at zero.
(3)Make certain that rudder pedals are set at neutral and install rigging pins P/N 98A27901006000 (Qty. 2) in rudder control bellcranks on control mechanism mounting beam in avionics compartment.
(4)Display warning notices in flight compartment prohibiting operation of flight controls.
(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	322/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	322/U64

(6)Open access door 312AR.
(7)Install rigging pin P/N 98A27307545000 in cable quadrant.
(8)Install rigging pin P/N 98A27307546000 in rudder control main bellcrank.

B. Removal (Ref. Fig. 401)
(1)Cut and remove lockwire from blanking plug.
(2)Remove blanking plug and install rigging pin P/N 43938 in rudder trim actuator zero position (red mobile index position).
(3)Temporarily install blanking plug in storage hole.
(4)Disconnect electrical connector 8CG-A and install blanking caps.
(5)Remove cotter pins (1), nuts (2), bolts (5) and washers (3).
(6)Remove rudder trim actuator (4) downwards by disengaging from torque shaft (7).



Rudder Trim Acutator
Figure 401

C. Installation (Ref. Fig. 401)

R
R

(1)Apply grease (Mat. No. 04-004) to rudder trim actuator splined shaft and coat bolts (5) with corrosion preventive paste (Mat. No. 05-002).
(2)Make certain that rigging pin P/N 43938 is installed.
(3)Position rudder trim actuator (4) at bracket (6) and engage splined shaft with torque shaft (7).
(4)Install bolts (5) with washers (3) and nuts (2).
(5)Tighten nuts (2), safety with cotter pins (1) and make certain that rigging pins P/N 98A27307545000 and P/N 98A27307546000 can be easily installed.
(6)Remove rigging pin P/N 43938.
(7)Remove blanking plug from storage hole, install in operating position, TORQUE to 0.1 m.daN (0.738 lbf. ft.) and safety with lockwire.
(8)Remove rigging pins P/N 98A27901006000 (QTY. 2), P/N 98A27307545000 and P/N98A27307546000.
(9)Remove blanking caps and connect electrical connector 8CG-A.
(10)Remove safety clips and tags, and close circuit breakers 1CG, 1CB, and 2CB.

D. Test
(1)Carry out functional test of rudder trim (Ref. 27-22-00, P. Block 501).

E. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)Close access door 312AR.
(3)Remove warning notices.
(4)Remove access platform.

ARTIFICIAL FEEL AND RUDDER TRAVEL LIMITING
DESCRIPTION AND OPERATION

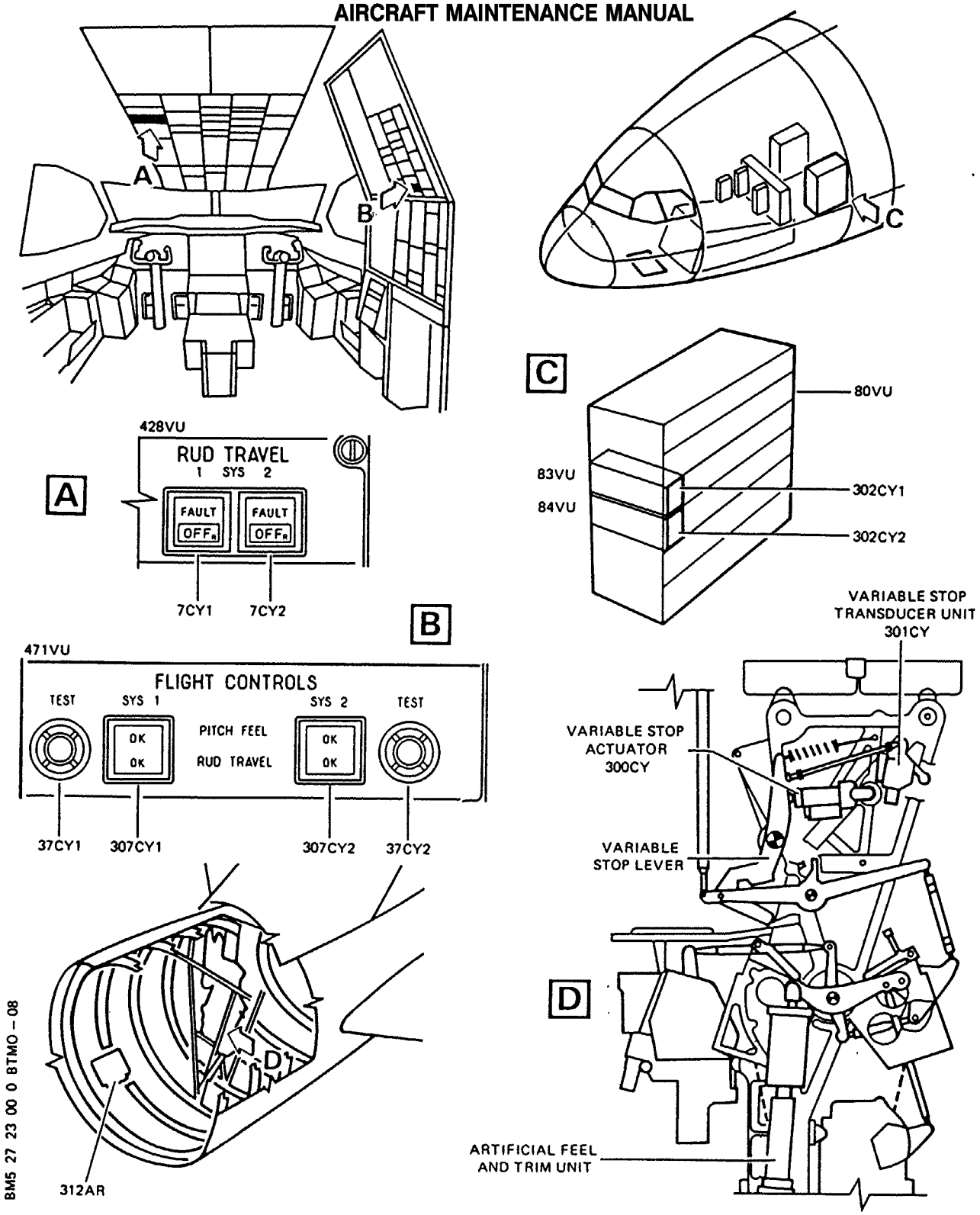
1. General

A spring assembly located in the artificial feel and trim unit restores a resistance to pedal depression which is proportional to rudder movement. A variable stop lever installed downstream of the servo controls on the control linkage serves to reduce rudder deflection with respect to pedal movement as the airspeed increases.

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
7CY1	P/BSW-RUD TRAVEL/SYS 1	428VU	211		
7CY2	P/BSW-RUD TRAVEL/SYS 2	428VU	211		
37CY1	P/BSW-FLIGHT CONTROLS/SYS 1 TEST	471VU	212		
37CY2	P/BSW-FLIGHT CONTROLS/SYS 2 TEST	471VU	212		
300CY	ACTUATOR-VARIABLE STOP		311	312AR	27-23-23
301CY	TRANSDUCER UNIT-VARIABLE STOP		311	312AR	27-23-24
302CY1	FLC-1	83VU	121	121BL	27-23-26
302CY2	FLC-2	84VU	121	121BL	27-23-26
307CY1	ANNUNCIATOR-FLIGHT CONTROLS/SYS 1/ RUD TRAVEL/OK	471VU	212		
307CY2	ANNUNCIATOR-FLIGHT CONTROLS/SYS 2/ RUD TRAVEL/OK	471VU	212		
	ARTIFICIAL FEEL AND TRIM UNIT		311	312AR	27-23-11
	VARIABLE STOP UNIT		311	312AR	27-23-22
	LEVER-VARIABLE STOP		311	312AR	27-23-25



Component Location
Figure 001

3. Rudder Artificial Feel

A. General (Ref. Fig. 002)

An artificial feel and trim unit is installed adjacent to the rear cable quadrant. It consists of a trim screwjack (Ref. 27-22) and a fail-safe constant resisting load spring rod, held in neutral position by the trim screwjack.

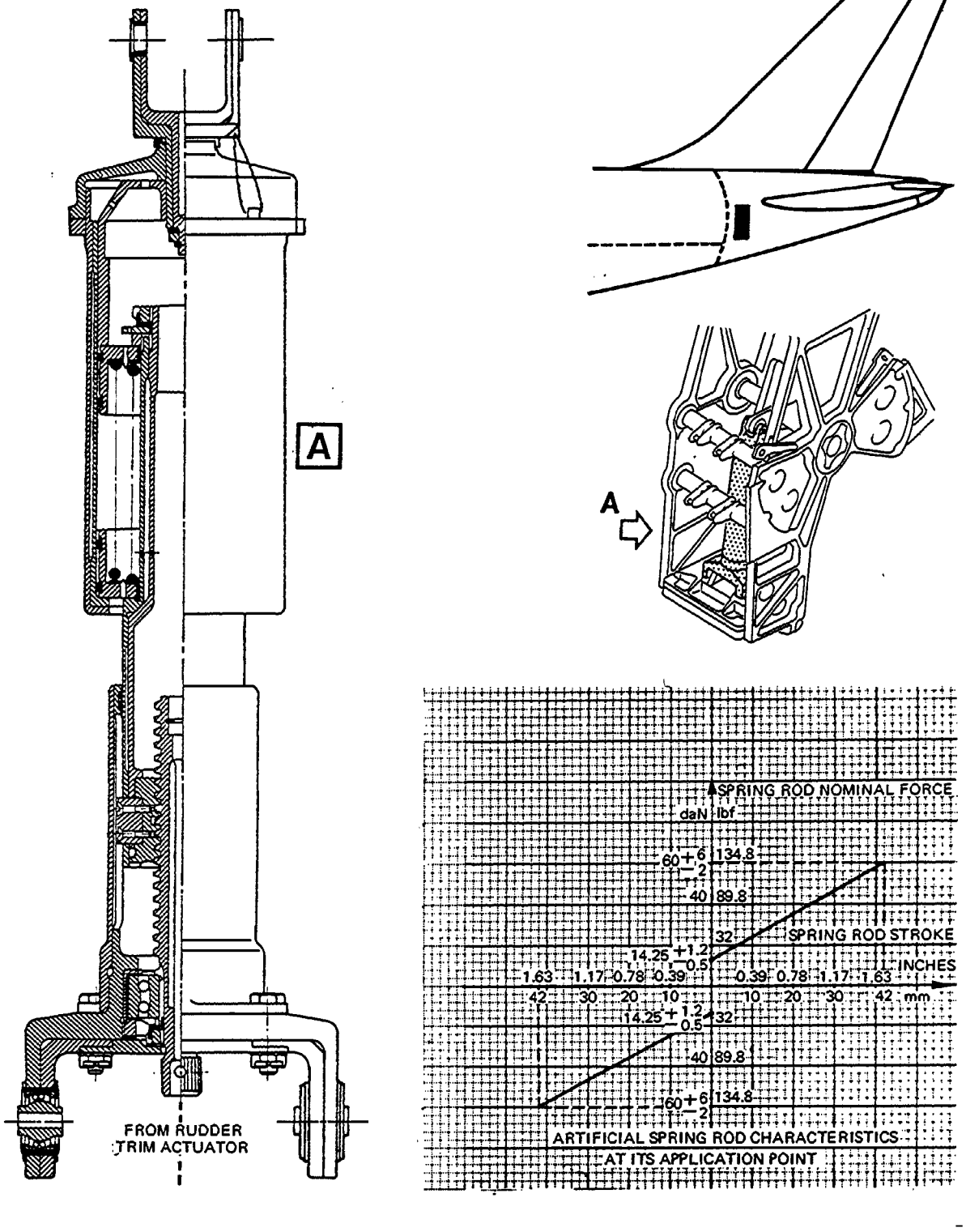
Spring rod function is :

- To maintain the downstream linkage and the input lever of the servo controls at neutral in the event of disconnection of the control linkage upstream of the artificial feel and trim unit
- To provide artificial feel loads proportional to rudder deflection
- To provide accurate centering of the surface at neutral in the absence of a control input
- To maintain the upstream controls at neutral, when signals are provided to the servo controls by the yaw damper actuator.

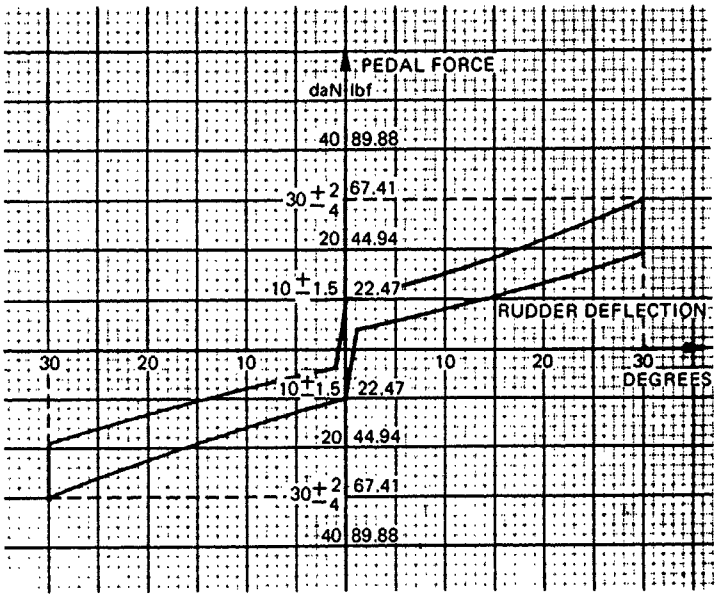
B. Leading Particulars

(1)Artificial feel characteristic (Ref. Fig. 002)

(2)Rudder pedal force versus rudder deflection (Ref. Fig. 003)



Artificial Feel & Trim Unit
Figure 002



NOTE : THIS CHARACTERISTIC REPRESENTS A COMPLETE CYCLE

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Pedal Force Versus Rudder Deflection
Figure 003

4. Rudder Travel Limiting

A. General

The rudder travel limiting system modifies control inputs to the servo controls, to vary rudder travel in relation to airspeed (Vc). Limitation is such that the maximum deflection which can be achieved by the rudder remains lower than the deflection which would induce limit loads on the structure, throughout the flight envelope.

B. System Description (Ref. Fig. 004)

The system is composed of :

- A variable stop unit consisting of an articulated lever operated by an electro-mechanical actuator, and a transducer unit detecting lever position. These items are all mounted on a frame assembly located downstream of the differential between the AP and yaw damper actuators (Ref. 27-21).
- Two control and monitoring computers designated FLC (Feel and Limitation Computer).
- One RUD TRAVEL control panel, one PITCH FEEL & RUD TRAVEL maintenance panel and five electrical power supply circuit breakers.

C. Mechanical Installation (Ref. Fig. 004, 005, 006)

(1)Variable stop actuator

(a)Description

The variable stop lever is operated by an electric actuator which consists basically of :

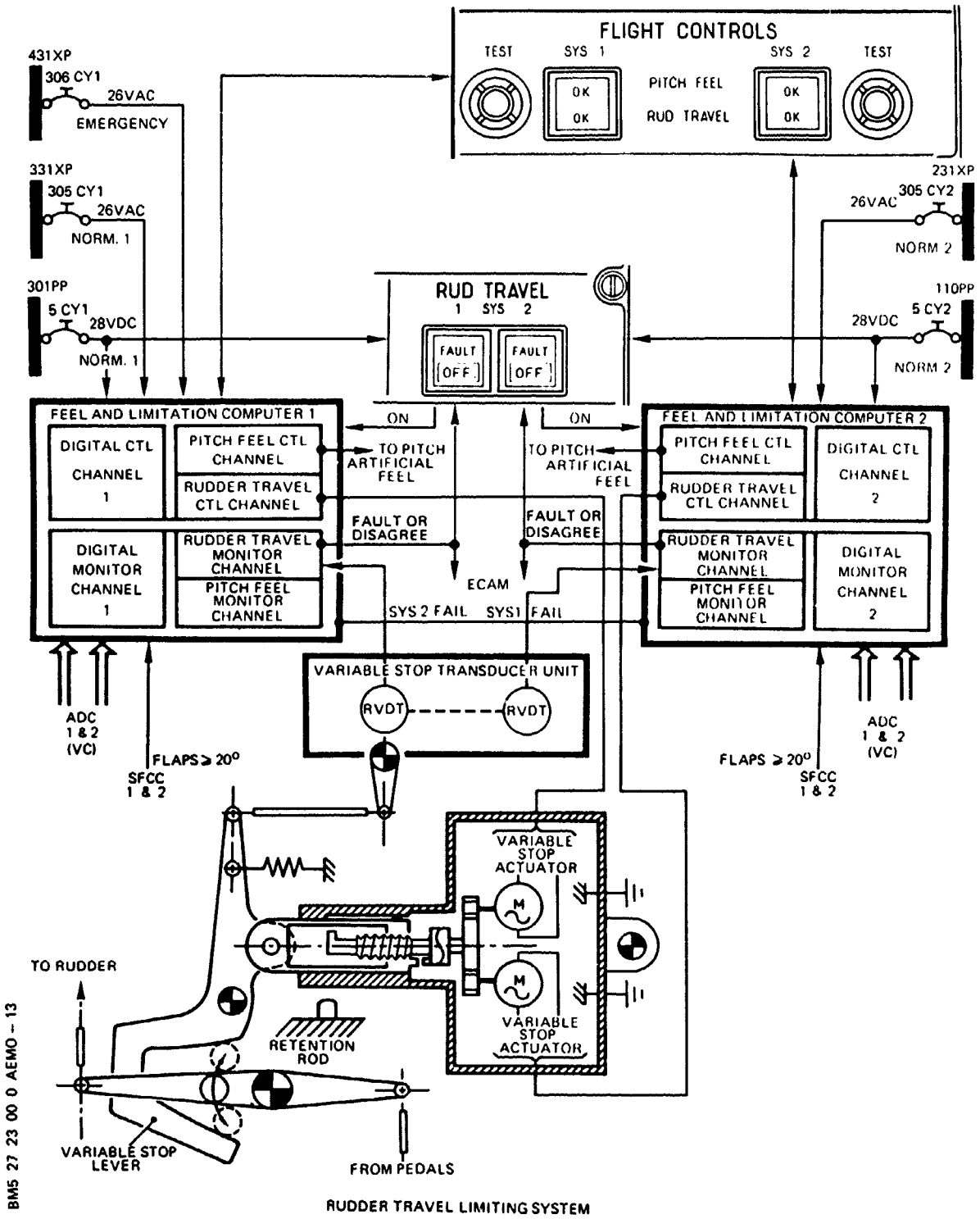
- Two AC motors, supplied with 26V - 400 Hz
- A single reduction gear actuated by both motors, which are rigidly connected.
- A nut/screw system, driven by means of a torque limiter
- Mechanical end-of-travel stops
- A torque limiter provided to protect the reduction system from any abrupt jamming of the output shaft, particularly when it reaches the mechanical stop.

(2)Transducer unit

The actuator is servo controlled and is monitored through a transducer unit driven by variable stop lever movement. The transducer unit, comprising two inductive transducers is identical to the one used in the spoiler control system.

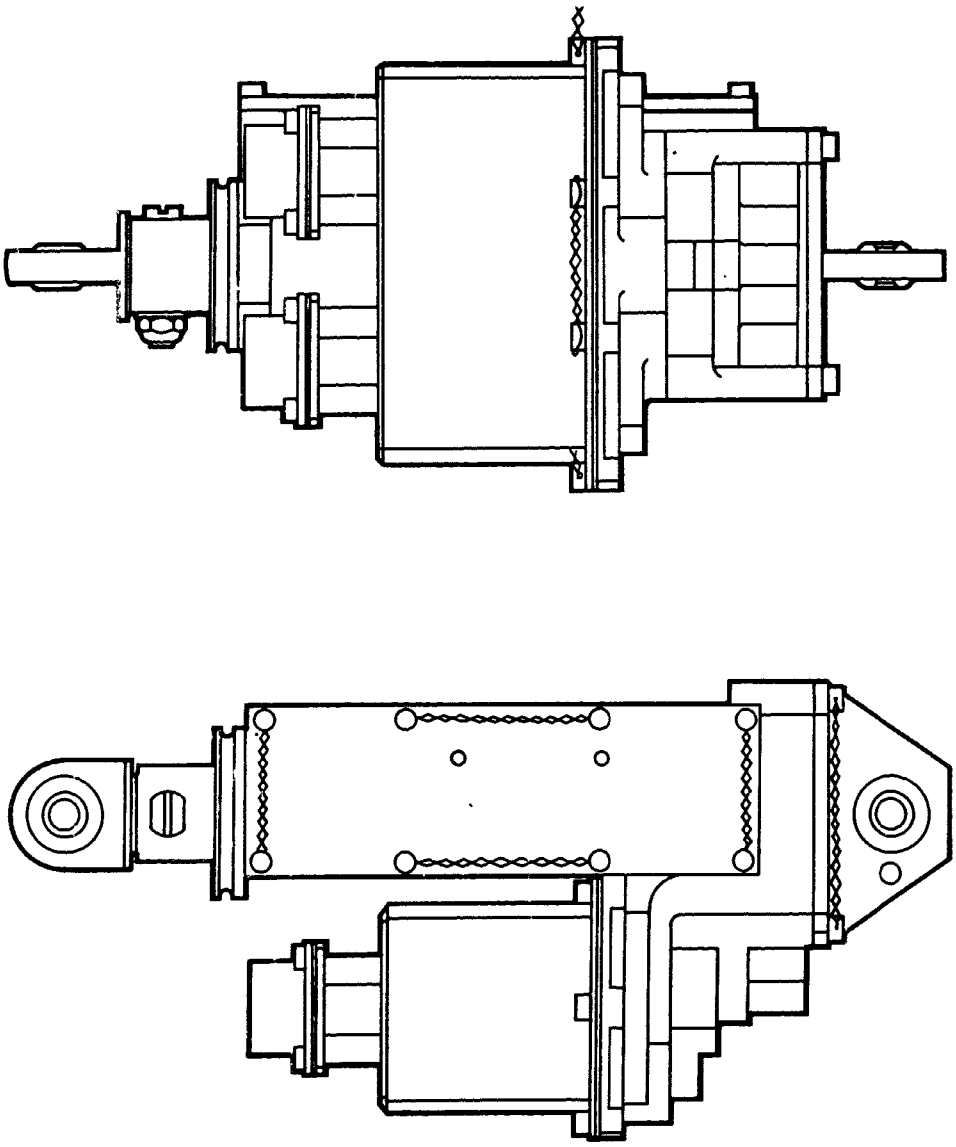
(3)Spring - Retention rod

In the event of a rupture or disconnection of an actuator attachment a retention rod limits actuator movement to prevent it from jamming the variable stop lever. A spring returns the lever to the "low speed" position where full control deflection (± 30°) is possible.



RUDDER TRAVEL LIMITING SYSTEM

Rudder Travel Limiting System
Figure 004



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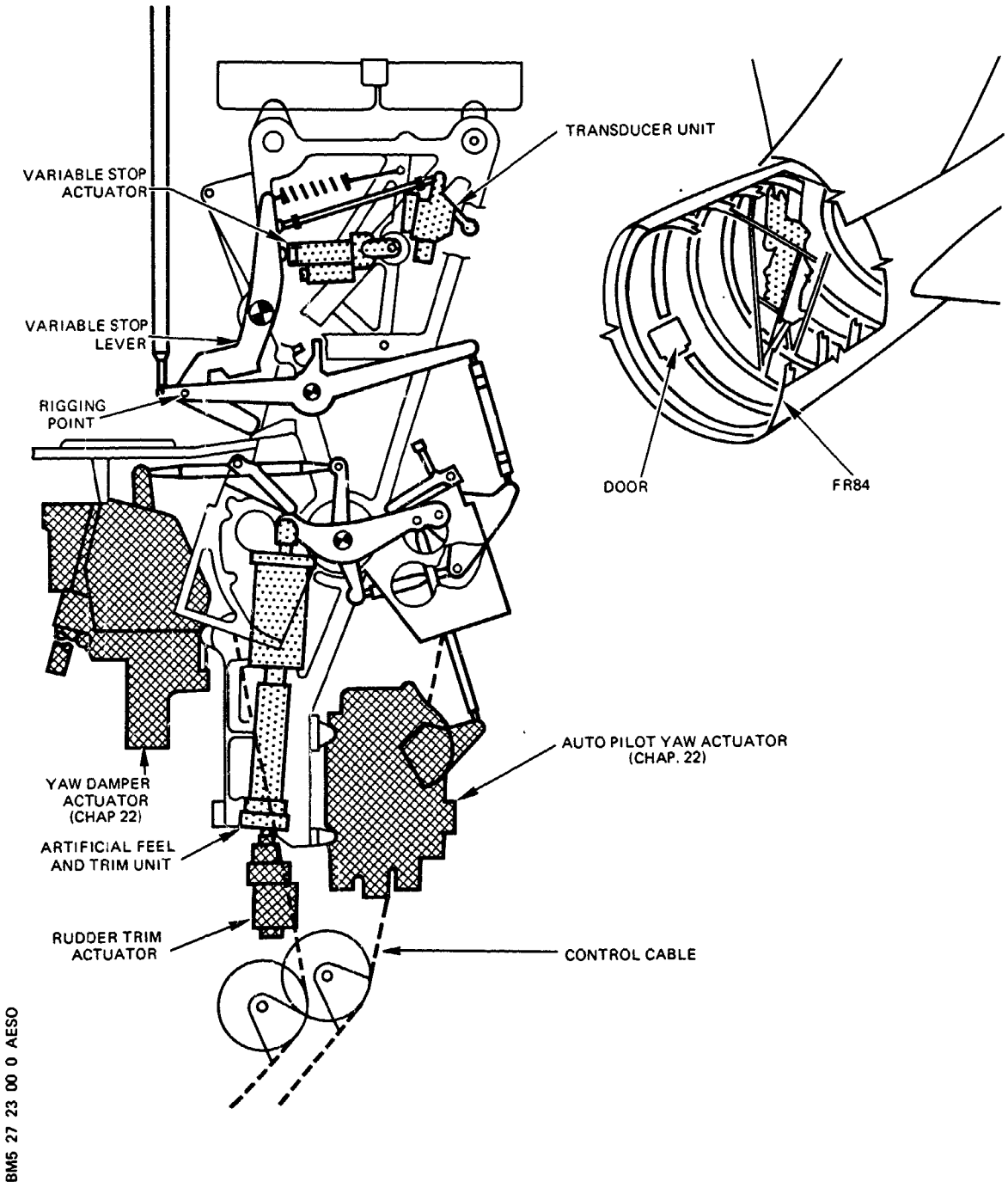
Variable Stop Actuator
Figure 005



Rudder Control Input Components
Figure 006

D. Electrical Installation

(1)Feel and limitation computer (FLC) (Ref. Fig. 007)

This computer contains the circuitry required for two functions : rudder travel limiting and pitch feel (Ref. 27-33).

The FLC is a digital computer comprising two different computation channels :

- Rudder travel limiting/pitch feel control channel
- Rudder travel limiting/pitch feel monitor channel.

Each channel is built around a MOTOROLA 6802 microprocessor.

However analog technology is used for power loops fed by the control channel.

Safety of the systems is ensured by :

- control and monitor channel programs which are intentionally different
- monitoring of digital computations which are performed by control and monitor channels with the same input data, achieved by comparison between the results of both channels, by mean of analog comparators.
- power loop monitoring achieved by software means in each digital channel.

Other redundant monitoring devices are provided to enhance safety. These considerations result in four electronic cards being used.

(a)Digital control channel card

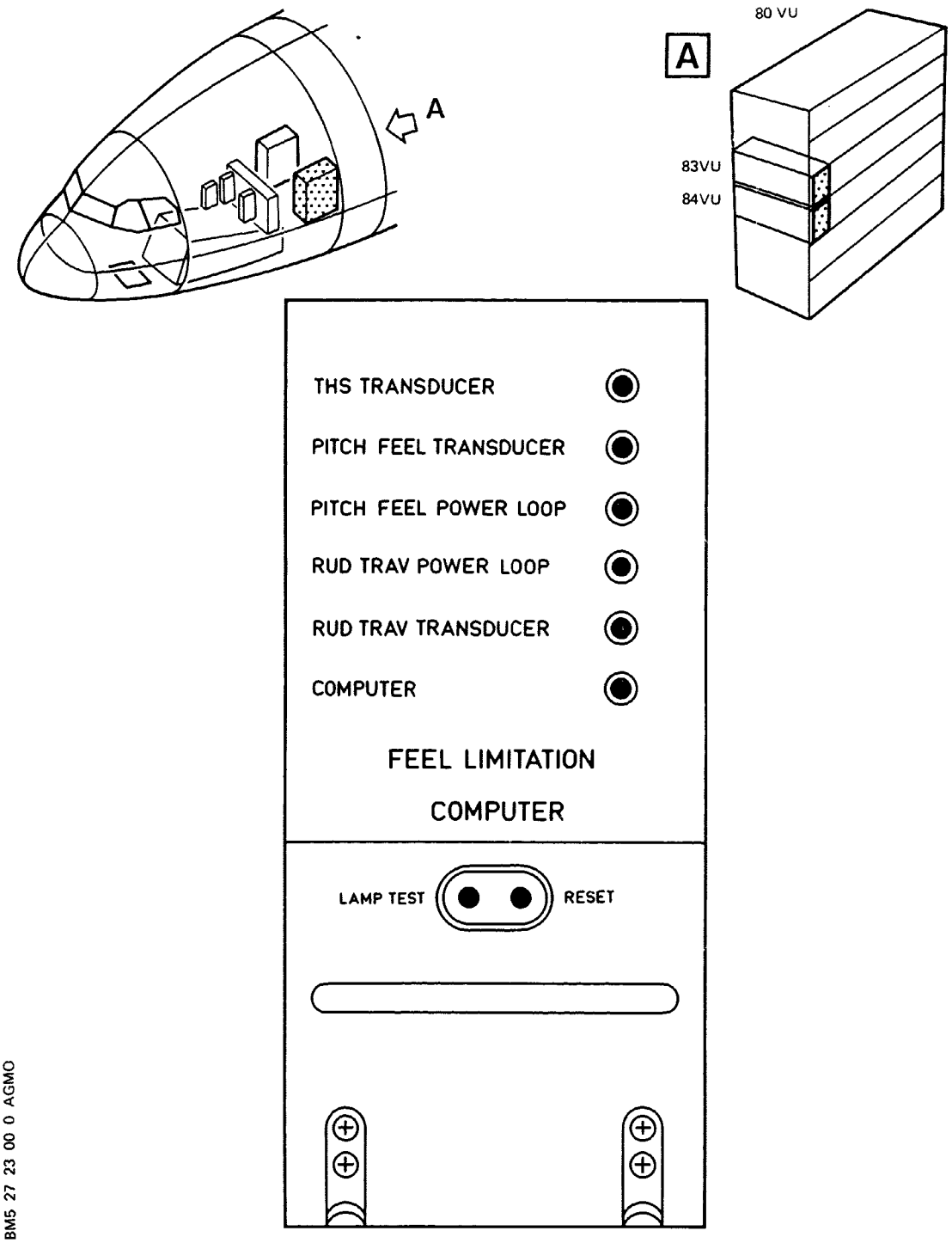
. Acquisition and monitoring of data from ADS 1 & 2
. Acquisition and monitoring of variable stop lever/pitch artificial feel actuator position transducer data
. Acquisition and monitoring of discrete signals
. Acquisition and monitoring of THS position sensor data
. Autotest of software : RAM test, ROM test, watch dog
. Generation of rudder travel limiting and pitch artificial feel laws and control signals.
. Anti-stall function control
. Monitoring of rudder travel and pitch feel power loops
. Power supply monitoring (± 15VDC and + 5VDC)
. Rudder disagree warning computation
. Monitoring of carbon rudder law pin programming

(b)Digital monitor channel card

Identical to the control channel plus activation of maintenance indicators located on the face of the computer.

(c)Analog control channel card

. Rudder travel limiting and pitch feel slaving error computation
. Supply of power to, and removal from the associated pitch artificial feel actuator servovalve



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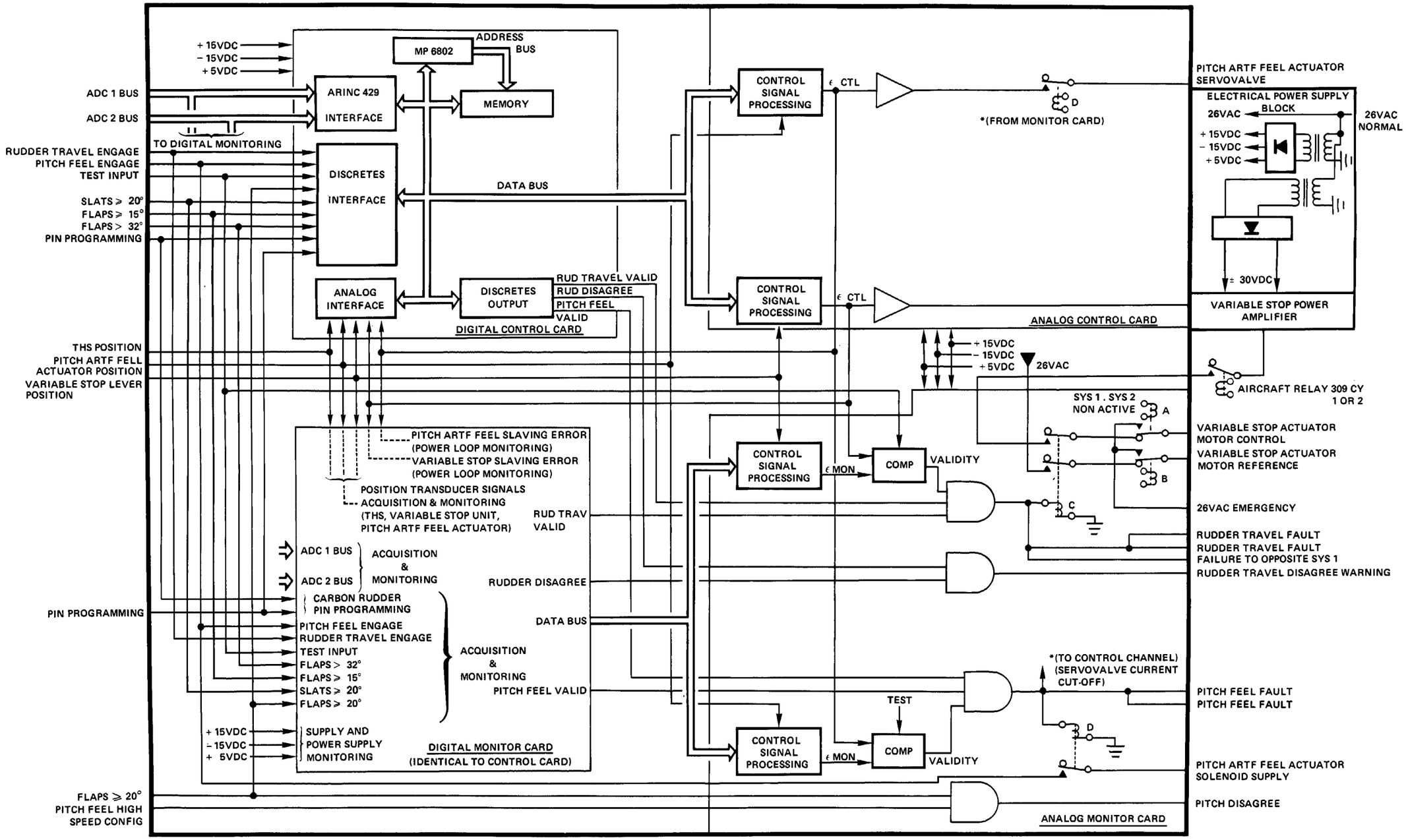
Feel and Limitation Computer Face
Figure 007

(d)Analog monitor channel card :
(Ref. Fig. 008)
. Rudder travel limiting and pitch feel slaving error computation
. Monitoring of both digital channels by comparison between slaving errors
. Supply of power to and removal from the variable stop actuator motor reference and control coils.
. Control of the automatic return to "low speed" position performed with a specific 26VAC voltage.
. Supply of power to and removal from the associated pitch artificial feel actuator solenoid valve.
. Rudder disagree and pitch disagree warning activation
. Rudder travel limiting and pitch feel FAULT warning activation.

The electrical power supply block is mounted on the frame of the computer. It consists of two transformers using 26VAC voltage, one to output computation voltages : ±15VDC and +5VDC, the other to output ±30VDC voltage used for supplying the associated variable stop actuator motor power amplifier which is also mounted on the computer frame.
The face of the FLC features indicators for locating any failed components in the system and two associated pushbutton switches : RESET for extinguishing indicators if the failure conditions have disappeared ; LAMP TEST for checking that there are no failed indicators.
Any indicator which is on will go off in the event of electrical power loss but will come on again when power supply to the computer is restored.
If any indicator is on, the test of either RUDDER TRAVEL LIMITING system (Ref. Para. E. (5)) or PITCH ARTIFICIAL FEEL system (Ref. 27-33 Para. 6. F.) will not operate.



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Feel and Limitation Computer - Block Diagram
Figure 008

(2)PITCH FEEL/RUD TRAVEL control panel (Ref. Fig. 004)
Rudder travel limiting and pitch artificial feel engagement and warning components are grouped onthe same panel.
The panel comprises four illuminated pushbutton switches with two legends, FAULT - OFF/R, and thecircuitry needed for light testing and dimming.
The FAULT legend is amber when on, OFF/R is white.

(3)PITCH FEEL & RUD TRAVEL maintenance panel (Ref. Fig. 004)
A single panel includes test facilities for travel limiting and pitch feel systems.
The panel comprises two TEST pushbutton switches (1 per FLC) and two annunciators, SYS1 and SYS2, each with two OK legends (come on white), i.e. 1 per function : PITCH FEEL and RUD TRAVEL.

(4)Electrical power supply
The systems are supplied with the following voltages :

RUDDER TRAVEL/PITCH FEEL SYSTEM	26VAC bus bar	28VDC bus bar
1	331 XP - 431 XP NORMAL - EMER	301 PP
2	231 XP NORMAL	110 PP

All the inductive transducers used in the systems are supplied with 26VAC voltage through their associated computer.

E. Operation

(Ref. Fig. 009)

The law of maximum rudder deflection versus Vc to be achieved so as not to exceed the structural limitation is shown in Diagram A (Ref. Fig. 009).

(1) Actuator control (Ref. Fig. 010)

Each actuator motor is associated with one FLC. Each FLC receives Vc data from both air data systems (ADS 1 and ADS 2), and uses the higher of the two values. In the event of failure of one ADS, both FLCs use Vc data from the remaining ADS.

On the basis of the following characteristics : max rudder deflection and actuator travel Diagram C (Ref. Fig. 009), the actuator slaving law generated by each FLC is given by diagram B.

Each computer generates a slaving error from the difference between y and the actuator position transmitted by one of the position transducers. FLC 1 is the normally active computer, FLC 2 being in standby ; this is achieved as follows :

- FLC 1 (Side 1) : the slaving error is amplified and transmitted to motor 1.
- FLC 2 (Side 2) : actuator position is applied to the slaving input so that the slaving error is null.

When FLC 2 becomes active (FLC 1 failure) the signal (Vc) generated by FLC 2 is gradually substituted for the initial signal so that monitoring is not triggered.

DIAGRAM A

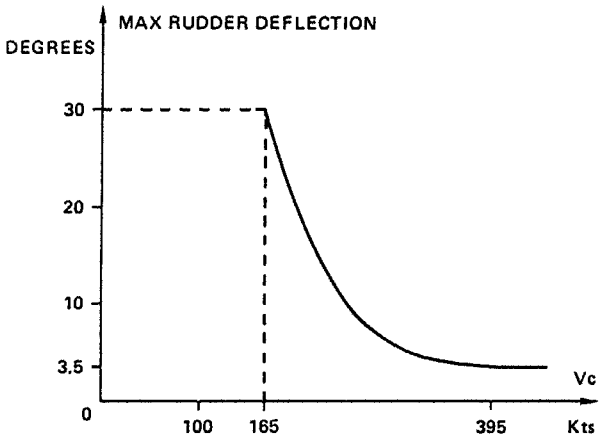


DIAGRAM B

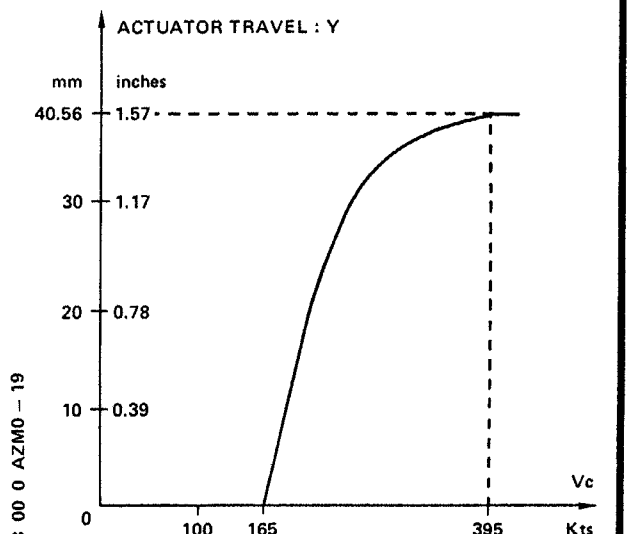
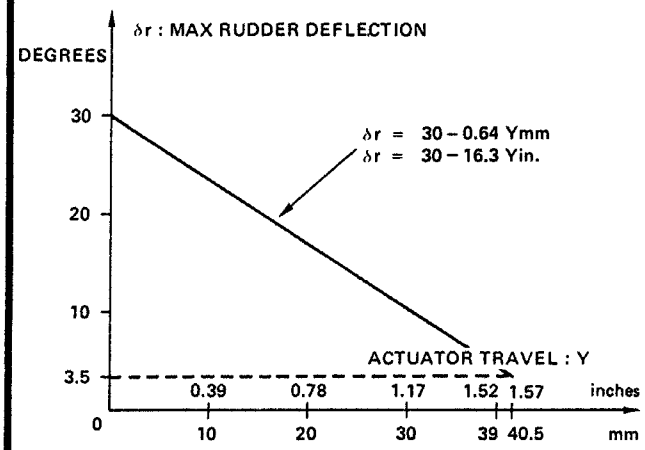


DIAGRAM C



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Rudder Travel Limiting Characteristics
Figure 009

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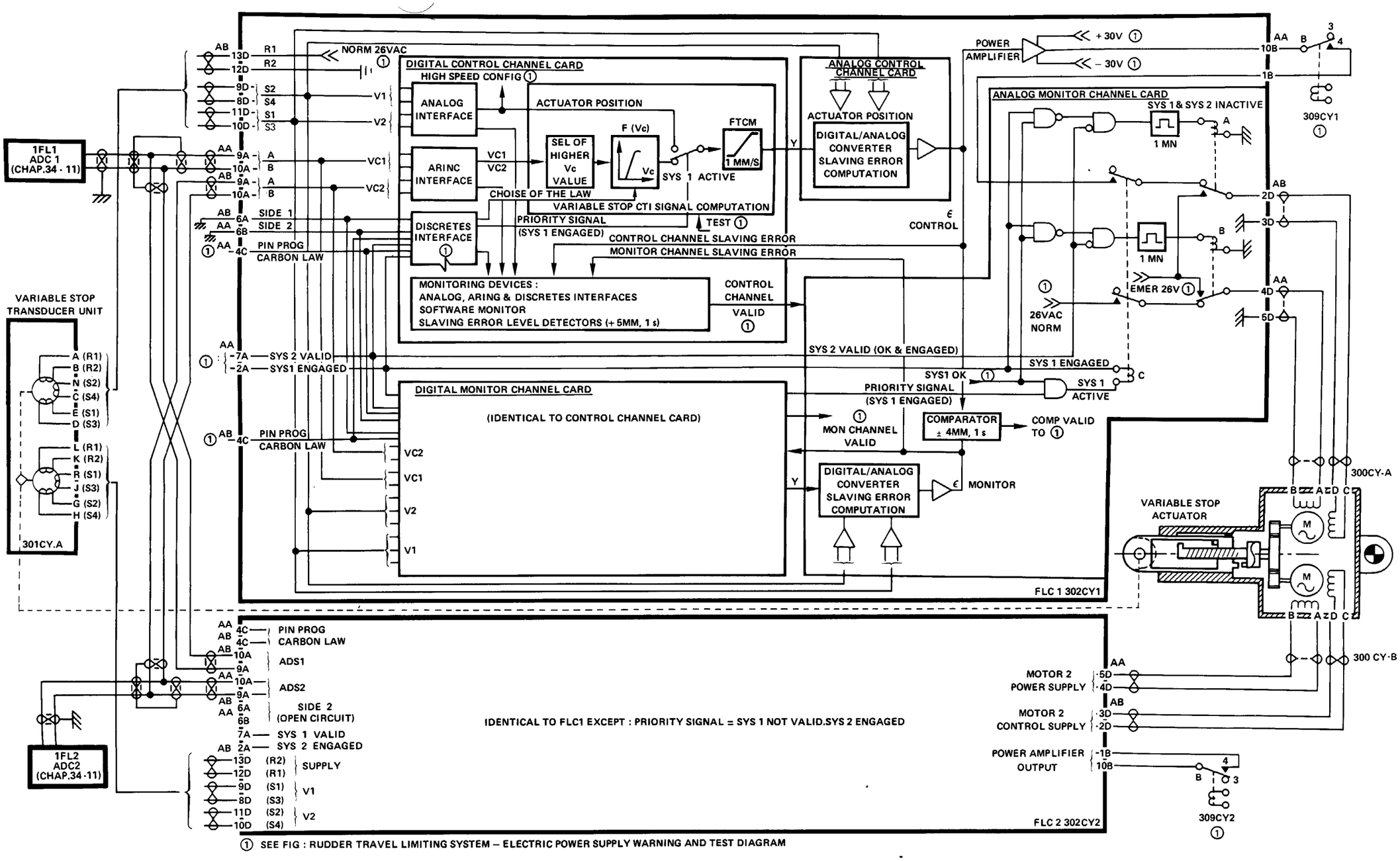

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Rudder Travel Limiting System - Functional Diagram
Figure 010

R

(2)Monitoring (Ref. Fig. 010)

Monitoring consists mainly in :

- Monitoring of digital computations by means of "hardware" comparison between a slaving error generated by the monitor channel and the slaving error generated by the control channel (comparator threshold corresponds to ±4 mm of variable stop actuator position ; delay = 1.3 s).
- Power loop monitoring, by software level detectors checking that each slaving error remains near zero (threshold = ±5 mm ; delay = 1 s). In addition each digital channel checks the validity of associated position transducer signals, ADS 1 & 2 data, discrete signals and software.

When an operation failure is detected the computer induces :

- Deactivation of the motor concerned by cutting off the control and reference signals (this is also performed when the system is not engaged or not active)
- Failure signaling to the other computer (Ref. Fig. 012)
- Activation of the warning (Ref. para. (3) : Engagement - Warnings)

NOTE : To enhance safety, the motor control signal is cut off again, outside the computer, by the relay which supplies the warning light.

- Activation of the relevant maintenance indicator.

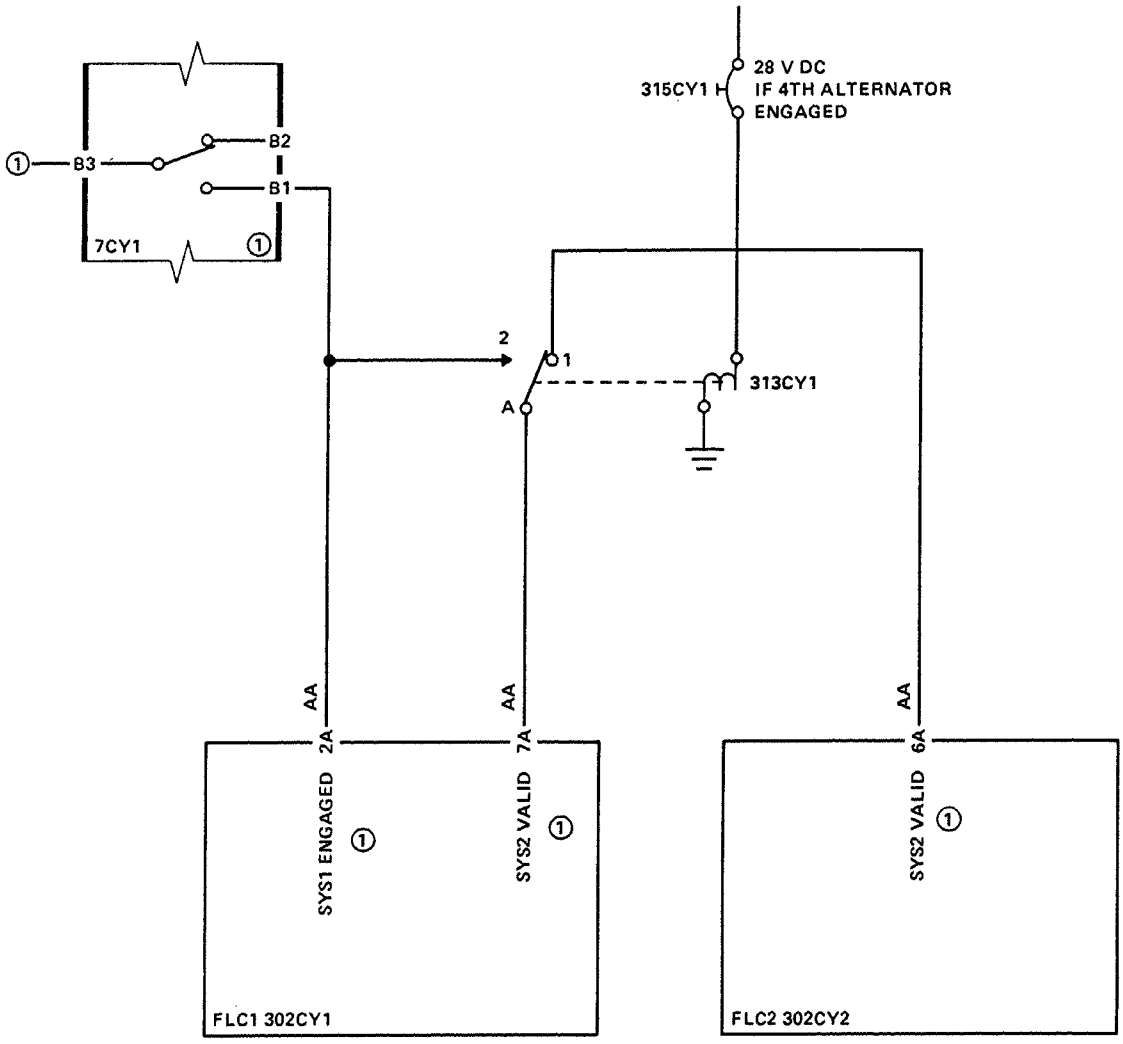
Failure detection is memorized, it is therefore necessary to reset the monitor circuits by pressing the RUD TRAVEL pushbutton switch (overhead control panel) to illuminate the OFF/R legend (Ref. para. (3) when the failure has disappeared).

NOTE : . An electrical power supply or double DADS loss is considered as a failure, but is not memorized and does not correspond to any maintenance indicator.
. Return of the power supply or of one DADS resets the monitor circuits.

In the event of loss of both systems (double failure or double disengagement), switching circuits located in each FLC apply a command to each motor to return to the "low speed" position. The command is held for one minute so that the actuator can return to the "low speed" position whatever its departure position.

For FLC 1, this command is generated from the emergency 26V so that it can survive any combined engine/AC generator failure.

NOTE : On Extended Range Operations (EROPS) aircraft, during operation of the 4th AC generator, a relay (313CY1) enables the SYS2 VALID information to be forced to the FLC1 (Ref. Fig. 011). This is to avoid, in the event of electrical transients affecting the standby generation, spurious returns of the variable stop actuator to the "low speed" position and then disconnections of SYS1 which is the only one available on board.



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① SEE FIG : RUDDER TRAVEL LIMITING SYSTEM–ELECTRIC POWER SUPPLY WARNING AND TEST DIAGRAM

EROPS Facility : System 2 Validity to System 1
Figure 011

(3)Engagement - warnings (Ref. Fig. 004)
Two pushbutton switches on control panel 428VU are each associated with one rudder travel limiting system, RUD TRAVEL SYS 1 or SYS 2.
The legends OFF/R are illuminated white when the systems are not engaged.
A system is engaged when the associated pushbutton switch is pressed in ; the legend OFF/R then goes off.
When a failure is detected by the monitor circuits, the FAULT legend of the pushbutton switch associated with the system concerned comes on amber.
This warning is repeated in the ECAM system :
(Ref. Fig. 012)
- Warning display.
Action on a failed system pushbutton switch (FAULT on) confirms its de-activation : the FAULT legend goes off and OFF/R comes on. It also allows the monitor circuits to be reset.
NOTE : There is no warning possibility under electrical emergency conditions.

(4)Rudder disagree warning (Ref. Fig. 012)
This warning is activated if the variable stop unit has not returned to the "low speed" position when the flaps are extended 20° or more (main possible reasons : actuator jamming, failure of both motors).
"Flaps extended" information is transmitted to each FLC by each slat/flap control computer. Detection of failure to return to low speed position is performed by the monitor circuits of each FLC from position transducer information (threshold = 16.5 mm (0.650 in.) of variable stop actuator length delay = 3s).
The warning consists of illumination of the FAULT legends on RUD TRAVEL SYS 1 and SYS 2 pushbutton switches.
The warning is repeated in the ECAM system :
- On CAPT and F/O main instrument panels 3VU and 5VU
  - MASTER CAUTION lights flash
  - Single chime sounds
- Warning display.
When the pushbutton switches are pressed the OFF/R legends come on, but FAULT does not go off as long as the failure conditions remain.

(5)Test
The test consists in checking the absence of dormant failures in the computer. The sequence is achieved when the system is engaged.
The test corresponding to each system (SYS 1 or SYS 2) checks out the monitor circuit(s) specific to the system. The system concerned must disengage, the associated PITCH FEEL and RUD TRAVEL FAULT legends must come on after flashing during ≅ 6s.
If all the monitor circuits operate correctly, a white OK annunciator legend associated with thesystem tested comes on on the lateral panel after ≅ 6 s delay, while the TEST pushbutton switch is pressed (Ref. para. 4. D. (3).
The OK annunciator will not light on if any indicator on the front face of the computer remains on.

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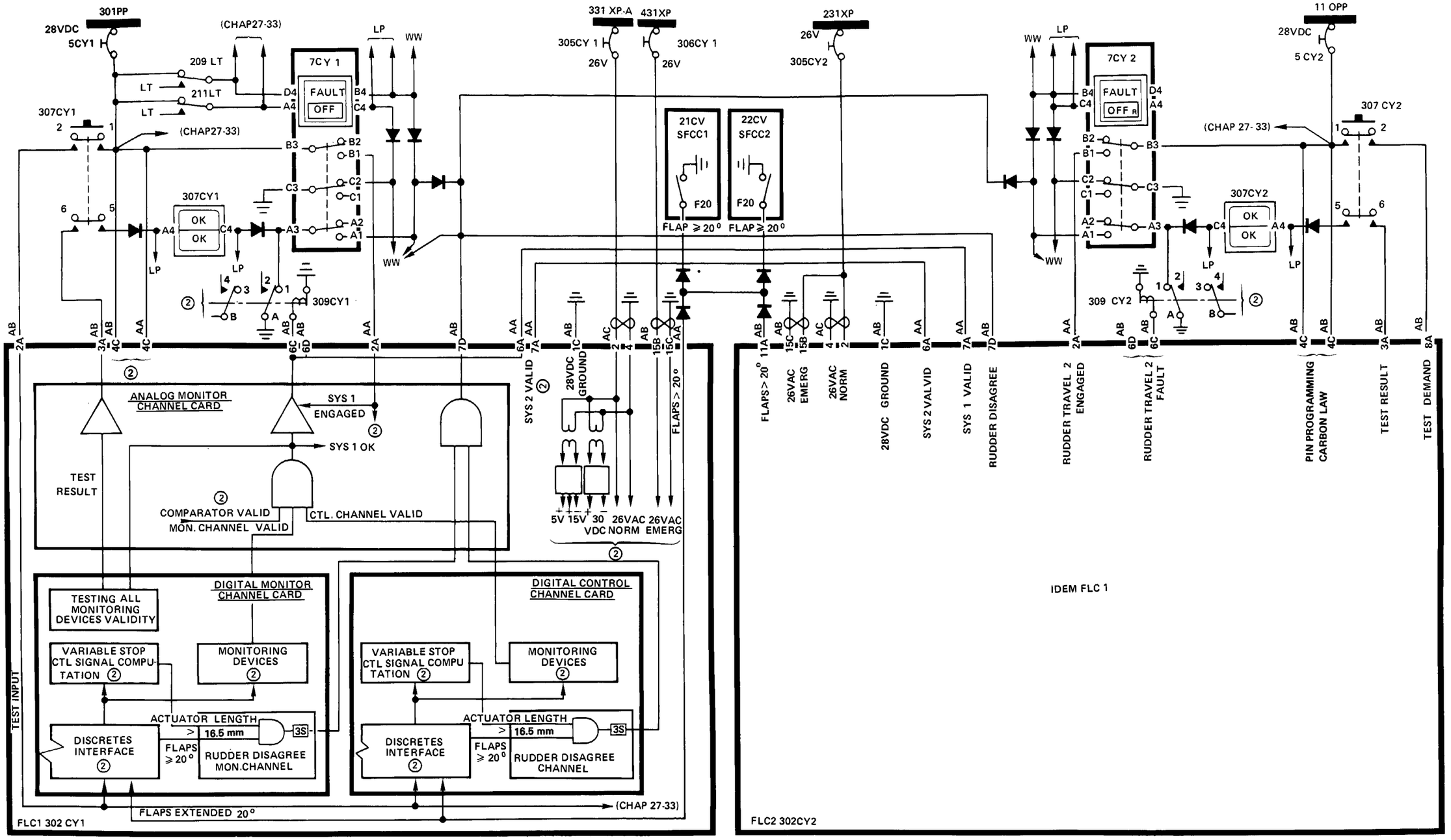


② SEE FIG: RUDDER TRAVEL LIMITING SYSTEM– FUNCTIONAL DIAGRAM

Rudder Travel Limiting System - Electrical Power Supply Warning and Test Diagram
Figure 012

F. Leading Particulars

(1)Variable stop actuator

- Mechanical

  Operating stroke----------39 mm (1.53 in.)
  Stop-to-stop stroke----------47 mm (1.85 in.)
  Screw pitch----------2.5 mm/rev (0.1 in./rev)
  Maximum speed with an external
  load of 25 daN (56.3 lbf)----------0.75 mm/s (0.03 in./s)
  (Temperature : 20°C (68°F); power
  supply : 26 V - 400 Hz)
  Stall load on 1 motor
  (20°C/26 V - 400 Hz)----------250 daN (563 lbf.)
  Maximum static external load----------550 daN (1238 lbf.)
  Weight----------1.4 kg (3 lb.)

- Electrical

  Motor power supply----------26V-400 Hz

(2)Feel and limitation computer (FLC)

- Size : 3 MCU
- Weight : 5 kg (11 lb)
- Current consumption : 1.2 A on 26VAC
- Rack connector size 1
- Microprocessors used : MOTOROLA 6802
- Memory capacity : - PROM 2 x 9 K octets
  - RAM 2 x 1 K octets
- Step computation : 65.5 ms
- Program language : assembler

ARTIFICIAL FEEL AND RUDDER TRAVEL LIMITING - ADJUSTMENT/TEST

R WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEM, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Operational Test

NOTE : This test can be performed in conjunction with test of Artificial Feel (Ref. 27-33-00, P. Block 501).
If not, do not take into account pitch feel warning.

A. Reason for the Job

Check the correct operation of the systems and warnings associated with the variable stop unit.

(1)Annunciator light test.
(2)Operational test of standby motor.
(3)Operational test of FLC computer.
(4)Test of warnings in the event of ADC failure.
(5)Test of SYS 1/2 systems.
(6)Operational test of low speed configuration emergency return using SYS 1 (SY 2).
(7)Operational test of rudder travel limitation at high speed.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up

(a)Initial conditions :

Correct electrical power supply (Ref. 24-41-00, P. Block 301).
Forward services ventilation system in operation.

Overhead and lateral panel circuit breakers closed, particularly those associated with FLT CTL (133VU).
Aircraft on ground (circuit breakers L/G PROX DET & RELAYS SYS1 and SYS2 closed on panel 133VU).

(b) Pressurize Green, Blue and Yellow hydraulic systems using Green auxiliary power (Ref. 29-21-00, P. Block 301) and Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c) On SERVO CTL section of panel 428VU
- make certain that G, B and Y pushbutton switches are pressed (in) and JAM and OFF legends are off.

(d) Make certain that flap and slat control lever is in first notch position.

(e) On RUD TRAVEL section of panel 428VU
- make certain that SYS 1 and 2 pushbutton switches are pressed (in).

(f) Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.

(g) On panel 408VU
- make certain that rudder trim is at zero.

(h) On panel 11VU on ECAM CONTROL PANEL
- Press and release CLR pushbutton switch until light goes off
- Press F/CTL pushbutton switch to call up FLT CTL page on R ECAM display unit.

CAUTION : DISREGARD DISCRETE INPUT FAULT 134 ON LEFT ECAM DISPLAY UNIT WHEN ECAM INPUT TEST IS SWITCHED ON AND CORRESPONDING FAULT LEGENDS OF RUD TRAVEL PUSHBUTTON SWITCHES ARE ON.

D. Test
(1)Annunciator light test

ACTION	RESULT
1. On ANN LT section of panel 436VU - place switch in TEST position.	On RUD TRAVEL section of panel 428VU - FAULT and OFF/R legends of SYS 1 and 2 pushbutton switches come on.
2. On ANN LT section of panel 436VU - place switch in BRT position.	- Above annunciator lights go off.
3. On panel 472VU - place ANN LT switch in TEST position.	On FLIGHT CONTROLS section of panel 471VU - OK legends of RUD TRAVEL/SYS 1 and 2 annunciators come on.
4. On panel 472VU - place ANN LT switch in OFF position.	- OK legends of RUD TRAVEL/SYS 1 and 2 annunciators go off.

(2)Operational test of standby motor

ACTION	RESULT
1. On RUD TRAVEL section of panel 428VU - Release SYS1 pushbutton switch.	- Corresponding OFF/R legend comes on On left ECAM display unit: - RUD TRAVEL 1 OFF/R message is displayed.
2. On ADS section of panel 470VU make sure that SYS1 and SYS2 pushbutton switches are released.	On CAPT PFD: - Check that airspeed and MACH indications are zero.
3. Actuate pedals full right.	On right ECAM display unit, RUD scale: - Bug shifts to extreme right.
4. Return pedals to neutral position.	On right ECAM display unit, RUD scale: - Bug returns to central position.
5. On ADS section of panel 470VU - Press SYS1 pushbutton switch.	On CAPT's (F/O's) PFD: - 367(±1) Kts is indicated after 5 seconds. On CAPT and F/O main instrument panels 3VU and 5VU: - MASTER CAUTION lights come on for a few seconds. Single chime sounds.
6. Wait for 1 minute Actuate pedals full right.	On right ECAM display unit, RUD scale: - Bug shifts to the right but travel is limited.
7. Return pedals to neutral position.	On right ECAM display unit, RUD scale: - Bug returns to central position.
8. Actuate pedals full left.	On right ECAM display unit, RUD scale: - Bug shifts to the left but travel is limited.
9. Return pedals to neutral position.	On right ECAM display unit, RUD scale: - Bug returns to central position.

ACTION	RESULT
10. On ADS section of panel 47OVU - Release SYS1 pushbutton switch.	On CAPT's PFD: - Airspeed and MACH indications are zero.
11. Wait for 1 minute Actuate pedals full left.	On Right ECAM display unit, RUD scale: - Bug shifts to the extreme left.
12. Return pedals to neutral position.	On right ECAM display unit, RUD scale: - Bug returns to central position.
13. On ADS section of panel 47OVU - Press SYS2 pushbutton switch.	On F/O's PFD: - 367(±1) Kts is indicated after 5 seconds. On CAPT and F/O main instrument panels 3VU and 5VU: - MASTER CAUTION lights come on for a few seconds. - Single chime sounds.
14. Wait for 1 minute Actuate pedals full right.	On right ECAM display unit, RUD scale: - Bug shifts to the right but travel is limited.
15. Return pedals to neutral position.	On right ECAM display unit, RUD scale: - Bug returns to central position.
16. Actuate pedals full left.	On right ECAM display unit, RUD scale: - Bug shifts to the left but travel is limited.
17. Return pedals to neutral position.	On right ECAM display unit, RUD scale: - Bug returns to central position.
18. On ADS section of panel 47OVU - Release SYS2 pushbutton switch.	On F/O's PFD: - Airspeed and MACH indications are zero.
19. Wait for 1 minute Actuate pedals full right.	On Right ECAM display unit, RUD scale: - Bug shifts to the extreme right.
20. Return pedals to neutral position.	On right ECAM display unit, RUD scale:

ACTION	RESULT
	- Bug returns to central position.
21. Actuate pedals full left.	On right ECAM display unit, RUD scale: - Bug shifts to extreme left.
22. Return pedals to neutral position.	On right ECAM display unit, RUD scale: - Bug returns to central position.
23. On RUD TRAVEL section of panel 428VU -Press SYS1 pushbutton switch.	- Corresponding OFF/R legend goes off. On left ECAM display unit: - message disappears.

R

(3)Operational test of FLC computer
(a)Operational check of monitoring circuits (rudder travel SYS1 and SYS2).

NOTE : Only SYS1 test is described, repeat procedure with indications between brackets for test of SYS2.

ACTION	RESULT
1. On FLIGHT CONTROLS section of panel 471VU - press and hold TEST/SYS1 (TEST/SYS2) pushbutton switch.	On FLIGHT CONTROLS section of panel 471VU - OK legend of RUD TRAVEL/SYS1 (RUD TRAVEL/SYS2) annunciator comes on after 7 seconds. On RUD TRAVEL section of panel 428VU - FAULT legend of SYS1 (SYS2) push-button switch comes on. On left ECAM display unit, following message appears FLT CTL RUD TRAVEL1 (2) FAULT.....OFF/R
2. On ANN LT section of panel 436VU - place switch in DIM position.	On RUD TRAVEL section of panel 428VU - FAULT legend of SYS1 (SYS2) push-button switch dims.
3. On ANN LT section of panel 436VU - place switch in BRT position.	On RUD TRAVEL section of panel 428VU - FAULT legend of SYS1 (SYS2) push-button switch resumes normal brightness.
4. On FLIGHT CONTROLS section of panel 471VU - release TEST/SYS1 (TEST/SYS2) pushbutton switch.	On FLIGHT CONTROLS section of panel 471VU - OK legend of RUD TRAVEL/SYS1 (RUD TRAVEL/SYS2) annunciator goes off. On RUD TRAVEL section of panel 428VU - FAULT legend of SYS1 (SYS2) push-button switch goes off. On left ECAM display unit - message disappears.

**ON A/C ALL

(b)Operational test of FLC computer at a weekly interval.

Repeat procedure with indication between brackets for test of FLC 2.

1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
2 Get access to the 80VU electronic rack in the avionics compartment.
3 Record the bite code, if any, on the FLC 1(2) located on shelf 83VU (84VU) and perform adequate maintenance action if required.
4 Push on both pushbuttons "LAMP TEST" and "RESET" located on FLC 1(2) front face.
5 Check that the "COMPUTER" light flashes on FLC 1(2) front face to confirm the correct operation of the computer.

**ON A/C ALL

(4)Test of Warnings in the Event of ADC Failure

ACTION	RESULT
1. On panel 22VU - open circuit breaker 9FL1 ADS/ADC1 (115VAC, location 208/B19).	On RUD TRAVEL section of panel 428VU - FAULT and OFF/R legends of SYS1 and SYS2 pushbutton switches are off. Single chime sounds On left ECAM display unit message appears. NAV ADC ADC1 FAULT On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on.
2. On panel 22VU Close circuit breaker 9FL1	On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off On left ECAM display unit screen is cleared.
3. On panel 21VU - open circuit breaker 9FL2 ADS/ADC2 (115VAC, location 105/E10).	- FAULT and OFF/R legends of SYS1 and SYS2 pushbutton switches remain off. On CAPT and F/O main instrument panels 3VU and 5VU. - MASTER CAUTION lights come on On left ECAM display unit message appears. NAV ADC ADC2 FAULT Single chime sounds
4. On panel 22VU - open circuit breaker 9FL1.	- FAULT LEGENDS OF SYS1 and SYS2 pushbutton switches come on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights remain on - Single chime sounds. On left ECAM display unit message appears. NAV ADC ADC1 + 2 FAULT
5. On panel 22VU - close circuit breaker 9FL1. On panel 21VU	On RUD TRAVEL section of panel 428VU - FAULT legends of SYS1 and SYS2 pushbutton switches go off.

ACTION	RESULT
- close circuit breaker 9FL2.	On left ECAM display unit screen is cleared. On CAPT AND F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off.

(5)Test of SYS 1/2 systems

ACTION	RESULT
1. On ADS section of panel 470VU - press SYS1 pushbutton switch.	On Captain's PFD - 367 (±1) Kts is indicated after 5 seconds. - MACH 0.660 ± 0.010 is displayed. Single chime sounds.
2. On panel 21VU Open following circuit breakers - ARTF FEEL/FLC1/26VAC/ESS 305 CY1 location 101/J 2 and ARTF FEEL/ FLC1/26VAC/EMER 306CY1 location 101/J 3.	On RUD TRAVEL section of panel 428VU - FAULT legend of SYS1 pushbutton switch comes on. On left ECAM display unit, following message appears FLT CTL RUD TRAVEL 1 FAULT.....OFF/R
3. On panel 21VU - close circuit breakers 305 CY1 and 306CY1.	On RUD TRAVEL section of panel 428VU - FAULT legend of SYS1 pushbutton switch goes off. On left ECAM display unit - message disappears.
4. On panel 21VU - open ARTF FEEL/FLC2/26VAC circuit breaker 305CY2 location 101/J 4	On RUD TRAVEL section of panel 428VU - FAULT legend of SYS2 pushbutton switch comes on. On left ECAM display unit - following message appears FLT CTL RUD TRAVEL 2 FAULT.....OFF/R
5. On panel 21VU - close circuit breaker 305CY2.	On RUD TRAVEL section of panel 428VU - FAULT legend of SYS2 pushbutton switch goes off. On left ECAM display unit - message disappears.
6. On panel 133VU - open following circuit breakers SFCC/LAND RECOVERY/SUPPLY/SLATS/ SYS1 9CV location 335/R66 SFCC/NORM SUPPLY/SLATS/SYS1 7CV location 333/T63 SFCC/NORM SUPPLY/SLATS/SYS2	On panel 428VU - SLAT SYS1 & 2 FAULT legends come on.

ACTION	RESULT
8CV location 333/T64	
7. On center pedestal - place slat and flap control lever in 4th notch position	Flaps extend to 20°. On RUD TRAVEL section of panel 428VU - FAULT legends of SYS1 and 2 push-button switches come on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on - Single chime sounds On left ECAM display unit - following messages appear FLT CTL RUD TRAVEL IN HI SPEED - RUD TRAVEL 1.....OFF/R - RUD TRAVEL 2.....OFF/R - MAX X WIND FOR LDG.....20
8. On RUD TRAVEL section of panel 428VU - release SYS1 pushbutton switch.	- corresponding OFF/R legend comes on. - FAULT legend on SYS1 pushbutton switch remains on
- release SYS2 pushbutton switch.	- corresponding OFF/R legend comes on - FAULT legends of SYS1 and SYS2 pushbutton switches go off after 15 sec. approx. - single chime sounds. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights remain on - Single chime sounds On left ECAM display unit - following messages appear : FLT CTL RUD TRAVEL 1 OFF/R RUD TRAVEL 2 OFF/R RUD WITH CARE ABV SPD 170.
9. On center pedestal - place slat and flap control lever in first notch position.	Flaps retract. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights remain on On left ECAM display unit, following messages appear FLT CTL RUD TRAVEL 1 OFF/R

ACTION	RESULT
	RUD TRAVEL 2 OFF/R RUD WITH CARE ABV SPD 170
10. On RUD TRAVEL section of panel 428VU - press SYS1 and 2 pushbutton switches	- corresponding OFF/R legends go off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On left ECAM display unit - messages disappear.
11. On panel 133VU - close circuit breakers 7CV, 8CV, 9CV.	On panel 428VU - SLAT SYS1 & 2 FAULT legends go off
12. On ADS section of panel 470VU - release SYS1 (SYS2) pushbutton switch.	On Captain's and First Officer's PFD's Airspeed and MACH indications return to zero.

(6)Operational test of low speed configuration emergency return using SYS1 (SYS2)

ACTION	RESULT
1. On ADS section of panel 47OVU - press SYS1 (SYS2) pushbutton switch.	On Captain's (First Officer's) PFD - 367 (± 1) Kts is indicated after 5 seconds. - MACH 0.660 ± 0.010 is displayed. Single chime sounds.
2. Wait for 1 minute. Move pedals full left or full right.	On right ECAM display unit bug shifts to the left or to the right but travel is limited.
3. On RUD TRAVEL section of panel 428VU - release SYS1 and SYS2 pushbutton switches.	- corresponding OFF/R legends come on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. - Single chime sounds On left ECAM display unit, following messages appear. FLT CTL - RUD TRAVEL 1...OFF/R - RUD TRAVEL 2...OFF/R - RUD WITH CARE ABV SPD...170
4. Wait for 1 minute. Move pedals full left or full right.	On right ECAM display unit bug shifts to extreme left or to extreme right.
5. On ADS section of panel 47OVU - release SYS1 (SYS2) pushbutton switch.	On Captain's (First Officer's) PFD - Airspeed and MACH indications return to zero.
6. On RUD TRAVEL section of panel 428VU - press SYS1 and SYS2 pushbutton switches.	- Corresponding OFF/R legends go off. On left ECAM display unit - messages disappear. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off.

(7)Operational test of rudder travel limitation at high speed
NOTE : Perform this test with only SYS1 engaged then with only SYS2 engaged.

ACTION	RESULT
1. On Captain's and First Officer's PFD's - check that airspeed and MACH indications are zero.	
2. Actuate pedals full right.	- rudder deflects to the right. On right ECAM display unit, RUD scale - Bug shifts to extreme right.
3. Return pedals to neutral position.	- rudder returns to zero position. On right ECAM display unit, RUD scale - Bug returns to central position.
4. Actuate pedals full left.	- rudder deflects to the left. On right ECAM display unit, RUD scale - Bug shifts to extreme left.
5. Return pedals to neutral position.	- rudder returns to zero position. On right ECAM display unit, RUD scale - Bug returns to central position.
6. On ADS section of panel 47OVU - press SYS1 (SYS2) pushbutton switch.	On Captain's (First Officer's) PFD - 367 (± 1) Kts is indicated after 5 seconds. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on for few seconds. Single chime sounds.
7. Wait for 1 minute Actuate pedals full right.	- rudder deflects to the right by a value lower than that indicated in para. 2. On right ECAM display unit, RUD scale - bug shifts to the right but travel is limited.
8. Return pedals to neutral position.	- rudder returns to zero. On right ECAM display unit, RUD scale - bug returns to central position.

ACTION	RESULT
9. Actuate pedals full left.	- rudder deflects to the left by a value lower than that indicated in para. 4. On right ECAM display unit, RUD scale - bug shifts to the left but travel is limited.
10. Return pedals to neutral position.	- rudder returns to zero position. On right ECAM display unit, RUD scale - bug returns to central position.
11. On ADS section of panel 47OVU - release SYS1 (SYS2) pushbutton switch.	On Captain's (First Officer's) PFD - airspeed and MACH indications are zero.

E. Close-Up

(1) Depressurize Green, Blue and Yellow hydraulic systems.

(2) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Functional Test of Rudder Artificial Feel Operating Loads

A. Reason for the Job
Measurement of rudder operating loads.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27203250000	Measuring Equipment - Rudder Pedal Operating Load
(2)97A27902016000	Spring Scale Assy
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 25-11-11, P. Block 401	Captain Seat
- 25-11-12, P. Block 401	First Officer Seat
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up

(a)Initial conditions
Correct electrical power supply (Ref. 24-41-00, P. Block 301).
Forward services ventilation system in operation.
Overhead and lateral panel circuit breakers closed, particularly those associated with FLT CTL (133VU).
Aircraft on ground (circuit breakers L/G PROX DET & RELAYS SYS1 and SYS2 closed on panel 133VU).

(b)Pressurize Green, Blue and Yellow hydraulic systems using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c)Make certain that flap and slat control lever is in first notch position (slats and flaps retracted).

(d)Make certain that SPEED BRAKE control lever is in RET position.

(e)On SERVO CTL section of panel 428VU
- make certain that G, B and Y pushbutton switches are pressed (in) and all legends are off.

(f)Remove Captain's seat (Ref. 25-11-11, P. Block 401) or First Officer's seat (Ref. 25-11-12, P. Block 401) of the corresponding side.

(g)On panel 408VU
- make certain that rudder trim is at zero.

(h)On RUD TRAVEL section of panel 428VU
- make certain that SYS 1 and 2 pushbutton switches are pressed (in).

(j)Make certain that Captain's and First Officer's airspeed/mach indicators read zero.

(k)Install tool 98A27203250000.

D. Test

CAUTION : DURING THE FOLLOWING TEST MAX LOAD VALUE OF 70 daN (157.5 lbf) MUST NOT BE EXCEEDED TO AVOID DAMAGE TO THE CONTROL.

NOTE : On right ECAM display unit, FLT CTL page, RUD scale, pointer reproduces rudder deflection.

ACTION	RESULT
1. Slowly press LH pedal down to stop. Using tool 97A27902016000 measure load exerted at pedal.	Rudder deflects to the left. Make certain that load is 30 daN + 2 - 4 daN (67.5 lbf + 4.5 - 9 lbf).
2. Slowly press RH pedal down to stop. Using tool 97A27902016000 measure load exerted at pedal	Rudder deflects to right. Make certain that load is 30 daN + 2 - 4 daN (67.5 lbf + 4.5 - 9 lbf).
3. Return pedals to neutral.	Rudder returns to zero.

E. Close-Up

(1)Install Captain's seat (Ref. 25-11-11, P. Block 401) and First Officer's seat (Ref. 25-11-12, P. Block 401).

(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3)Depressurize hydraulic systems.

(4)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

3. System Test

A. Reason for the Job

Check that extension of variable stop unit cylinder varies depending on speed and causes a limitation of the rudder deflection.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 6 m (19 ft 8 in.)
(2)98A27308005000	Protractor - Control Surface Deflection
or	
TR12-18	Rigmaster System
TR31	Rigmaster System - Protractor
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 34-10-00, P. Block 501	Flight Environment Data

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT

ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up

(a)Initial conditions

Correct electrical power supply (Ref. 24-41-00, P. Block 301).
Forward services ventilation system in operation.
Overhead and lateral panel circuit breakers closed, particularly those associated with FLT CTL (133VU).
Aircraft on ground (circuit breakers L/G PROX DET & RELAYS SYS1 and SYS2 closed on panel133VU).

(b)Pressurize Green, Blue and Yellow hydraulic systems using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c)Make certain that flap and slat control lever is in first notch position (slats and flaps retracted).

(d)Make certain that SPEED BRAKE control lever is in RET position.

(e)On SERVO CTL section of panel 428VU

- make certain that G, B and Y pushbutton switches are pressed (in) and all legends are off.

(f)On panel 408VU

- make certain that rudder trim is at zero.

(g)On RUD TRAVEL section of panel 428VU

- make certain that SYS 1 and 2 pushbutton switches are pressed (in).

(h)Install protractor 98A27308005000 or TR12-18 and TR31 and set to zero.

NOTE : Make certain that head piece of protractor is perpendicular to stabilizer trailing edge.

D. Test

(1)Test of variable stop unit cylinder extension and rudder deflection.

NOTE : For speed display on ADC1 and ADC2 Ref. 34-10-00, P. Block 501.

(a)With cylinder fully retracted, measure distance between cylinder housing and piston rod end fitting (dimension X) (Ref. Fig. 501).

(b)For configuration given in the table below, measure again distance between cylinder housing and piston rod end fitting (dimension Y) and calculate cylinder extension = dimension Y - dimension X.

RUD TRAVEL		ADC1	ADC2	CYLINDER EXTENSION	RUDDER DEFLECTION
SYS1	SYS2	KTS		mm (in.)	
IN	OFF	220	60	24.2 ± 1.5 (0.953 ± 0.059)	
IN	OFF	220	> 395	40.56 ± 2 (1.597 ± 0.079)	± 3.5° ± 1°
OFF	IN	220	> 395	40.56 ± 2 (1.597 ± 0.079)	± 3.5° ± 1°
OFF	IN	220	60	24.2 ± 1.5 (0.953 ± 0.059)	
OFF	IN	30	> 395	40.56 ± 2 (1.597 ± 0.079)	± 3.5° ± 1°
OFF	IN	220	OFF	24.2 ± 1.5 (0.953 ± 0.059)	
IN	OFF	220	OFF	24.2 ± 1.5 (0.953 ± 0.059)	
IN	OFF	OFF	220	24.2 ± 1.5 (0.953 ± 0.059)	

E. Close-Up

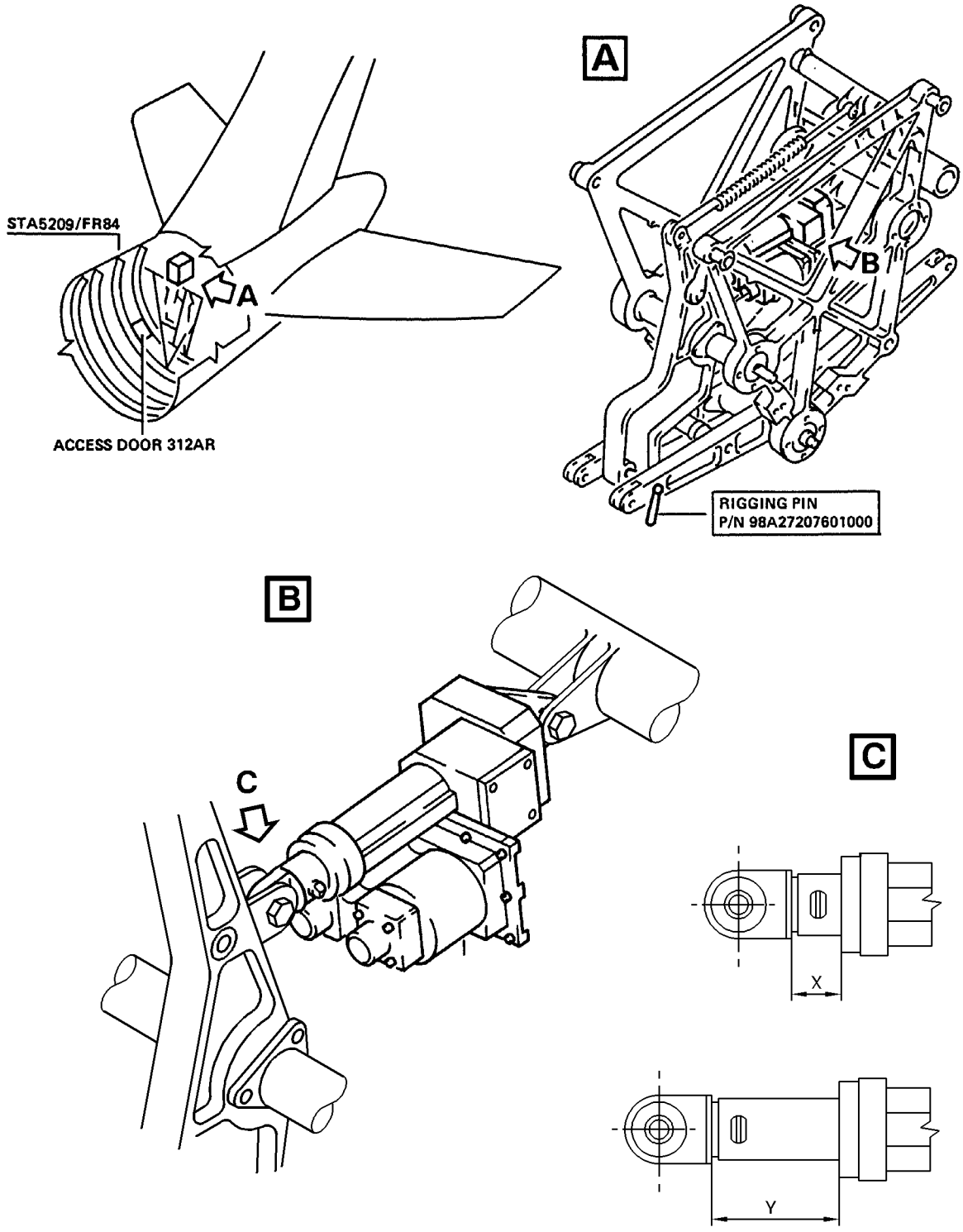
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Close access door 312AR.

(3)Remove safety barriers and access platforms.

(4)Shut down pressurization of hydraulic systems.

(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



BM5 27 23 00 5 AAM0 00

Variable Stop Actuator
Figure 501

ARTIFICIAL FEEL AND RUDDER TRAVEL LIMITING RUD TRAVEL FAULT LIGHT DEACTIVATION/REACTIVATION

Ref.MMEL Sect. 1-27, Item 9 (Rud-Travel "FAULT" Lt.)

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Deactivation

A. Reason for the Job

Check correct operation of system in the event of RUD TRAVEL FAULT warning failure by display of messages on left ECAM display unit.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up

(a)Initial Conditions

- Correct electrical power supply (Ref. 24-41-00, P. Block 301).
- Forward services ventilation system in operation
- Overhead and lateral panels circuit breakers closed, particularly those associated with FLT CTL (133VU).
- Aircraft on ground (circuit breakers L/G PROX DET & RELAYS SYS1 and SYS2 closed on panel 133VU).

(b)Pressurize Green, Blue and Yellow hydraulic systems using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU make certain that G, B and Y pushbutton switches are pressed (in) and legends off.

(d)Make certain that flap and slat control lever is in first notch position (flaps and slats retracted).

(e)On RUD TRAVEL section of panel 428VU make certain that SYS 1 and 2 pushbutton switches are pressed (in).
(f)Make certain that SPEEDBRAKE control lever is in RET position, ground spoiler function not preselected.
(g)On panel 408VU, make certain that rudder trim is set to zero.
(h)On panel 11VU, on ECAM control panel
- Press CLR pushbutton switch until it goes off
- Press F/CTL pushbutton switch, FLT CTL page appears on right ECAM display unit.

(2)Deactivation

ACTION	RESULT
1. On ANN LT section of panel 436VU - place switch in TEST position	On RUD TRAVEL section of panel 428VU - FAULT legend of SYS1 (SYS2) push-button switch is off - legends of pushbutton switches surrounding FAULT legend flash
2. On ANN LT section of panel 436VU - place switch in BRT position	- legends go off
3. On FLIGHT CONTROLS section of panel 471VU - press and hold TEST/SYS1 (TEST SYS 2) pushbutton switch	On FLIGHT CONTROLS section of panel 471VU - OK legend of RUD TRAVEL/SYS 1 (RUD TRAVEL/SYS 2) annunciator comes on after 7 seconds On left ECAM display unit, following message appears FLT CTL RUD TRAVEL 1 (2) FAULT.....OFF R
4. On FLIGHT CONTROLS section of panel 471VU - release TEST/SYS 1 (TEST SYS 2) pushbutton switch	On FLIGHT CONTROLS section of panel 471VU - OK legend of RUD TRAVEL/SYS1 (RUD TRAVEL SYS 2) annunciator goes off. On left ECAM display unit - message disappears

(3)Close-up
(a)Shut down pressurization of hydraulic systems
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Restore aircraft to normal operating condition.

2. Reactivation
Refer to TSM 27-23-00.

ARTIFICIAL FEEL AND TRIM UNIT - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18 ft.)
B. 43938	Pin - Rigging, Rudder and Aileron Trim Actuators
C. 98A27307545000	Rigging Pin - Cable Quadrant, Rudder Mechanical Controls
D. 98A27307546000	Rigging Pin - Main Bellcrank, Rudder Mechanical Controls
E. 98A27901006000	Pin - Rigging, Rudder Control (Qty. 2)
F.	Torque Wrench - 0.19 to 0.84 m.daN (16.8 to 74.3 lbf.in.)
G.	Cotter Pins
H.	Corrosion-Resistant Steel Lockwire 0.8 mm (0.032 in.) dia.
J.	Circuit Breaker Safety Clips
K.	Warning Notice
L. Material No. 04-004	Common Greases (Ref. 20-31-00)
M. Material No. 05-002	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 27-22-00, P. Block 501	Trim (Rudder)
R - 27-22-23, P. Block 401	Rudder Trim Actuator

2. Procedure

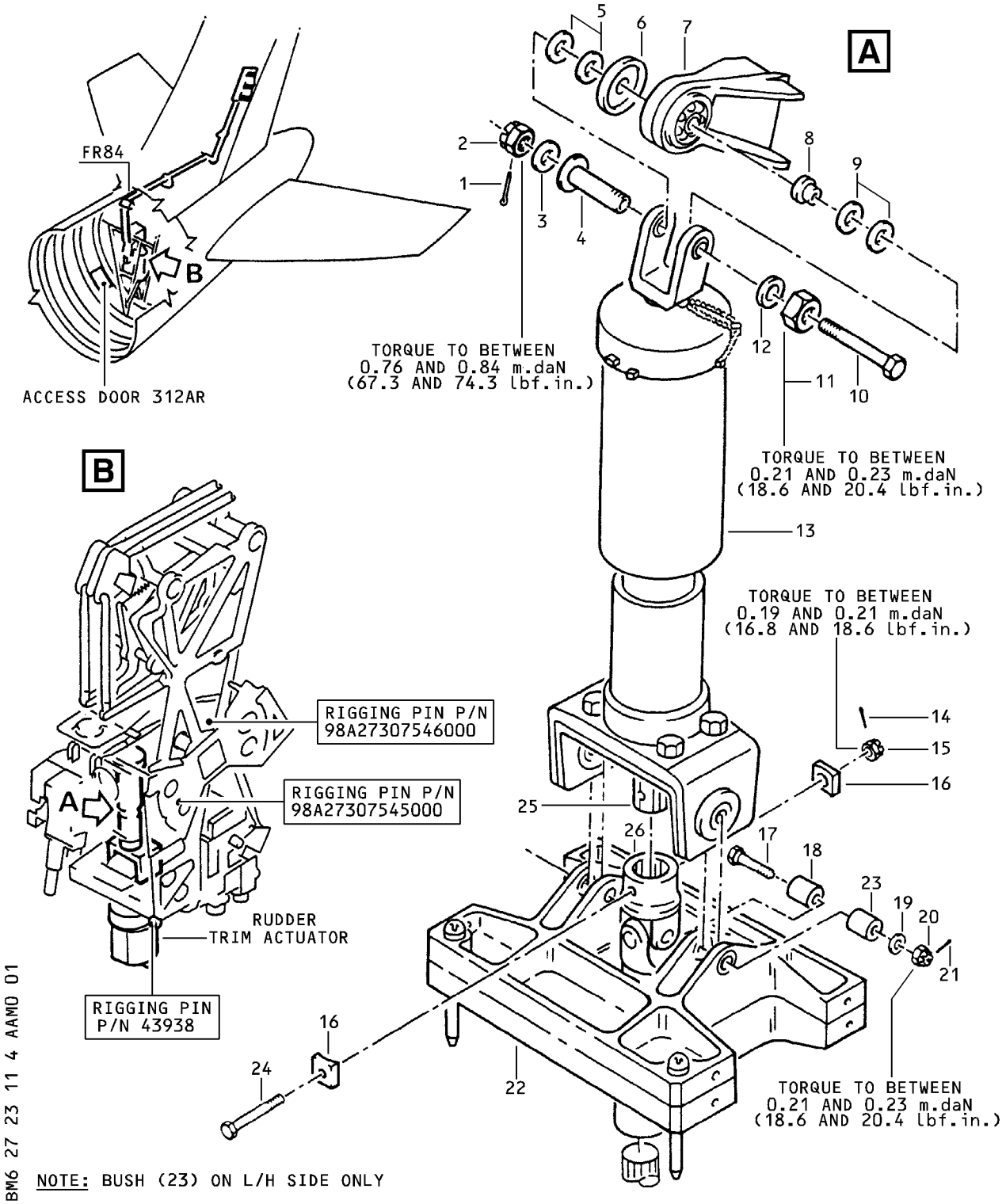
A. Job Set-Up (Ref. Fig. 401)
(1)Position access steps.
(2)Make certain that rudder trim is set at zero.
(3)Make certain that rudder pedals are set at neutral and install rigging pins P/N 98A27901006000 (Qty. 2) in rudder control bellcranks on control mechanism mounting beam in avionics compartment.
(4)Display warning notice in flight compartment prohibiting operation of flight controls.
(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	ARTF FEEL/FLC 1/28VDC	5CY1	101/J 1
21VU	ARTF FEEL/FLC 1/26VAC/ESS	305CY1	101/J 2
21VU	ARTF FEEL/FLC 1/26VAC/EMER	306CY1	101/J 3
21VU	ARTF FEEL/FLC 2/26VAC	305CY2	101/J 4
21VU	ARTF FEEL/FLC 2/28VDC	5CY2	101/J 5
22VU	RUD/TRIM SLOW	1CG	201/J27
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(6)Open access door 312AR.
(7)Install rigging pin P/N 98A27307545000 in cable quadrant.
(8)Install rigging pin P/N 98A27307546000 in rudder control main bellcrank.
(9)Install rigging pin P/N 43938 in rudder trim actuator.

B. Removal (Ref. Fig. 401)
R (1)Remove rudder trim actuator 8CG (Ref. 27-22-23, P. Block 401).
R (2)Remove cotter pin (14), nut (15), bolt (24), washers (16) and disconnect
R torque shaft (26) from splined shaft (25).
R (3)At base plate (22) attachment, remove cotter pins (21), nuts (20), washers (19), bolts (17) and bushes (18).
R (4)On LH side remove bush (23).
R (5)At bellcrank (7) attachment, cut and remove lockwire between bolt (10) and nut (11).
R (6)Remove cotter pin (1), nut (2), washer (3) and bolt (10).
R (7)Remove nut (11) and washer (12).
R (8)Support artificial feel and trim unit (13).
R (9)Remove hollow pin (4).
R (10)Remove artificial feel and trim unit (13), including torque shaft (26), from trim actuator.
R (11)Remove bushes (6, 8) and washers (5, 9).

C. Preparation for Installation (Ref. Fig. 401)
(1)Adjust length of replacement artificial feel and trim unit (13) to achieve center distance of 420.9 mm (16.57 in.) between upper and lower attachments.
R



Artificial Feel and Trim Unit
Figure 401

R (2)Apply grease (Mat. No. 04-004) to internal splines of torque shaft (26).
R
(3)Coat all bolts and threaded parts with corrosion-preventive paste (Mat. No. 05-002).

D. Installation (Ref. Fig. 401)
R (1)Position artificial feel and trim unit (13).
(2)Install washers (5, 9) on bushes (6, 8).
(3)Position bushes (6, 8) in artificial feel unit forked fitting.
(4)Connect artificial feel and trim unit (13) to bellcrank (7) and install hollow pin (4), washer (12) and nut (11).
(5)Install bolt (10), washer (3), and nut (2).
(6)Connect artificial feel and trim unit (13) to base plate (22) and install LH bush (23), bushes (18), bolts (17), washers (19) and nuts (20).
(7)Tighten and safety nuts (11, 2, 20) as follows:
(a)TORQUE nut (11) to between 0.21 and 0.23 m.daN (18.6 and 20.4 lbf.in.) and safety with lockwire to head of bolt (10).
(b)TORQUE nut (2) to between 0.76 and 0.84 m.daN (67.3 and 74.3 lbf.in.) and safety with cotter pin (1).
(c)TORQUE nuts (20) to between 0.21 and 0.23 m.daN (18.6 and 20.4 lbf.in.) and safety with cotter pins (21).
R (8)Install torque shaft (26) as follows:
R (a)Align holes, engage splined shaft (25) in torque shaft (26), and
R install bolt(24), washers (16) and nut (15).
R (a)TORQUE nut (15) to between 0.19 and 0.21 m.daN (16.8 and 18.6 lbf.in)
R and safety with cotter pin (14).
R (9)Install rudder trim actuator 8CG (Ref. 27-22-23, P. Block 401).
R (10)Remove rigging pins P/N 98A27901006000 (Qty. 2), P/N 98A27307546000, P/N 98A27307545000 and P/N 43938.
R (11)Remove safety clips and tags, and close circuit breakers 1CB, 2CB, 5CY1, 305CY1, 306CY1, 305CY2, 5CY2 and 1CG.

E. Test
(1)Carry out rudder trim functional test (Ref. 27-22-00, P. Block 501).

F. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)Close access door 312AR.
(3)Remove warning notice.
(4)Remove access platform.

VARIABLE STOP UNIT - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platforms, 5.5 m, 11.0 m (18 ft., 36 ft.)
B. 43938	Pin - Rigging, Rudder and Aileron Trim Actuators
C. 98A27207601000	Pin - Rigging, Variable Stop Unit, Rudder Mechanical Controls
D. 98A27307545000	Rigging Pin - Cable Quadrant, Rudder Mechanical Controls
E. 98A27307546000	Rigging Pin - Main Bellcrank, Rudder Mechanical Controls
F. 98A27307547000	Rigging Pin - Bellcrank Assembly, Rudder Servo Controls
G. 98A27901006000	Pin - Rigging, Rudder Control (Qty. 2)
H.	Torque Wrench, up to 1.05 m.daN (92.9 lbf.in.)
J.	Electrical Connector Blanking Caps
K.	Cotter Pins
L.	Warning Notice
M.	Circuit Breaker Safety Clips
N. Material No. 05-002	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 20-28-11, P. Block 1	Electrical Bonding
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 27-23-00, P. Block 501	Artificial Feel and Rudder Travel Limiting
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 55-33-13, P. Block 401	Trailing Edge Access Panels

2. Procedure

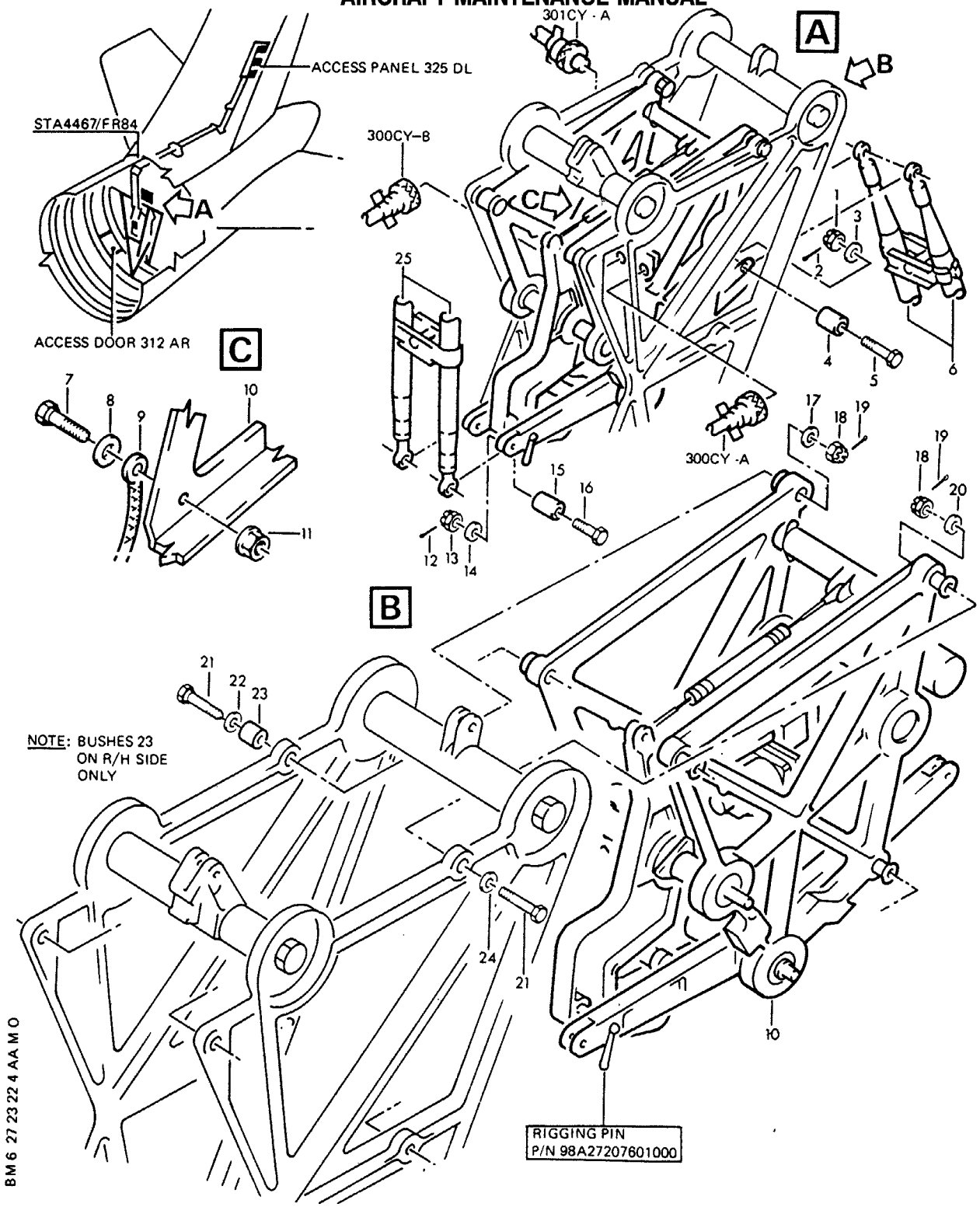
A. Job Set-Up
(1)Position access platforms.
(2)Make certain that rudder trim control is set at zero.
(3)Make certain that rudder pedals are set at neutral and install rigging pins P/N 98A27901006000, (Qty. 2) in rudder control bellcranks on control mechanism mounting beam in avionics compartment.
(4)Display warning notice in flight compartment prohibiting operation of flight controls.
(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	ARTF FEEL/FLC 1/2VDC	5CY1	101/J 1
21VU	ARTF FEEL/FLC 1/2VAC/ESS	305CY1	101/J 2
21VU	ARTF FEEL/FLC 1/2VAC/EMER	306CY1	101/J 3
21VU	ARTF FEEL/FLC 2/26VAC	305CY2	101/J 4
21VU	ARTF FEEL/FLC 2/28VDC	5CY2	101/J 5
22VU	RUD/TRIM/SLOW	1CG	201/J27
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(6)Open access door 312AR.
(7)Install rigging pin P/N 98A27307545000 in cable quadrant.
(8)Install rigging pin P/N 43938 in rudder trim actuator zero position.
(9)Install rigging pin P/N 98A27307546000 in rudder control main bellcrank.
(10)Install rigging pin P/N 98A27207601000 in variable stop unit.
(11)Open trailing edge access panel 325DL and remove access panel support struts (Ref. 55-33-13, P. Block 401).
(12)Install rigging pin P/N 98A27307547000 in bellcrank at RIB12.

B. Removal (Ref. Fig. 401)
(1)Disconnect electrical connectors, secure to airframe structure temporarily and install blanking caps:
(a)At variable stop actuator.
(b)At variable stop transducer unit.
(2)Remove nut (11), bolt (7), washer (8) and disconnect bonding strap (9) from variable stop unit (10).
(3)Remove cotter pins (2, 12), nuts (1, 13), washers (3, 14), bolts (5, 16), bushes (4, 15) and disconnect pushrods (6, 25).
(4)Removal of variable stop unit.
(a)Remove cotter pins (19), nuts (18) and washers (17, 20).
(b)Support variable stop unit (10).
(c)Remove bolts (21), washers (22, 24) and bushes (23).
(d)Remove variable stop unit (10) aft from rudder control frame.

C. Installation (Ref. Fig. 401)
(1)Coat all bolts and threaded parts with corrosion-preventive paste (Mat. No. 05-002).
(2)Installation of variable stop unit:



Variable Stop Unit
Figure 401

(a)Position variable stop unit (10).
(b)Install bushes (23) on RH rudder control frame.
(c)Install washers (22, 24) and bolts (21).
(d)Install washers (17, 20) and nut (18).
(e)TORQUE nuts (18) to between 0.95 and 1.05 m.daN (84.1 and 92.9 lbf.in.) and safety with cotter pins (19).

(3)Install rigging pin P/N 98A27207601000 on the replaced variable stop unit (10).
(4)Connect pushrods (6, 25) to variable stop unit (10) using bushes (4, 15) and bolts (5, 16).
(5)If bolts (5, 16) cannot be easily inserted, adjust length of push-rods (6, 25).
(6)Install washers (3, 14) and nuts (1, 13).
(7)TORQUE nuts (1, 13) to between 0.21 and 0.23 m.daN (18.6 and 20.4 lbf.in.) and safety with cotter pins (2, 12).
(8)Install bonding strap (9) between variable stop unit (10) and rudder control frame with bolt (7), washer (8) and nut (11). For electrical bonding, refer to 20-28-11, P. Block 1.
(9)Remove protective caps from plugs and from line ends, and connect the following electrical connectors:
(a)At variable stop actuator LH: 300CY-A and RH: 300CY-B.
(b)At variable stop transducer unit: 301CY-A.
(10)Remove rigging pins P/N 98A27207601000, P/N 98A27307545000, P/N 43938, P/N 98A27307546000, P/N 98A27307547000 and P/N 98A27901006000 (Qty. 2).
(11)Remove safety clips and tags, and close circuit breakers 5CY1, 305CY1, 306CY1, 305CY2, 5CY2, 1CG, 1CB and 2CB.
(12)Make sure that travel ranges of variable stop unit are clear of tools and miscellaneous items of equipment.

D. Test
(1)Carry out system test of mechanical controls (Ref. 27-21-00, P. Block 501).
R (2)Make sure that there is a gap of 0.5 mm (0.02 in.) between the
R additional stops and the drive shaft (Ref. 27-21-00, P. Block 501).
R (3)Carry out operational test of rudder travel limitation at high speed (Ref. 27-23-00, P. Block 501).

E. Close-Up
(1)Make sure that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 312AR.
(3)Install access panel support struts and close trailing edge access panel 325DL (Ref. 55-33-13, P. Block 401).
(4)Remove warning notice.
(5)Remove access platforms.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18 ft.)
B. 98A27207601000	Pin - Rigging, Variable Stop Unit, Rudder Mechanical Controls
C. 98A27901006000	Pin - Rigging, Rudder Control (Qty. 2)
D.	Torque Wrench, up to 0.23 m.daN (20.4 lbf.in.)
E.	Electrical Connector Blanking Caps
F.	Cotter Pins
G.	Warning Notice
H.	Circuit Breaker Safety Clips
J.	Corrosion-Resistant Steel Lockwire, 0.5 mm (0.02 in.) dia.
K. Material No. 05-002	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 27-23-00, P. Block 501	Artificial Feel and Rudder Travel Limiting

R

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Make certain that rudder trim control is set at zero.
(3)Make certain that rudder pedals are set at neutral and install rigging pins P/N 98A27901006000, (Qty. 2) in rudder control bellcranks on control mechanism mounting beam in avionics compartment.
(4)Display warning notice in flight compartment prohibiting operation of flight controls.
(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	ARTF FEEL/FLC 1/28VDC	5CY1	101/J 1
21VU	ARTF FEEL/FLC 1/26VAC/ESS	305CY1	101/J 2
21VU	ARTF FEEL/FLC 1/26VAC/EMER	306CY1	101/J 3
21VU	ARTF FEEL/FLC 2/26VAC	305CY2	101/J 4
21VU	ARTF FEEL/FLC 2/28VDC	5CY2	101/J 5
22VU	RUD/TRIM SLOW	1CG	201/J27
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

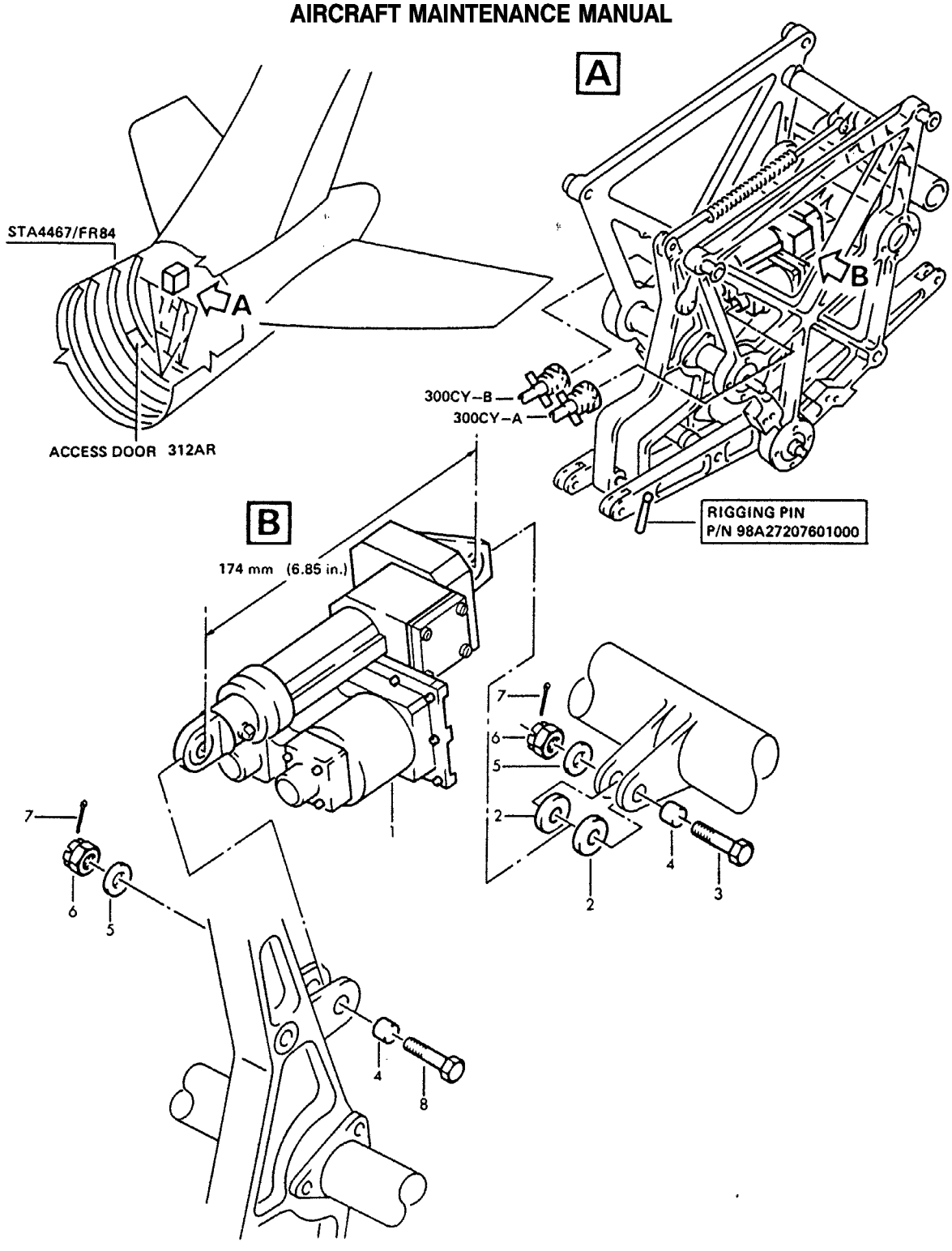
(6)Open access door 312AR.
(7)Install rigging pin P/N 98A27207601000 in variable stop unit.

B. Removal (Ref. Fig. 401)
(1)Disconnect electrical connectors at variable stop actuator (1), secure to airframe structure and install blanking caps.
(2)Remove cotter pins (7), nuts (6), washers (5), bolts (3, 8) and bushes (4).
(3)Remove variable stop actuator (1) and washers (2).

C. Installation (Ref. Fig. 401)

R
R

(1)Coat all bolts and threaded parts with corrosion-preventive paste (Mat. No. 05-002).
(2)Installation of variable stop actuator.
(a)Check length between eye-end centers of variable stop actuator (1) and make certain the distance is 174 mm (6.85 in.).
(b)Position variable stop actuator (1).
(c)Install bushes (4).
(d)Install washers (2) and bolts (3, 8).
(e)Install washers (5) and nuts (6).
(f)TORQUE nuts (6) to between 0.21 and 0.23 m.daN (18.6 and 20.4 lbf.in.) and safety with cotter pins (7).
(3)Remove protective caps from plugs and from line ends, and connect the following electrical connectors:
(a)At variable stop actuator LH 300CY-A.
(b)At variable stop actuator RH 300CY-B.



Variable Stop Actuator
Figure 401

(4)Remove rigging pins P/N 98A27207601000 and P/N 98A27901006000 (Qty. 2).
(5)Remove safety clips and tags, and close circuit breakers 5CY1, 305CY1, 306CY1, 305CY2, 5CY2, 1CG, 1CB and 2CB.
(6)Make certain that travel ranges of variable stop unit are clear of tools and miscellaneous items of equipment.

D. Test
R (1)Carry out operational test of rudder travel limitation at high speed
R (Ref. 27-23-00, P. Block 501).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 312AR.
(3)Remove warning notice.
(4)Remove access platform.

VARIABLE STOP TRANSDUCER UNIT 301CY
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18.0 ft.)
B. 98A27207601000	Pin - Rigging, Variable Stop Unit, Rudder Mechanical Controls
C. 98A27207602000	Pin - Rigging, VSU Transducer Rudder Mechanical Controls
Superseded by 98A27303502000	Measuring Equipment THS Deflection
D. 98A27901006000	Pin - Rigging, Rudder Control (Qty. 2)
E.	Torque Wrench, up to 0.5 m.daN (44.25 lbf.in.)
F.	Electrical Connector Blanking Caps
G.	Circuit Breaker Safety Clips
H.	Warning Notice
J.	Cotter pins
K. Material No. 05-002	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 27-23-00, P. Block 501	Artificial Feel and Rudder Travel Limiting

2. Procedure

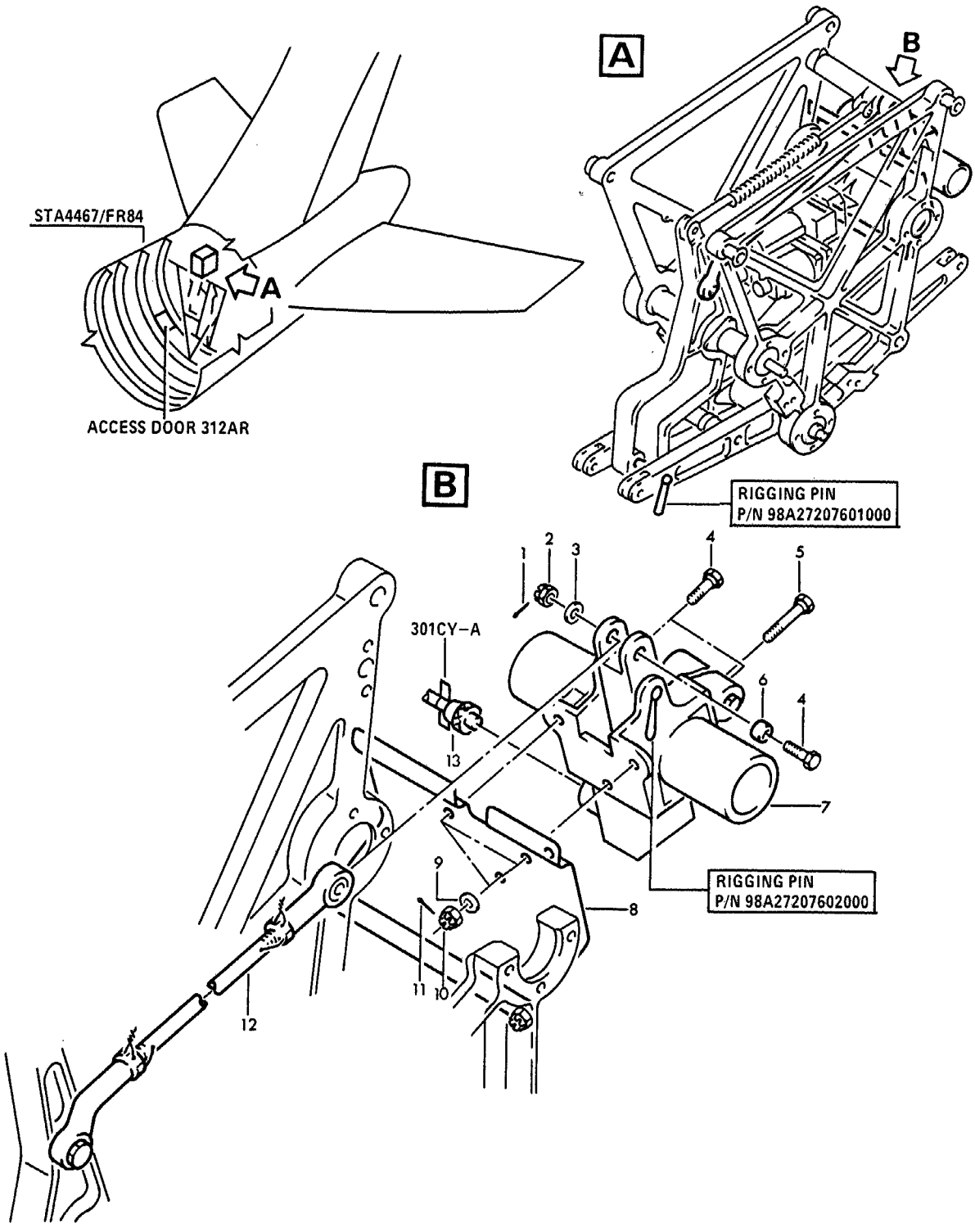
A. Job Set-Up
(1)Position access platform.
(2)Make certain that rudder trim is set at zero.
(3)Make certain that rudder pedals are set at neutral and install rigging pins P/N 98A27901006000 (Qty. 2) in rudder control bellcranks on control mechanism mounting beam in avionics compartment.
(4)Display warning notice in flight compartment prohibiting operation of flight controls.
(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	ART FEEL/FLC 1/28VDC	5CY1	101/J 1
21VU	ART FEEL/FLC 1/26VAC/ESS	305CY1	101/J 2
21VU	ART FEEL/FLC 1/26VAC/EMER	306CY1	101/J 3
21VU	ART FEEL/FLC 2/26VAC	305CY2	101/J 4
21VU	ART FEEL/FLC 2/28VDC	5CY2	101/J 5

(6)Open access door 312AR.
(7)Install rigging pin P/N 98A27207601000 in variable stop unit.
(8)Install rigging pin P/N 98A27207602000 or 98A27303502000 in variable stop transducer unit.

B. Removal (Ref. Fig. 401)
(1)Disconnect electrical connector (13) and install blanking caps.
(2)Remove cotter pin (1), nut (2), washer (3), bolt (4), bush (6) and disconnect pushrod (12).
(3)Remove cotter pins (11), nuts (10) and washers (9).
(4)Remove bolts (4, 5) and variable stop transducer unit (7).
(5)Temporarily secure loose bushes in variable stop transducer unit.

C. Installation (Ref. Fig. 401)
(1)Install variable stop transducer unit (7) on bracket (8) with bolts (4, 5), washers (9) and nuts (10).
(2)TORQUE nuts (10) to between 0.4 and 0.44 m.daN (35.4 and 38.94 lbf.in.) and safety with cotter pins (11).
R (3)Install rigging pin P/N 98A27207602000 or 98A27303502000 in the replaced
R variable stop transducer unit (7).
R (4)Connect pushrod (12), install bush (6), apply corrosion preventive paste (Mat. No. 05-002) to bolt (4) and install.
R (5)If bolt (4) cannot be easily inserted, adjust length of pushrod (12).
R (6)Install washer (3), and nut (2).
R (7)TORQUE nut (2) to between 0.21 and 0.23 m.daN (18.6 and 20.4 lbf.in.) and safety with cotter pin (1).
R (8)Remove blanking caps and connect electrical connector 301CY-A.
R (9)Remove rigging pins P/N 98A27207601000, P/N 98A27207602000 or 98A27303502000 and P/N 98A27901006000 (Qty. 2).
R (10)Remove safety clips and tags, and close circuit breakers 5CY1, 305CY1, 306CY1, 305CY2 and 5CY2.
R (11)Make certain that travel ranges of variable stop unit are clear of



Variable Stop Transducer Unit
Figure 401

tools and miscellaneous items of equipment.

D. Test
(1)Carry out operational test of rudder travel limitation at high speed (Ref. 27-23-00, P. Block 501).

E. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)Close access door 312AR.
(3)Remove warning notice.
(4)Remove access platform.

FEEL AND LIMITATION COMPUTER (FLC) 302CY1 302CY2
REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Safety Clips
B.	Blanking Caps
Referenced Procedures	
- 27-23-00, P. Block 501	Artificial Feel and Rudder Travel Limiting
- 27-33-00, P. Block 501	Artificial Feel (Elevator)

2. Procedure

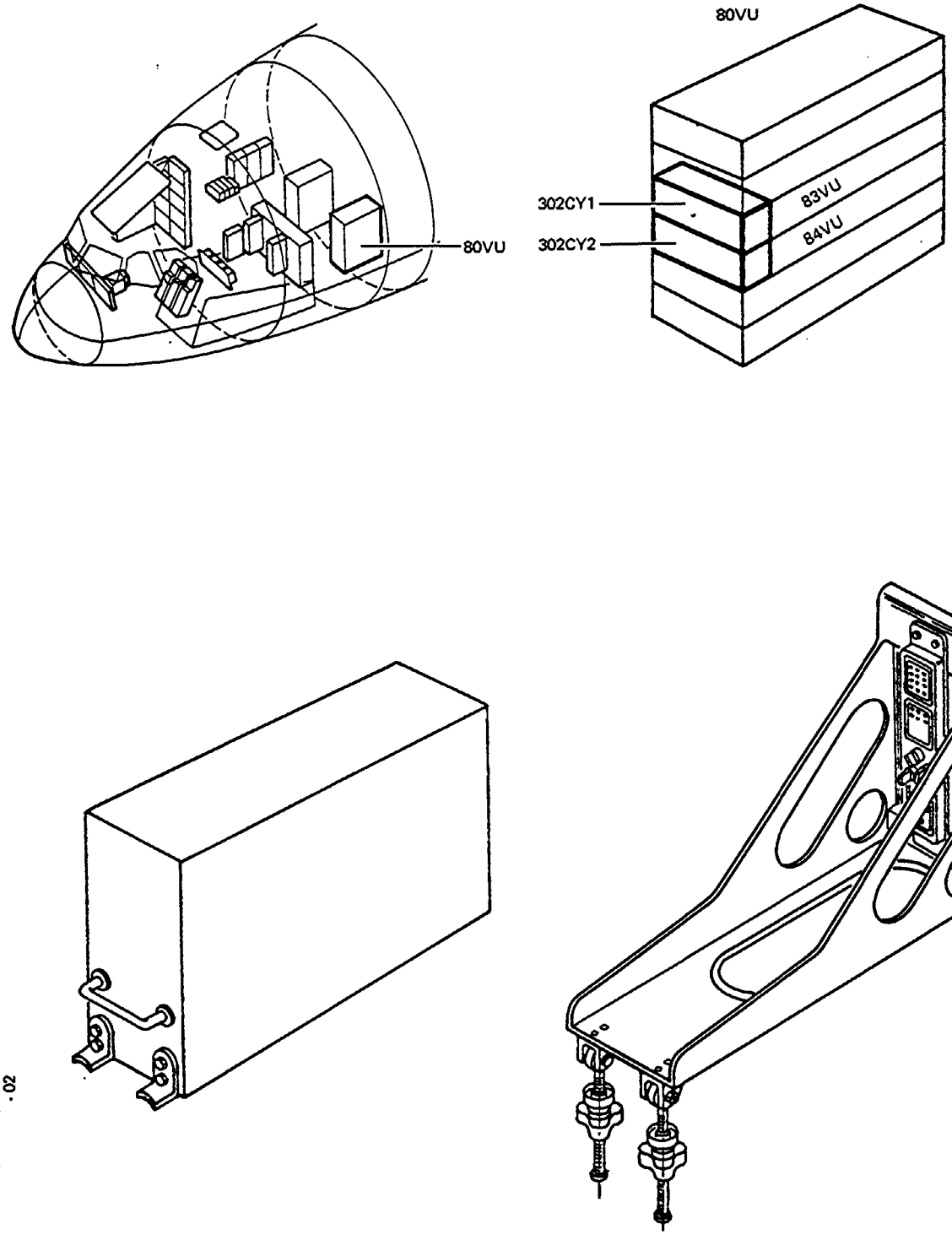
A. Job Set-Up
(1)Open, safety and tag following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	ARTF FEEL	Line	101 J1 to J5

(2)Open access door 121BL.
(3)In electronics rack 80VU, gain access to computers 302CY1 and 302CY2.

B. Removal
(Ref. Fig. 401)
(1)Unscrew nuts until unit attaching studs are released.
(2)Withdraw unit from its mount by slowly pulling on handle so as to free electrical connector.
(3)Cap electrical connector.
(4)Remove unit.

C. Installation
(1)Clean and visually inspect unit interface and mount.
(2)Remove blanking caps from connector and visually inspect pins.
(3)Position unit on its mount and slowly slide along tracks until resistance is met.



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DM5

Feel and Limitation Computer
Figure 401

(4)Lift knurled retaining nuts into position on studs and tighten.
(5)On panel 21VU remove safety clips and tags and close circuit breakers ARTF FEEL line 101 J1 to J5.

D. Test

R (1)Carry out operational test of FLC computer (rudder travel SYS 1 and
R SYS 2) (Ref. 27-23-00, P. Block 501).
(2)Carry out operational test of rudder travel limitation at high speed using appropriate system (Ref. 27-23-00, P. Block 501).
R (3)Carry out operational test of FLC computer (pitch feel SYS 1 and SYS 2)
R (Ref. 27-33-00, P. Block 501).
(4)Carry out functional test (Ref. 27-33-00, P. Block 501, Para. 2.).

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door.

HYDRAULIC ACTUATION (RUDDER) - DESCRIPTION AND OPERATION

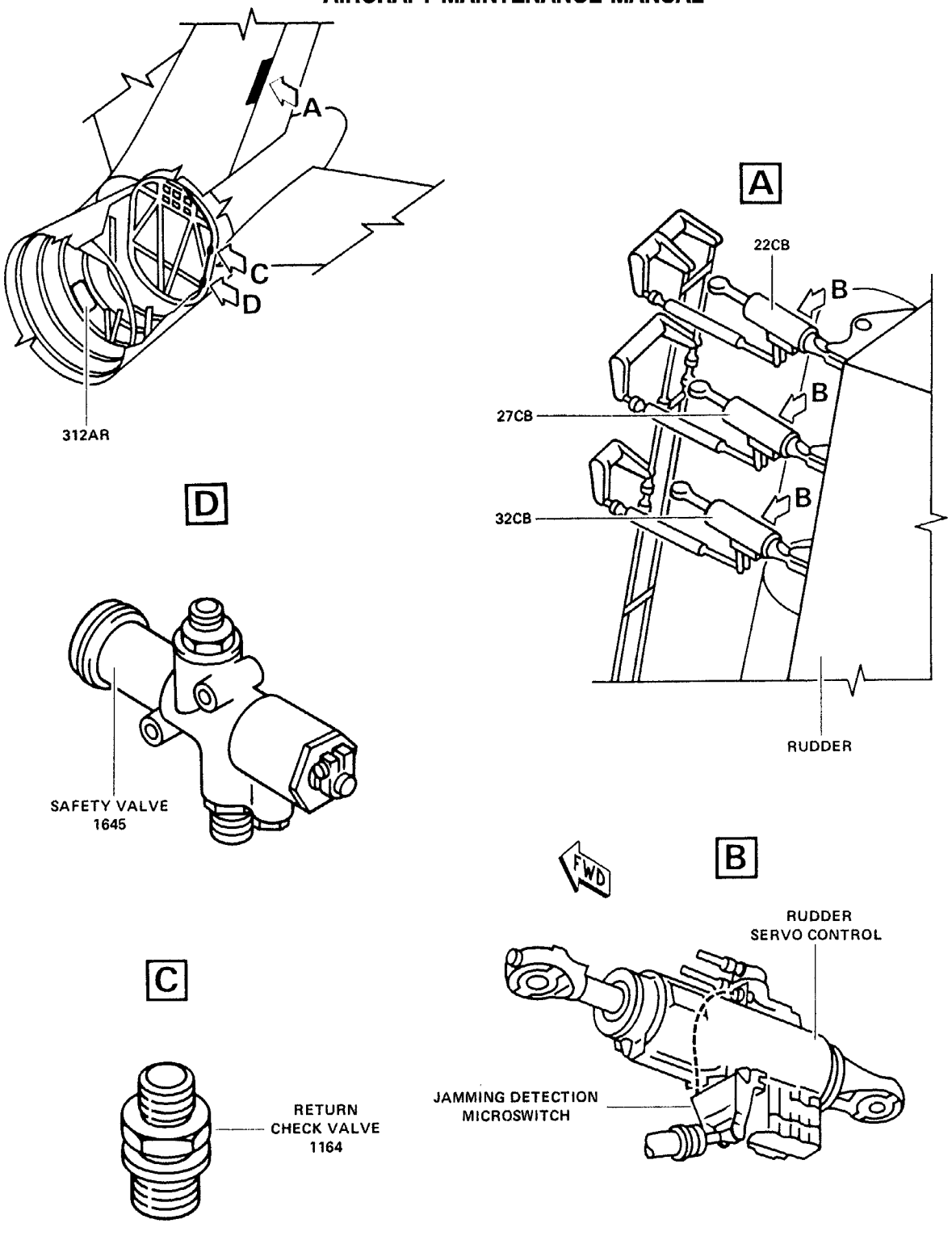
1. General

Hydraulic actuation is achieved by three mechanical input servo controls, each powered by a different hydraulic system (Ref. 27-00). The servo controls are associated with a control valve jamming detection system (Ref. 27-14).

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
22CB	SERVO CTL-RUDDER, BLUE		325	325DL	27-24-11
27CB	SERVO CTL-RUDDER, GREEN		325	325DL	27-24-11
32CB	SERVO CTL-RUDDER, YELLOW		325	325DL	27-24-11
1164	CHECK VALVE-RUD SERVO CTL, RETURN		312	312AR	27-24-15
1645	SAFETY VALVE-RUD SERVO CTL		312	312AR	27-24-14
	MICROSWITCH-RUD SERVO CTL JAMMING DETECTION		325	325DL	27-24-12



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Component Location
Figure 001

3. Component Description

A. Rudder Servo Control (Ref. Fig. 002, 003)

(1) General

The three servo controls are interchangeable.

(2) Normal operation with the servo control pressurized

The moving servo control body is slaved to the mechanical input signal via input lever (6), travelof which is limited by stops (1). The lever actuates control valve (10).

In the event of overpressure in one of the chambers, check valve (11) holds supply pressure against one of the faces of pressure controlled relief valves (13). Chamber overpressure is then applied to the other face of one pressure controlled relief valve (13) and causes it to move. The overpressurized chamber is then connected to return thus limiting overpressure.

If the servo control body has moved, pressure is supplied again to the other chamber by anti cavitation check valve (9).

Pressure relief valves (7) are used to limit pressure in the event of jamming of pressure controlled relief valves (13).

High pressure is connected to return via the heating orifice (8) protected by a filter, thus ensuring permanent heating leakage.

(3) Operation in the event of control valve jamming

When the input force is higher than preloaded spring (5) force, roller (4) moves onto its cam. This depresses jamming detector microswitch (3) which transmits a warning signal to the crew via the jamming detection system (Ref. 27-14). The crew must then shut off the power supply from the hydraulicsystem involved. The warning is provided to prevent loss of deflection capability of the rudder in the event of hidden control valve jamming plus engine shut down at takeoff.

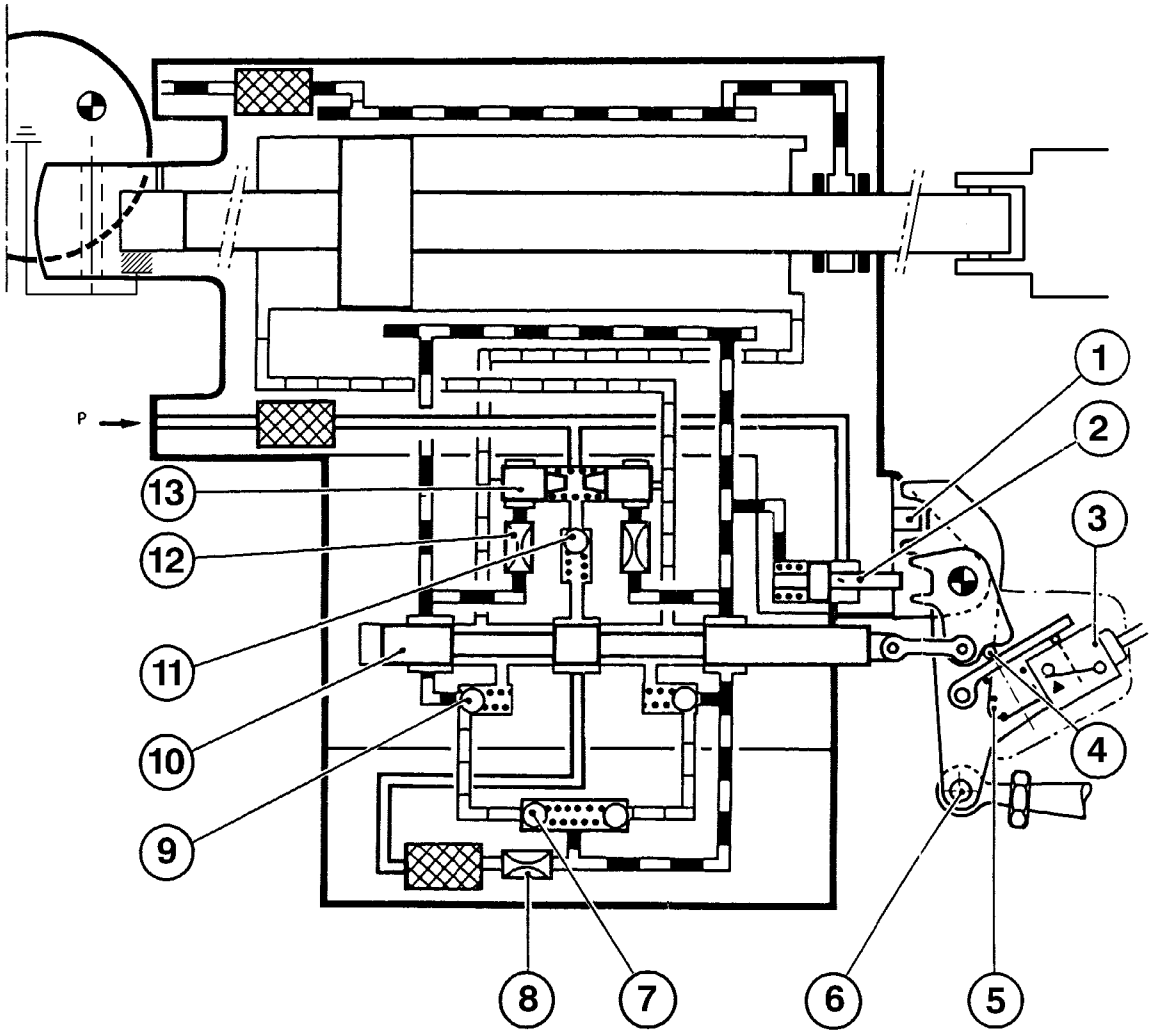
(4) Operation on the ground, with the servo control depressurized

If the rudder is subjected to external forces, pressure increases in one of the chambers, thus causing one pressure controlled relief valve (13) to open. This chamber then empties into the return line via a metering ground damping orifice (12) which provides a ground gust damping function, for gust speeds up to 80 kts.

(5) Ground test device

The jamming detection system can be tested by means of stop (2) which is extended when there is no pressure, and limits the travel of the control valve.

Operation of input lever (6) over a sufficient amount of travel then depresses microswitch (3) and allows it to be checked for correct operation. The test procedure is described in 27-14.



1 - INPUT LEVER STOP
2 - GROUND TEST STOP
3 - JAMMING DETECTION MICROSWITCH
4 - CAM/ROLLER
5 - PRELOADED SPRING
6 - INPUT LEVER
7 - RELIEF VALVE
8 - HEATING ORIFICE
9 - ANTI CAVITATION CHECK VALVE
10 - CONTROL VALVE
11 - CHECK VALVE
12 - GROUND DAMPING ORIFICE
13 - PRESSURE CONTROLLED RELIEF VALVE

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R

Rudder Servo Control
Figure 002

(6)Maintenance : on condition
LRUs - filter
- microswitch.

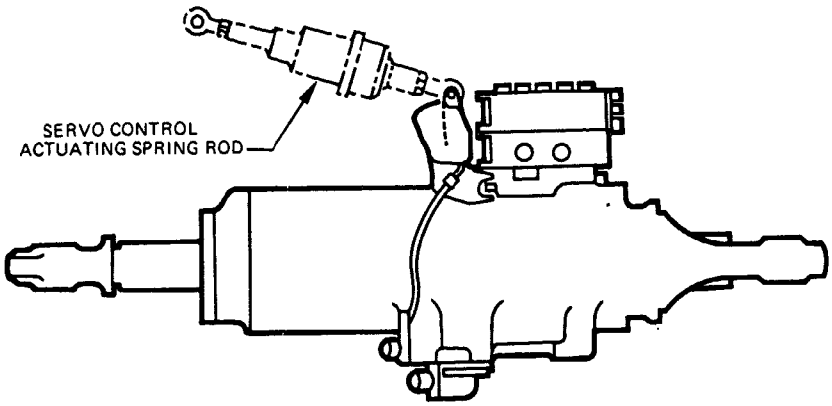
(7)Leading particulars

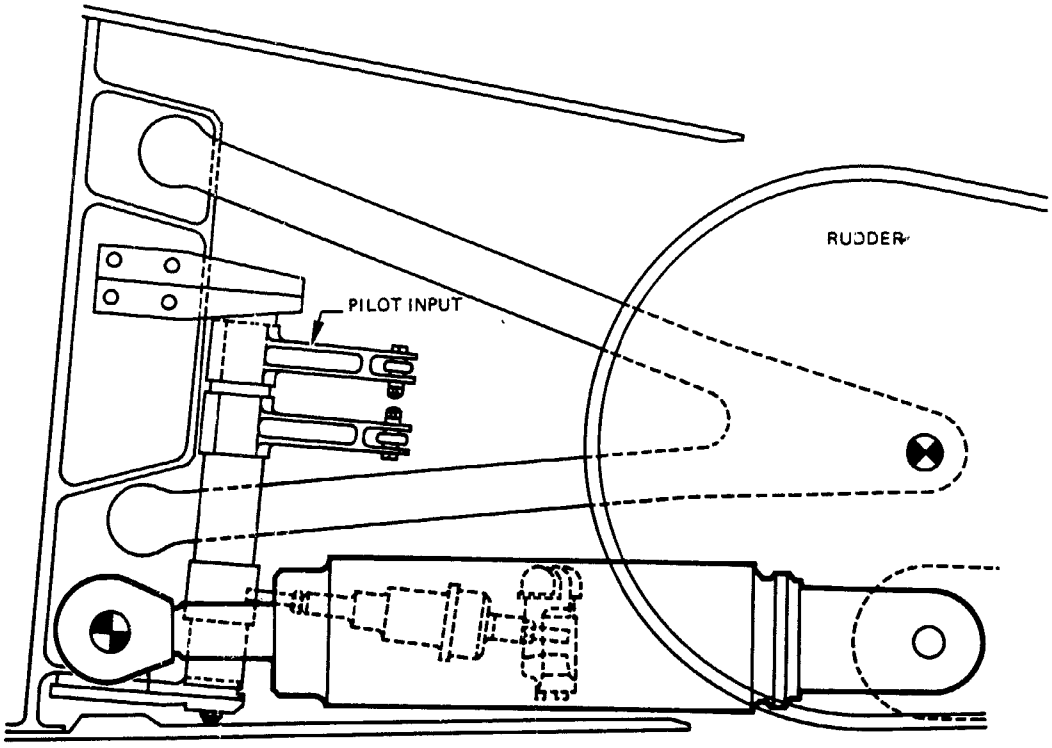
(a)Mechanical

- Piston area----------49.48 cm² (7.67 in.²)
- Stall load (for HP = 200 bars/2900 psi--9650 daN (21734 lbf.) and LP = 5 bars/73 psi and no friction)
- Operating stroke----------145 mm (5.70 in.) corresponding to rudder deflection of-----30° right or left
- Stop-to-stop stroke----------157 mm (6.18 in.)
- Maximum jamming detection spring break out force----------50 N (11.26 lbf.)
- Maximum input lever operating force--------3 N (0.68 lbf.)
- Weight (filled with fluid)----------21.3 kg (47 lb)

(b)Hydraulic

- Maximum speed without external load, in degrees/s of rudder deflection----------60 ±5°/s corresponding to a maximum flow----------43 l/mn (11.4 US gal/mn)
- Maximum internal leakage
  . When new----------0.650 l/mn (0.17 US gal/mn)
  . Permissible in service----------2.1 l/mn (0.55 US gal/mn)
- Maximum external leakage
  . When new----------1 drop/mn
  . Permissible in service----------15 drops/mn





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Rudder Servo Control - Installation
Figure 003

1. Operational/Functional Test
   Refer to 27-14-00, P. Block 501.

WARNING : LANDING GEAR - MAKE SURE GROUND SAFETIES AND CHOCKS ARE IN POSITION.
FLIGHT CONTROLS - MAKE SURE GROUND SAFETIES AND NOTICES ARE IN POSITION.
BEFORE HYDRAULIC SYSTEM IS PRESSURIZED OR DEPRESSURIZED, MAKE SURE THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE THE HYDRAULIC SYSTEM IS PRESSURIZED MAKE SURE THE FLIGHT CONTROLS ALIGN WITH THE SURFACE POSITION.
MAKE SURE THAT ALL THE CIRCUITS IN MAINTENANCE ARE ISOLATED BEFORE YOU SUPPLY ELECTRICAL POWER TO THE AIRCRAFT.

1. Reason for the Job

A. General Visual Inspection of Actuators and Hydraulic Lines

2. Procedure

A. Check of Cable Tension on Rudder Linkage
(1)Equipment and materials

ITEM	DESIGNATION
(a)	Access Platform 2 to 12 meters (6 ft. 7 in. to 39 ft. 4 in.)
Referenced Procedure	
- 20-29-12, P. Block 1	Control Cable Check
- 27-29-14, P. Block 1	Control Cable Rejection Criteria

(2)Job set-up
(a)Open access doors 734, 744, 812, 813.
(b)Remove access panels 312AR, 312AZ, 334BT, 334CT, 335BT, 344CT, 345BT, 575CB, 675CB, 675DB, 581BB and 681BB.
(c)Remove access panels 311AZ, 311BZ, 326BR through 326KR, and 325AL through 325DL.
(3)Check
(a)Check that all attachments and hinge fittings are correctly installed.
(b)Check that all pins, bolts, washers, nuts are in satisfactory condition.
(c)Check all hose clamps for correct diameter and satisfactory condition.
(d)Check all pipes for deformation, incipient cracks, and dents especially at elbows and at unions.
(e)Check that there is no possibility of metal parts, clamps or rails causing damage to pipes at attachment points.
(f)Check for fluid leakage in the areas where hydraulic equipment is installed.
(g)Check that all actuators are in satisfactory condition.
(h)Check condition of pulleys (Ref. 20-29-14, P. Block 1).
(i)Check cables for wear (Ref. 20-29-12, P. Block 1).
(j)Check bellcranks for corrosion damage.

(4)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Install access panels 311AZ, 311BZ, 326BR through 326KR, and 325AL through 325DL.
(c)Install access panels 312AR, 312AZ, 334BT, 334CT, 335BT, 344CT, 345BT, 575CB, 675CB, 675DB, 581BB and 681BB.
(d)Close access doors 734, 744, 812, 813.

RUDDER SERVO CONTROL 22CB, 27CB, 32CB
REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

NOTE : The servo controls are identical in design and function. Only one is described and illustrated.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 11 m (36 ft.)
B. SL90-313-1-0000	Tool - Installation, Tab Washers STA-LOK NSA5454
C. SL90-314-1-0000	Tool - Extraction, Tab Washers STA-LOK NSA5454
D. SL90-315-1-0000	Wrenches - Notched, Tightening of Nuts NSA5454
E. 98A27003000000	Extractors
F. 98A27203001000	Blanking Plates - Rudder Spar Box
G. 98A27307547000	Rigging Pin - Bellcrank Assembly, Rudder Servo Controls
H. 98A27901006000	Pin - Rigging, Rudder Control (Qty. 2)
J.	Torque Wrench, up to 3.0 m.daN (22.0 lbf.ft.)
K.	Warning Notices
L.	Circuit Breaker Safety Clips
M.	Container - Hydraulic Fluid
N.	Electrical Connection Blanking Caps
P.	Hydraulic Line Blanking Caps/Plugs
Q.	Cotter Pins
R.	Corrosion-Resistant Steel Lockwire, 0.8 mm (0.032 in.) dia.
S.	Tape measure
T. Material No. 04-004	Common Greases (Ref. 20-31-00)
U. Material No. 05-005	Special Materials (Ref. 20-31-00)
V. Material No. 09-018	Sealants (Ref. 20-31-00)

Referenced Procedures

- 20-28-11, P. Block 1	Electrical Bonding
- 24-41-00, P. Block 301	AC External Power Control
- 27-21-00, P. Block 501	Mechanical Control (Rudder)
- 27-24-12, P. Block 401	Rudder Servo Control Jamming

		Detection Microswitches
	- 27-25-00, P. Block 501	Control Surface Position Indicating (Rudder)
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
R	- 29-21-00, P. Block 301	Green Auxiliary Power - Servicing
R	- 29-22-00, P. Block 301	Blue Auxiliary Power (Power Transfer Unit) -
R		Servicing
R	- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit) -
R		Servicing
	- 51-75-10, P. Block 801	Repair of Paint Coatings
	- 51-76-10, P. Block 801	Repair of Sealing
	- 55-33-13, P. Block 401	Trailing Edge Access Panels
	- 55-42-13, P. Block 401	Rudder Leading Edge Access Panels

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Make certain that rudder pedals are set at neutral, and install rigging pins P/N 98A27901006000 (Qty. 2) in rudder control bellcranks on control mechanism mounting beam in avionics compartment.
R (3)Pressurize green, blue and yellow hydraulic systems either:
R - using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
R - or using green auxiliary power (Ref. 29-21-00, P. Block 301) and
R blue auxiliary power (Ref. 29-22-00, P. Block 301) and yellow
R auxiliary power (Ref. 29-23-00, P. Block 301).
(4)Make certain that rudder trim is at zero.
(5)Install rigging pin P/N 98A27307547000 into the lower rudder servo springrod input bellcrank.
(6)Check that the rudder trailing edge is in line with or in limits of the reference triangle NSA950200 located on the rear cone.
NOTE : Maximum tolerance of the rudder trailing edge is 1 mm (0.039 in.) either side of the triangle axis.
NOTE : If the rudder trailing edge is not within the reference triangle tolerances than an adjustment of the rudder neutral position will need to be performed.
This can be done after removal and installation of the servo control(s) as described in step F.
NOTE : If the reference neutral position triangle is missing than an adjustment of the rudder neutral position is to be performed (Ref. 27-21-00, P. Block 501).
This can be done after removal and installation of the servo control(s) as described in step F.
(7)Depressurize green, blue and yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(8)Display warning notice in flight compartment prohibiting operation of flight controls.
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM SLOW	1CG	201/J27
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(10)Display warning notices, prohibiting repressurization of hydraulic systems.
(11)Open trailing edge access panel 325DL and remove access panel support struts (Ref. 55-33-13, P. Block 401).
(12)Remove leading edge access panel 326DL (Ref. 55-42-13, P. Block 401).
(13)Install blanking plate P/N 98A27203001000 at rudder spar box.

R **ON A/C 001-100, 102-200,

B. Removal (Ref. Fig. 401)

R **ON A/C 101-101,

R B. Removal (Ref. Fig. 402)

R **ON A/C ALL

CAUTION : IT IS ESSENTIAL TO IDENTIFY BOLTS, BUSHES AND SIMILAR SMALL COMPONENTS AT EACH CONNECTION, TO ENSURE INSTALLATION IN ORIGINAL POSITIONS.

NOTE : If it is necessary to remove the three servo controls, remove in the following order: upper, center, lower.

(1)Position container for hydraulic fluid spillage.
(2)Cut and remove lockwire from unions, disconnect hydraulic hoses (32, 33) and drain residual hydraulic fluid into container.
(3)Cap and plug hydraulic hoses and servo control ports.
(4)Disconnect electrical connector (36) from jamming detection micro-switch and install blanking caps.
(5)Remove cotter pin (15), nut (16), washer (17) and bolt (19), and disconnect servo control actuating spring rod (37). At input lever (18), temporarily secure bushes (1, 2).
(6)At servo control to rudder pivot connection, remove cotter pin (13), nut (14), washer (12) and bolt (3).
(7)At servo control to vertical stabilizer pivot connection, remove cotter pin (20), nut (21), washer (22) and bolt (31).
(8)Remove retaining rings (11, 23) using extractor P/N SL90-314-1-0000.
(9)Remove ring nuts (10, 24) using notched wrench P/N SL90-315-1-0000.

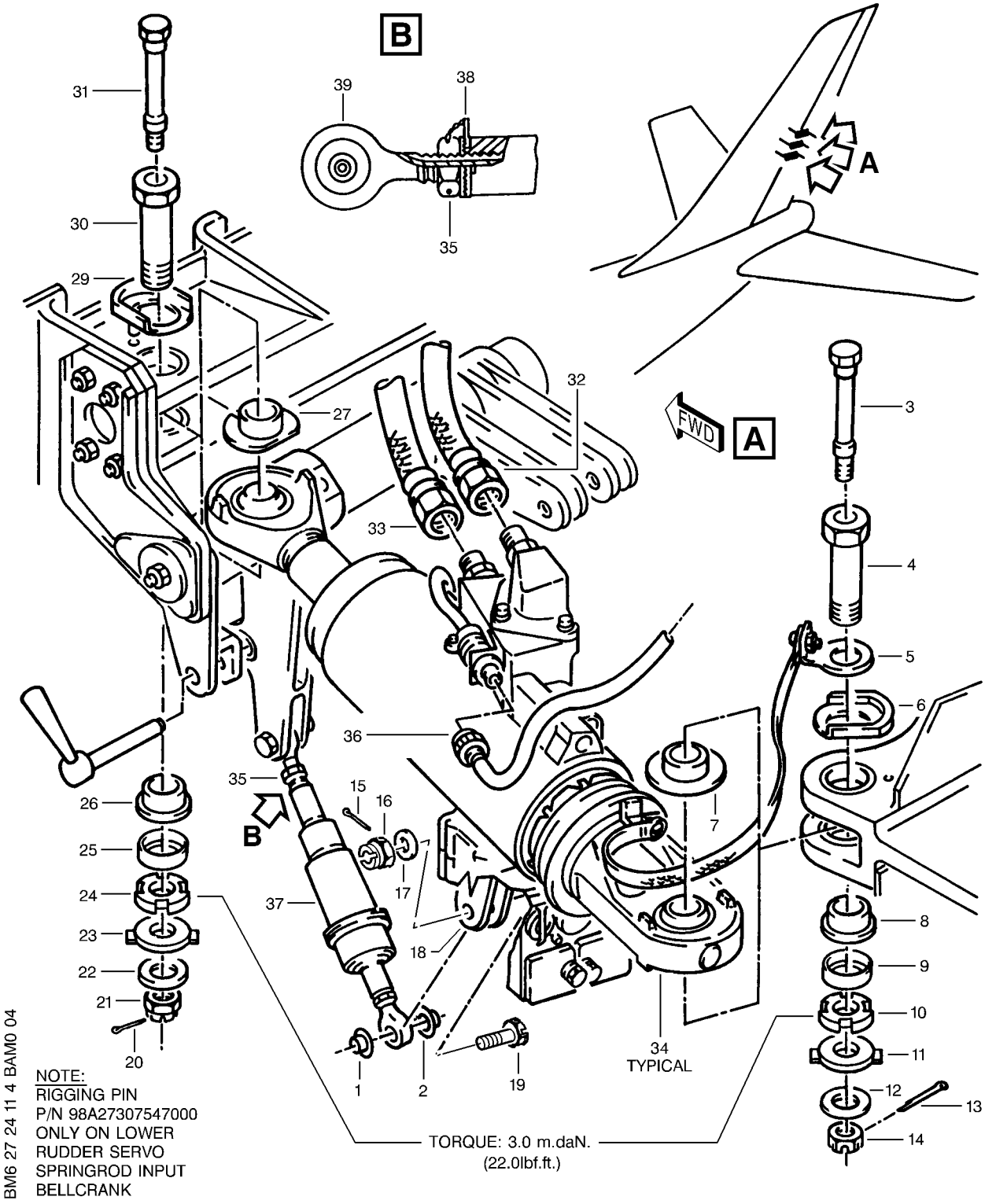
R **ON A/C 001-100, 102-200,

(10)Remove cupwashers (9, 25).
(11)Remove bolts (4, 30) using pins P/N 98A27003000200 from extractor P/N 98A27003000000.
(12)Remove bonding terminal (5) but do not remove locking devices (6, 29).
CAUTION : SERVO CONTROL WEIGHS APPROX. 15 kg (33 lb.).
(13)Remove servo control (34) and bushes (8, 26).
(14)Remove bushes (7, 27).

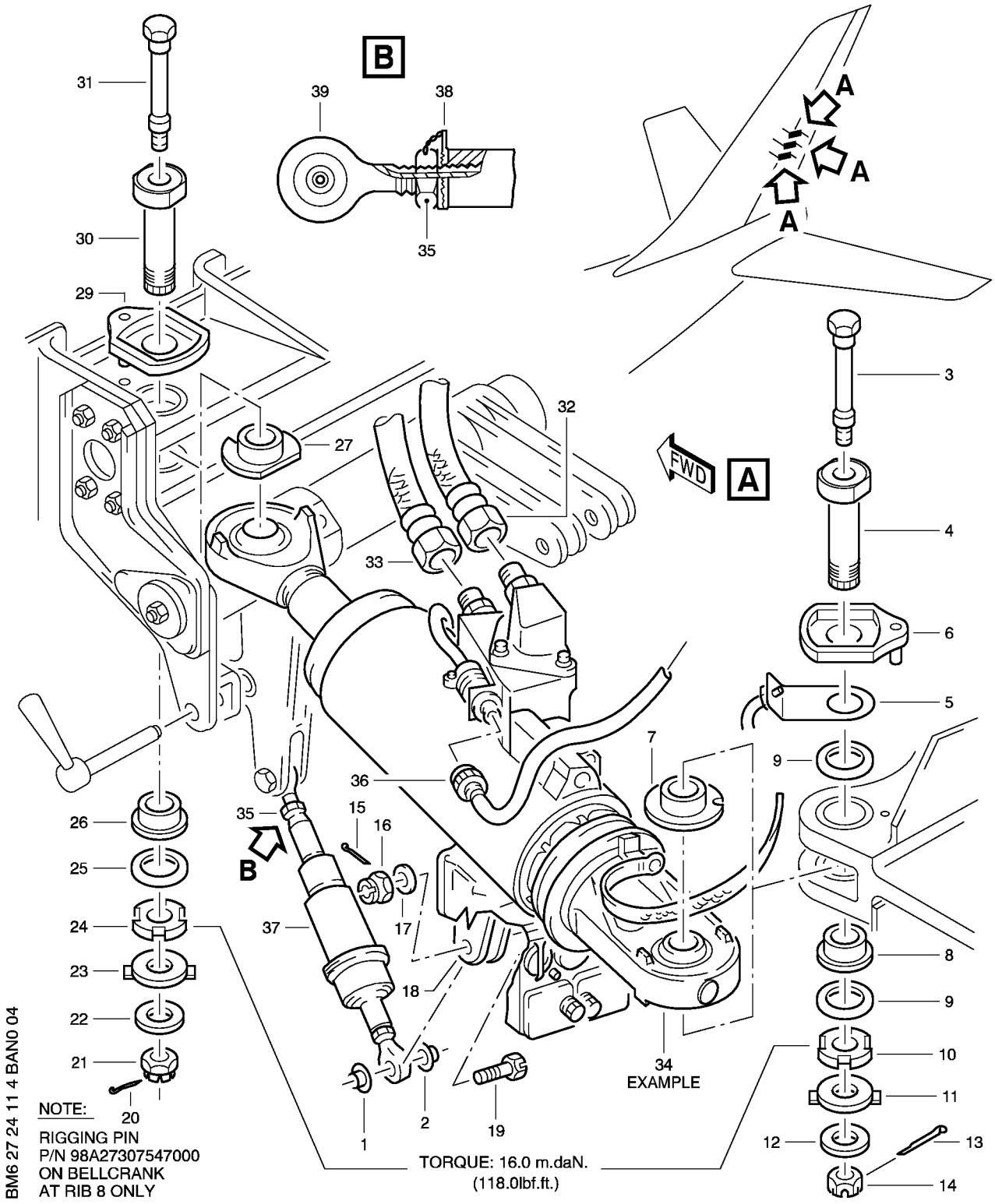
R **ON A/C 101-101,

R (10)Remove washers (9, 25).
R (11)Remove bolts (4, 30) using pins P/N 98A27003000200 from extractor
R P/N 98A27003000000.
R (12)Remove locking devices (6, 29) bonding terminal (5)and washer (9).
R CAUTION : SERVO CONTROL WEIGHS APPROX. 15 kg (33 lb.).
R (13)Remove servo control (34) and bushes (8, 26).
R (14)Remove bushes (7, 27).

R **ON A/C ALL



Rudder Servo Controls
Figure 401



Rudder Servo Controls
Figure 402

C. Preparation for Installation
(1)Check identification placards on servo controls:
- 2162 - For Blue hydraulic system - upper servo control.
- 1162 - For Green hydraulic system - center servo control.
- 3162 - For Yellow hydraulic system - lower servo control.
(2)Check that drain holes of the servo control actuating springrod are clear.
(3)Transfer bonding strap from removed servo control to replacement servo control. For electrical bonding refer to 20-28-11, P. Block 1.
(4)Check condition of all bolts, bushes etc.
(5)If locking devices (6, 29) must be replaced, remove old sealant, apply sealant (Material No. 09-018) to spigot of locking device and then install (Ref. 51-76-10, P. Block 801).
(6)Apply grease (Material No. 04-004) to all bolts and threaded fasteners.

R **ON A/C 001-100, 102-200,

D. Installation (Ref. Fig. 401)

R **ON A/C 101-101,

R D. Installation (Ref. Fig. 402)

R **ON A/C ALL

NOTE : If three servo controls have been removed, install the new servo controls in the following order: lower, center, upper.
(1)Install bush (27).
(2)Install bush (7).
(3)Position servo control (34).
(4)Install bushes (26, 8).

R **ON A/C 001-100, 102-200,

(5)Make certain that locking devices (29, 6) are correctly positioned.
(6)Position bonding terminal (5) and install bolt (4). For electrical bonding refer to 20-28-11, P. Block 1.
(7)Install bolt (30).
(8)Install cupwashers (25, 9) and ring nuts (24, 10).

R **ON A/C 101-101,

R (5)Position washer (9) bonding terminal (5) and locking devices (29, 6).
R For electrical bonding refer to 20-28-11, P. Block 1.
R (6)Install bolt (4).
R (7)Install bolt (30).
R (8)Install washers (25, 9) and ring nuts (24, 10).

R **ON A/C 001-100, 102-200,

(9)TORQUE ring nuts (24, 10) to 3.0 m.daN (22.0 lbf.ft.) using notched wrench P/N SL90-315-1-0000.

R **ON A/C 101-101,

R (9)TORQUE ring nuts (24, 10) to 16.0 m.daN (118.0 lbf.ft.) using notched
R wrench P/N SL90-315-1-0000.

R **ON A/C ALL

(10)Install retaining rings (23, 11) using installation tool P/N SL90-313-1-0000.
(11)Install bolts (31, 3), washers (22, 12) and nuts (21, 14).
(12)Finger-tighten nuts (21, 14) and safety with cotter pins (20, 13).
(13)Coat all visible cadmium-plated steel parts with corrosion-preventive paste (Mat. No. 05-005) (Ref. 51-75-10, P. Block 801).
(14)Check that bushes (1) and (2) are in place in servo control input lever.
(15)Position servo control actuating spring rod (37) and install bolt (19).
(16)Install washer (17) and nut (16).
(17)TORQUE nut (16) to between 0.21 and 0.23 m.daN (18.6 and 20.4 lbf.in.) and safety with cotter pin (15).
(18)Remove caps and plugs from hydraulic hoses (32, 33) and from servo control ports, and connect hoses to servo control.

CAUTION : TO PREVENT HOSES CHAFING ON REAR SPAR OF VERTICAL STABILIZER SPAR BOX, HOSES MUST NOT BE TWISTED WHEN TIGHTENING UNIONS.

(19)Tighten unions and safety with lockwire.
(20)Remove protective caps from plug and from open line end (36) and connect jamming detection microswitch electrical connector.
(a)At upper servo control 22CB-A.
(b)At center servo control 27CB-A.
(c)At lower servo control 32CB-A.
(21)Remove hydraulic fluid container from working area and make certain that all excess fluid is cleaned off all components.

E. Bleeding of Servo Control
(1)Remove rigging pins P/N 98A27901006000 (Qty. 2) and P/N 98A27307547000.
(2)Remove safety clips and tags, and close circuit breakers 1CB, 2CB, 1CG.
(3)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Make certain that electronics racks ventilation is correct.
R
R (5)Make certain that travel ranges of rudder and servo controls are clear of tools and miscellaneous items of equipment.
R (6)Pressurize green, blue and yellow hydraulic systems either:
R - using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
R - or using green auxiliary power (Ref. 29-21-00, P. Block 301) and
R blue auxiliary power (Ref. 29-22-00, P. Block 301) and yellow
R auxiliary power (Ref. 29-23-00, P. Block 301).
(7)Make certain that B/G/Y pushbutton switches on SERVO CTL section of panel 428VU are pressed in (legends OFF).
(8)To bleed servo controls, operate LH and RH rudder pedals to deflect

rudder surface.
(9)Repeat this operation ten times and return pedals to neutral position.
(10)Check that hydraulic connections are free from leaks.

F. Adjustment/Test
NOTE : If the reference neutral position triangle is missing carry out adjustment of rudder to neutral (Ref. 27-21-00, P. Block 501).
(1)Install rigging pin P/N 98A27307547000 into the lower rudder servo springrod input bellcrank.
(2)Test of servo controls
NOTE : Upper servo control - B pushbutton switch.
Center servo control - G pushbutton switch.
Lower servo control - Y pushbutton switch.
NOTE : Only Green hydraulic system replacement servo control test is described. The Yellow and Blue hydraulic system servo control tests are similar and need to be performed based on what servo control was replaced.

ACTION	RESULT
1. Check that rudder is in neutral as previously recorded.	
2. On SERVO CTL section of panel 428VU: - press pushbutton switch G. - release pushbutton switches B and Y.	Check that rudder trailing edge is in line with or in limits of the reference triangle NSA 950200 located on the rear cone. NOTE : Maximum tolerance of the rudder trailing edge is 1 mm (0.039 in.) either side of the triangle axes.

If the rudder trailing edge is not within the reference triangle tolerance adjust the corresponding actuating spring rod (37) (Ref. Para. G.)

3. On SERVO CTL section of panel 428VU: - press pushbutton switch B. - release pushbutton switch G.	Check that rudder trailing edge is in line with or in limits of the reference triangle NSA 950200 located on the rear cone. NOTE : Maximum tolerance of the rudder trailing edge is 1 mm (0.039 in.) either side of the triangel axes.

If the rudder trailing edge is not within the reference triangle tolerance adjust the corresponding actuating spring rod (37) (Ref. Para. G.)

ACTION	RESULT
4. On SERVO CTL section of panel 428VU: - press pushbutton switch Y. - release pushbutton switch B.	Check that rudder trailing edge is in line with or in limits of the reference triangle NSA 950200 located on the rear cone. NOTE : Maximum tolerance of the rudder trailing edge is 1 mm (0.039 in.) either side of the triangel axes.

If the rudder trailing edge is not within the reference triangle tolerance adjust the corresponding actuating spring rod (37) (Ref. Para. G.)

5. Remove rigging pin P/N 98A27307547000.

6. On SERVO CTL section of panel 428VU:
   - release pushbutton switch Y.
   - press pushbutton switch G.

7. Move rudder fully left	Check that rudder full deflection and neutral is 1057 mm ± 34 mm (41.22 in. ± 1.34 in.).
8. Move rudder fully right	Check that rudder full deflection and neutral is 1057 mm ± 34 mm (41.22 in. ± 1.34 in.).

9. Move rudder to neutral.

(3)Check that rudder is in neutral.
(4)Make certain that hydraulic flexible hoses of rudder servo controls do not chafe on rear spar of vertical stabilizer spar box.
(5)Carry out jamming detection test (Ref. 27-24-12, P. Block 401).
(6)Carry out functional test of position indicating system (Ref. 27-25-00, P. Block 501).

G. Adjust actuating spring rod (37) for the servo control which gives an incorrect neutral position as follows:
(1)Cut and remove lockwire from nut (35).
(2)Loosen nut (35) and serrated locking device (38).
NOTE : Make sure that both spring rod eye ends are held in a fixed and correctly alignd position before turning the the spring rod body so that they do not move at all. Do not allow the eye ends to rotate back and forth as this may damage the bearings.
(3)Adjust length by rotating spring rod body, until rudder is in neutral position.

(4)Engage serrated locking device (38) and tighten nut (35).
(5)Make certain that rod end threads are visible through inspection holes.
(6)Safety nut (35) with lockwire to serrated locking device (38).

H. Close-Up

R (1)Depressurize hydraulic systems. If applicable, disconnect the hydraulic
R ground power cart (Ref. 29-10-00, P. Block 301).
(2)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Remove blanking plate P/N 98A27203001000 from rudder spar box.
(5)Install leading edge access panel 326DL (Ref. 55-42-13, P. Block 401).
(6)Install access panel support struts and close trailing edge access panel 325DL (Ref. 55-33-13, P. Block 401).
(7)Remove warning notices.
(8)Remove access platform.

RUDDER SERVO CONTROL 22CB, 27CB, 32CB
INSPECTION/CHECK

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT TRAVEL RANGES OF CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITIONS OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, up to 8 m (26 ft.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-24-11, P. Block 401	Rudder Servo Control 22CB, 27CB, 32CB
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 55-33-13, P. Block 401	Trailing Edge Access Panels

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Open access panels 325DL (Ref. 55-33-13, P. Block 401).

B. Inspection
(1)Visual inspection
(a)Inspect servo control bearings in the front and rear locations of the servo controls for:
- corrosion, wear and other damage
- damage of the liner
- extrusion of the self lubricating coating.
(b)Replace any worn or damaged bearings (Ref. Lucas Aerospace SB 31042-27-06 or Lucas Aerospace SB 27-21-0W). For removal/installation of servo controls refer to 27-24-11, P. Block 401.

(2)Test
WARNING : MAKE CERTAIN THAT TRAVEL RANGES OF CONTROL SURFACES ARE CLEAR.
(a)Initial conditions:
- Correct electrical power supply.
- Forward services ventilation system in operation.
- Overhead and aft panel circuit breakers closed particularly those associated with FLT CTL and ECAM.
- Aircraft in ground configuration (LDG GEAR PROX DET & RELAYS circuit breakers closed.)
(b)Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU:
- Make certain that B, G and Y pushbutton switches are pressed (legends off).
(d)Make certain that all control surfaces are set to zero.
(e)Make certain that flap and slat control lever is in first notch position (slats and flaps retracted).
(f)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.
(g)On ECAM control panel 11VU:
- press F/CTL pushbutton switch to display FLT CTL page on right ECAM display unit.
- adjust brightness on right ECAM display unit using RIGHT DISPLAY knob.
(h)Servo control location:

HYDRAULIC SYSTEM LOCATION	
BLUE	UPPER SERVO CONTROL
GREEN	CENTER SERVO CONTROL
YELLOW	LOWER SERVO CONTROL

(j)Test

NOTE : Test, using Green hydraulic system only is described.
Repeat this test using Blue and Yellow hydraulic systems.

ACTION	RESULT
1. On SERVO CTL section of panel 428VU: - release B and Y pushbutton switches.	
2. Move right pedal fully forward.	- Rudder moves to right On right ECAM display unit, RUD scale: - bug reproduces motion.
3. Move left pedal fully forward.	- Rudder moves to Left On right ECAM display unit, RUD scale: - bug reproduces motion.
4. Return pedals to neutral position.	Check that bug returns to zero. If not, check bearings on servo controls for damage.
5. On SERVO CTL section of panel 428VU: - press B and Y pushbutton switches.	

(k)Test completion:
- Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
- De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
- Restore aircraft to normal operating condition.

C. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access panel 325DL (Ref. 55-33-13, P. Block 401).
(3)Remove access platform.

RUDDER SERVO CONTROL JAMMING DETECTION MICROSWITCHES REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 12 m (39 ft.)
B.	Electrical Connector Protective Caps/Plugs
C.	Warning Notices
D.	Circuit Breaker Safety Clips and Tags
E.	Torque Wrench, up to 0.3 m.daN (26.56 lbf.in.)
F.	Corrosion-Resistant Steel Lockwire, 0.6 mm (0.024 in.) dia.
G.	Corrosion-Resistant Steel Lockwire, 0.8 mm (0.032 in.) dia.
H. Material No. 05-027	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 07-11-00, P. Block 1	Jacking for Aircraft Maintenance Operation
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 31-51-00, P. Block 1	ECAM - General
R - 31-51-00, P. Block 201	ECAM SYSTEM
- 51-75-10, P. Block 801	Repair of Paint Coatings
- 55-33-13, P. Block 401	Trailing Edge Access Panels

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(4)Set rudder trim to zero.
(5)Move rudder pedals to neutral.
(6)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(7)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(8)Display warning notices in flight compartment prohibiting operation of flight controls.
(9)Open access panels 325DL and 325ER (Ref. 55-33-13, P. Block 401).
(10)Jamming detection microswitches to be removed are identified as follows:

HYDRAULIC SYSTEM	JAMMING DETECTION MICROSWITCH	
	LOCATION	ELECTRICAL IDENTIFIER
	UPPER SERVO CONTROL	22CB
	CENTER SERVO CONTROL	27CB
	LOWER SERVO CONTROL	32CB

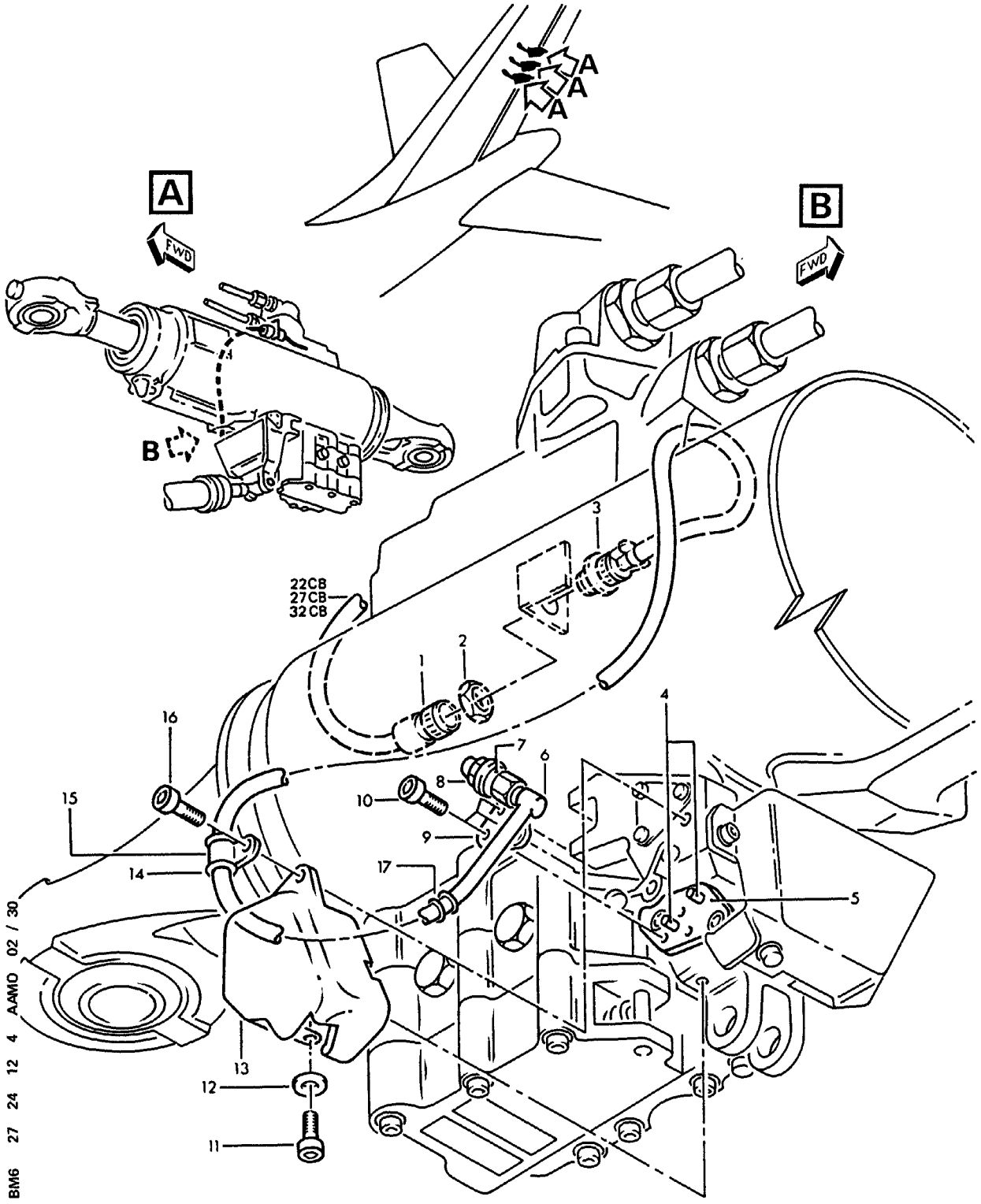
** ON A/C WITH RUDDER SERVO CONTROL P/N 30503

B. Removal (Ref. Fig. 401)
(1)Remove microswitch assembly as follows:
(a)Disconnect microswitch cable (14) as follows:
1 Cut and remove lockwire from connector (1).
2 Disconnect connector (1).
3 Cut and remove lockwire from nut (2).
4 Remove nut (2).
5 Pull receptacle (3) from bracket and install a protective cap.
(b)Remove cover (13) as follows:
1 Remove screw (16) and clamp (15).
2 Remove screw (11) and washer (12).
(c)Remove microswitch (6) as follows:
1 Cut and remove lockwire from screws (10).
2 Remove screws (10) and clamp (17).
3 Pull microswitch (6) from plate (5).

C. Installation (Ref. Fig. 401)
NOTE : The jamming detection microswitch (6) is supplied complete with nut (8), support bracket (9) and a factory-adjusted shim (7) thus requiring no further adjustment on installation.
(1)Install microswitch assembly as follows:
(a)Install microswitch (6) as follows:
1 Position microswitch (6) on plate (5) and locating pins (4).
2 Install screws (10) and clamp (17).
3 TORQUE screws (10) to between 0.071 m.daN and 0.087 m.daN (6.2 lbf.in. and 7.6 lbf.in.) and safety with lockwire 0.6 mm (0.024 in.) dia.
(b)Install cover (13) as follows:
1 Position cover (13) on input lever assembly.
2 Install screw (16) and clamp (15).
3 Install screw (11) and washer (12).
(c)Connect microswitch cable (14) as follows:
1 Remove protective cap and insert receptacle (3) in bracket.
2 Install nut (2) and safety with lockwire 0.8 mm (0.032 in.) dia.
3 Connect connector (1) and safety with lockwire 0.6 mm (0.024 in.) dia.

** ON A/C WITH RUDDER SERVO CONTROL P/N 31042

B. Removal (Ref. Fig. 402)
(1)Remove microswitch assembly as follows:
(a)Disconnect microswitch cable (14) as follows:
1 Cut and remove lockwire from connector (1).
2 Disconnect connector (1).
3 Cut and remove lockwire from nut (2).
4 Remove nut (2).
5 Pull receptacle (3) from bracket and install a protective cap.
(b)Remove microswitch (6) as follows:
1 Cut and remove lockwire from screws (10).
2 Remove screws (10) and clamps (15).



Jamming Detection Microswitch (for P/N 30503)
Figure 401

3 Pull microswitch (6) from input lever assembly (5).
4 Remove boot (17) from microswitch (6).

C. Installation (Ref. Fig. 402)

NOTE : The jamming detection microswitch (6) is supplied complete with nut (8), support bracket (9) and a factory-adjusted shim (7) thus requiring no further adjustment on installation.

(1)Install microswitch assembly as follows:

(a)Install microswitch (6) as follows:

1 Position boot (17) on microswitch (6).
2 Position microswitch (6) on plate (5) and locating pins (4).
3 Install screws (10) and clamps (15).
4 TORQUE screws (10) to between 0.224 m.daN and 0.295 m.daN (19.82 lbf.in. and 26.10 lbf.in.) and safety with lockwire 0.6 mm (0.024 in.) dia.

(b)Connect microswitch cable (14) as follows:

1 Remove protective cap and insert receptacle (3) in bracket.
2 Install nut (2) and safety with lockwire 0.8 mm (0.032 in.) dia.
3 Connect connector (1) and safety with lockwire 0.6 mm (0.024 in.) dia.

** ON ALL A/C

D. Test

(1)Initial test conditions:

WARNING : WHEN AIRCRAFT IS ON JACKS OBSERVE SPECIAL PRECAUTIONS (REF. 07-11-00, P. BLOCK 1).

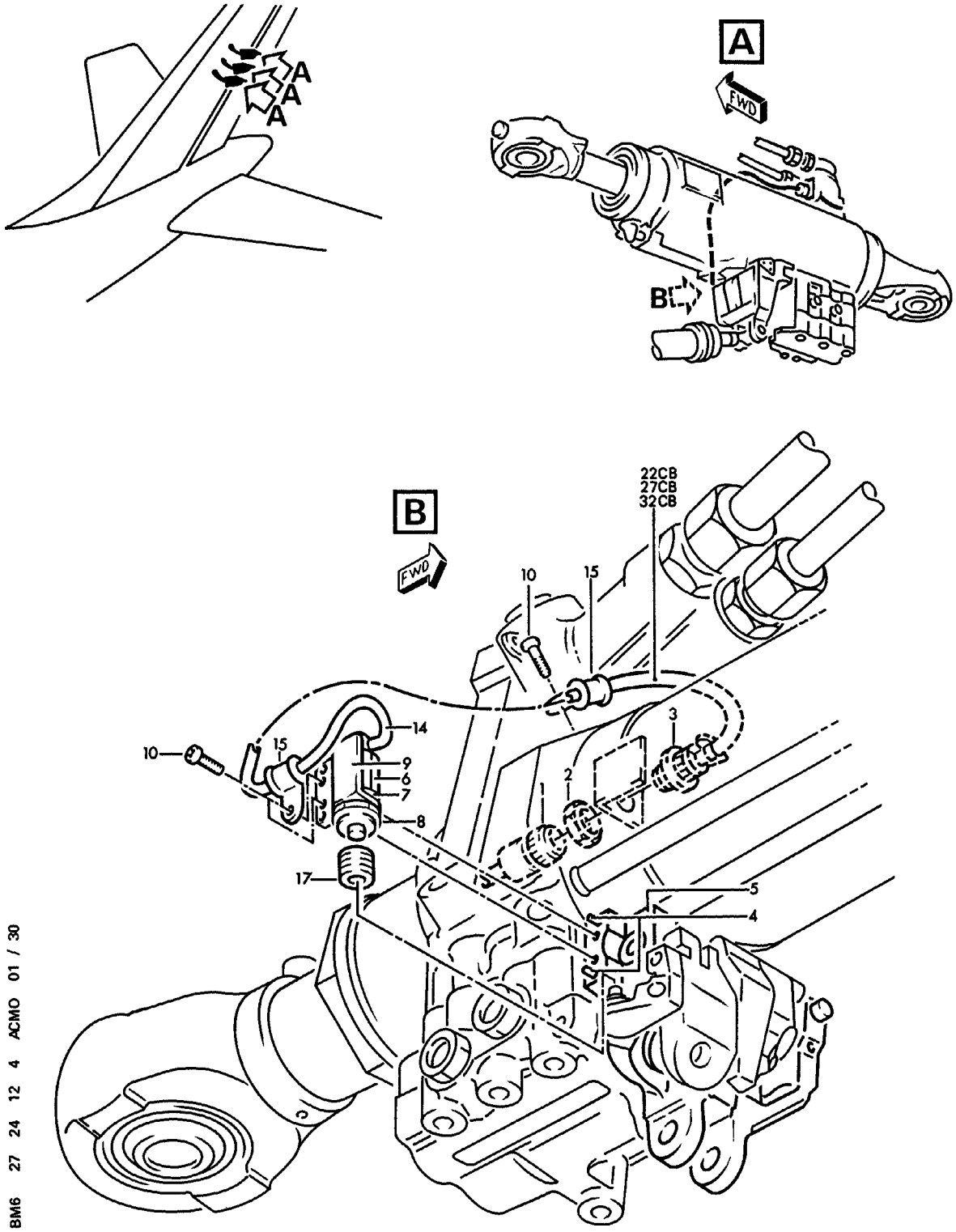
(a)Aircraft in ground configuration.

R (b)Start ECAM SYSTEM (Ref. 31-51-00, P. Block 201).

R (c)Make sure that following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27
22VU	LDG/GEAR/EXTEND/CTL	1GA	201/J28
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64
133VU	HYDRAULIC/LDG GEAR PROX DET & RELAYS/ SYS 2/GEAR DOWN & OVHD PNL/POS IND	83GB	331/V51
133VU	HYDRAULIC/LDG GEAR PROX DET & RELAYS/ SYS 2/GEAR DOWN & OVHD PNL/FLT/GND	1GB	331/V52
133VU	HYDRAULIC/LDG GEAR PROX DET & RELAYS/ SYS 1/RELAYS & RETRACT/CTL	2GB	332/U51
133VU	HYDRAULIC/LDG GEAR PROX DET & RELAYS/ SYS 1/FLT/GND	119GB	332/U52
133VU	HYDRAULIC/LDG GEAR PROX DET & RELAYS/ SYS 1/GEAR DN & CTR PNL/POS IND	3GB	332/U53

(d)Carry out the following jamming detection test for microswitch 27CB:



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Jamming Detection Microswitch (for P/N 31042)
Figure 402

ACTION	RESULT
1. On SERVO CTL section of panel 428VU: - press and release G pushbutton switch.	On 428VU: - OFF legend of G pushbutton switch comes on.
2. On SERVO CTL section of panel 471VU: - press and release G pushbutton switch.	On 471VU: - TEST legend of G pushbutton switch comes on and remains on.
3. On ECAM control panel: R - select FLT CTL page (Ref. 31-51-00, P. Block 1).	- FLT CTL page appears on right ECAM display.
4. Move rudder pedals.	On SERVO CTL section of panel 428VU: - JAM legend of G pushbutton switch comes on. NOTE : JAM legend of G pushbutton is in most cases already on because some other jamming detection microswitch is pressed. On CAPT and F/O instrument panels 3VU and 5VU: - MASTER CAUTION lights comes on and single chime sounds. On left ECAM display: - Following message will be added: GREEN RUD SERVO JAM
5. On SERVO CTL section of panel 428VU: - press G pushbutton switch.	- OFF legend of G pushbutton switch goes off. On SERVO CTL section of panel 471VU: - TEST legend of G pushbutton switch goes off.

(e)Carry out the following jamming detection test for microswitch 22CB:

ACTION	RESULT
1. On SERVO CTL section of panel 428VU: - press and release B pushbutton switch.	On 428VU: - OFF legend of B pushbutton switch comes on.
2. On SERVO CTL section of panel 471VU: - press and release B pushbutton switch.	On 471VU: - TEST legend of B pushbutton switch comes on and remains on.
3. On ECAM control panel: R - select FLT CTL page (Ref. 31-51-00, P. Block 1).	- FLT CTL page appears on right ECAM display.
4. Move rudder pedals.	On SERVO CTL section of panel 428VU: - JAM legend of B pushbutton switch comes on. NOTE : JAM legend of B pushbutton is in most cases already on because some other jamming

ACTION	RESULT
	detection microswitch is pressed. On CAPT and F/O instrument panels 3VU and 5VU: - MASTER CAUTION lights comes on and single chime sounds. On left ECAM display: - Following message will be added: BLUE RUD SERVO JAM
5. On SERVO CTL section of panel 428VU: - press B pushbutton switch.	- OFF legend of B pushbutton switch goes off. On SERVO CTL section of panel 471VU: - TEST legend of B pushbutton switch goes off.

(f)Carry out the following jamming detection test for microswitch 32CB:

ACTION	RESULT
1. ON SERVO CTL section of panel 428VU: - press and release Y pushbutton switch.	- OFF legend of Y pushbutton switch comes on.
2. On SERVO CTL section of panel 471VU: - press and release Y pushbutton switch.	On 471VU: - TEST legend of Y pushbutton switch comes on and remains on.
3. On ECAM control panel: R - select FLT CTL page (Ref. 31-51-00, P. Block 1).	- FLT CTL page appears on right ECAM display.
4. Move rudder pedals.	On SERVO CTL section of panel 428VU: - JAM legend of Y pushbutton switch comes on. NOTE : JAM legend of Y pushbutton is in most cases already on because some other jamming detection microswitch is pressed. On CAPT and F/O instrument panels 3VU and 5VU: - MASTER CAUTION lights comes on and single chime sounds. On left ECAM display: - Following message will be added: YELLOW RUD SERVO JAM
5. On SERVO CTL section of panel 428VU: - press Y pushbutton switch.	- OFF legend of Y pushbutton switch goes off. On SERVO CTL section of panel 471VU: - TEST legend of Y pushbutton switch goes off.

E. Close-Up
(1)Check coating of moisture-removing oil (Mat. No. 05-027) on rudder servo controls for good condition and renew as necessary (Ref. 51-75-10, P. Block 801).
(2)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(3)Close access panels 325DL and 325ER (Ref. 55-33-13, P. Block 401).
(4)Disconnect electrical ground power unit and de-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(5)Remove warning notices.
(6)Remove access platform.

RUDDER SERVO CONTROL JAMMING DETECTION MICROSWITCHES DEACTIVATION/REACTIVATION

Ref.: MMEL Sect. 1-27, Item 3

CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MMEL.

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Deactivation

A. Reason for the Job

(1) One or more detectors on servo controls may be inoperative.

NOTE : All components relative to the THS actuator must be operative.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 11 m (36 ft.)
(2)	Electrical Connector Protective Caps/Plugs
(3)	Circuit Breaker Safety Clips
(4)	Tie-wrap
(5)	Warning Notices

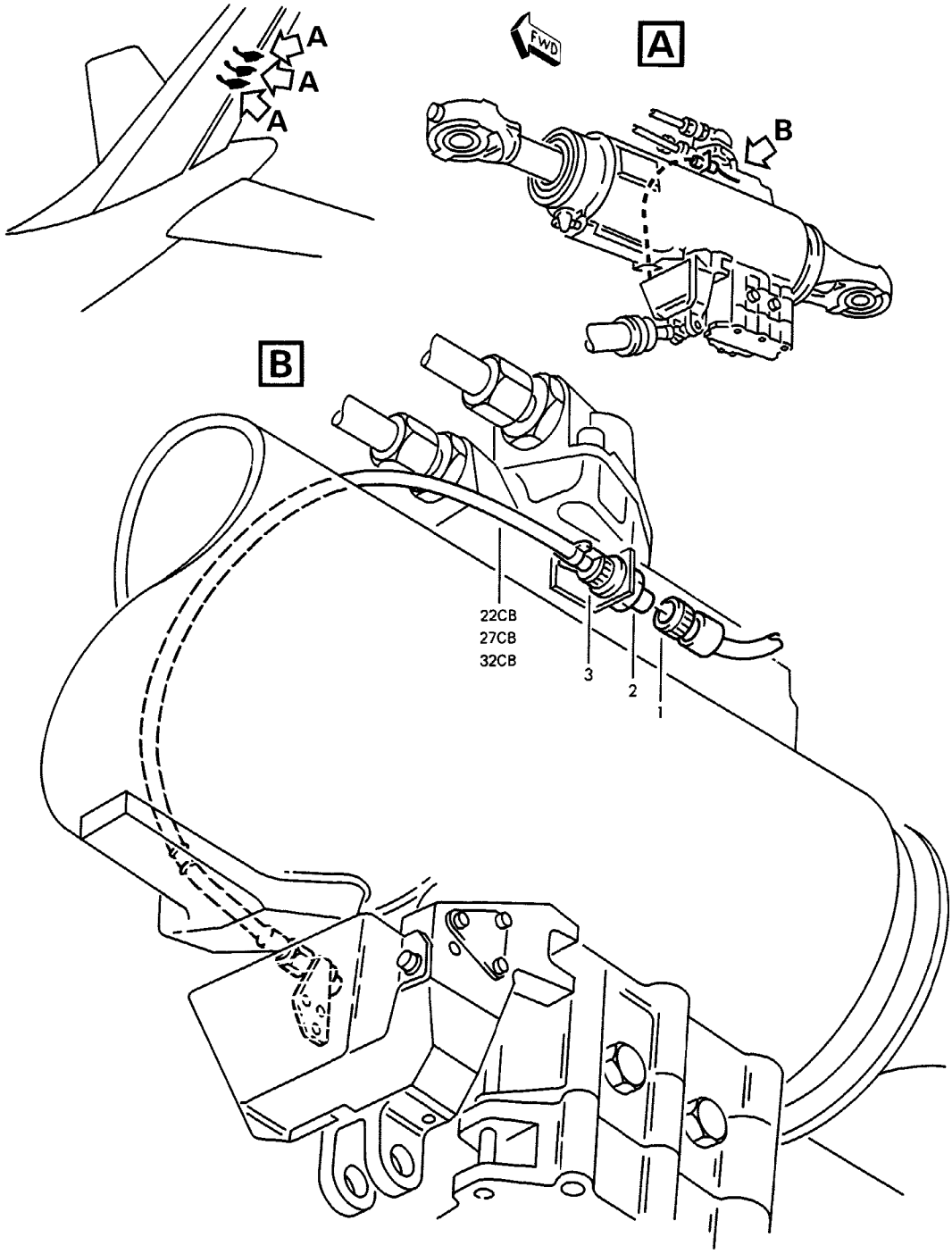
Referenced Procedures

- 27-14-00, P. Block 501	Hydraulic Actuation (Aileron)
- 55-33-13, P. Block 401	Trailing Edge Access Panels

C. Procedure
(1)Job Set-Up
(a)Position access platform.
(b)Display warning notices prohibiting pressurization of hydraulic systems and operation of rudder controls.
(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(d)Open trailing edge access panel 325DL and remove access panel support struts (Ref. 55-33-13, P. Block 401).
(2)Deactivation (Ref. Fig. 901)
(a)Disconnect electrical connector (1) and install protective plug.
WARNING : MAKE CERTAIN THAT ELECTRICAL PLUG CANNOT CAUSE FOULING OF MOVING PARTS.
(b)Stow electrical connector (1) and secure with tie-wrap at bracket (3).
(c)Install protective cap on receptacle (2).
(d)Remove safety clips and tags and close circuit breakers 1CB and 2CB.
(3)Test
(a)Perform rudder operational test with individual hydraulic system corresponding to deactivated microswitch (Ref. 27-14-00, P. Block 501).
(4)Close-Up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Install access panel support struts and close trailing edge access panel 325DL (Ref. 55-33-13, P. Block 401).
(c)Remove access platform and warning notices.
(d)Install a temporary warning notice in the flight compartment to warn the flight crew that rudder Green (Blue, Yellow) servo control jamming detection microswitch is deactivated.
(e)Make an entry in the aircraft technical log.



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Jamming Detection Microswitch
Figure 901

2. Reactivation

A. Reason for the Job
Reconnection of the electrical plug of the jamming detection microswitch on the rudder servo controls in order that trouble shooting procedure and the ensuing corrective action be performed.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 11 m (36 ft.)
(2)	Electrical Connector Protective Caps/Plugs
(3)	Circuit Breaker Safety Clips
(4)	Warning Notices

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-14-00, P. Block 501	Hydraulic Actuation (Aileron)
- 27-24-12, P. Block 401	Rudder Servo Control Jamming Detection Microswitches
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 55-33-13, P. Block 401	Trailing Edge Access Panels
- 27-14-00, P. Block 101	Servo Control Jamming - Trouble Shooting Manual (TSM)

C. Procedure
(1)Job Set-Up
(a)Position access platform.
(b)Display warning notices prohibiting pressurization of hydraulic systems and operation of rudder controls.
(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(d)Open trailing edge access panel 325DL and remove access panel support struts (Ref. 55-33-13, P. Block 401).
(2)Reactivation (Ref. Fig. 901)
(a)Remove tie-wrap and protective plug/cap.
(b)Connect electrical connector (1) to receptacle (2).
(c)Remove safety clips and tags and close circuit breakers 1CB and 2CB.
(3)Trouble Shooting/Corrective Action
(a)Connect hydraulic ground power cart and pressurize the three hydraulic systems (Ref. 29-10-00, P. Block 301).
(b)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Perform rudder servo control jamming detection microswitch trouble

shooting (Ref. TSM 27-14-00, P. Block 101) and carry out the ensuing corrective action.

(4)Test

(a)Carry out functional tests of the jamming detection microswitch (Ref. 27-24-12, P. Block 401) and of the rudder system (Ref. 27-14-00, P. Block 501).

(5)Close-Up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Shut down and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).

(c)De-energize the aircraft electrical network and disconnect ground power unit (Ref. 24-41-00, P. Block 301).

(d)Install access panel support struts and close trailing edge access panel 325DL (Ref. 55-33-13, P. Block 401).

(e)Remove access platform and warning notices.

(f)Remove the temporary **DEACTIVATION** warning notice in flight compartment.

(g)Record reactivation in aircraft technical log.

SERVO CONTROL SAFETY VALVE 271645 - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18 ft.)
B. 98A27901006000	Pin - Rigging, Rudder Control (Qty. 2)
C.	O-Ring
D.	Warning Notices
E.	Circuit Breaker Safety Clips
F.	Container, Hydraulic Fluid Spillage
G.	Hydraulic Tube Blanking Plugs
H. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 20-23-11, P. Block 1	Installation and Repair of Tubing
- 24-41-00, P. Block 301	AC External Power Control
- 27-14-00, P. Block 501	Hydraulic Actuation (Aileron)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

2. Procedure

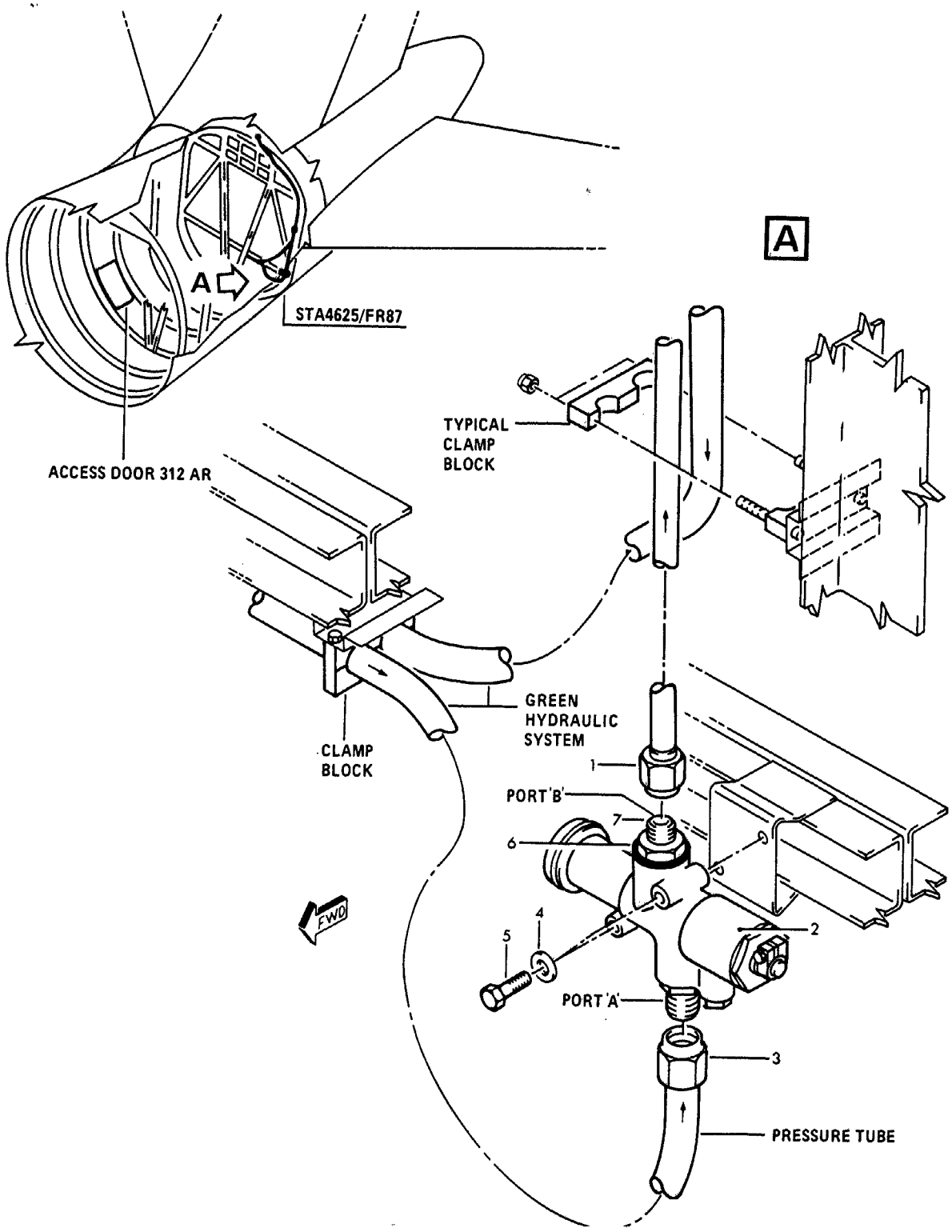
A. Job Set-Up (Ref. Fig. 401)
(1)Position access platform.
(2)Make certain that rudder trim is set at zero.
(3)Make certain that rudder pedals are set at neutral and install rigging pins P/N 98A27901006000 (Qty. 2) in rudder control bellcranks on control mechanism mounting beam in avionics compartment.
(4)Display warning notices in flight compartment prohibiting operation of flight controls.
(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/R63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(6)Display warning notices prohibiting system repressurization of Green hydraulic system.
(7)Open access door 312AR.
(8)Position container for hydraulic fluid spillage.

B. Removal (Ref. Fig. 401)
(1)Remove clamp blocks as necessary.
(2)Disconnect pressure tubes (1, 3).
(3)Remove bolts (5), washers (4) and safety valve (2).
(4)Install blanking plugs in ports and tubes.

C. Preparation for Installation (Ref. Fig. 401)
(1)Remove coupling (7) and remove and discard O-ring (6) from removed safety valve (2).
(2)Apply hydraulic fluid (Mat. No. 02-003) to new O-ring (6) and install O-ring (6) and coupling (7) at replacement safety valve (2).



Rudder Center Servo Control Safety Valve
Figure 401

D. Installation (Ref. Fig. 401)
(1)Remove blanking plugs from ports and tubes.
(2)Position safety valve (2) with port 'B' uppermost.
(3)Install safety valve (2) with washers (4) and bolts (5).
(4)Connect pressure tubes (1, 3) (Ref. 20-23-11, P. Block 1).
(5)Install clamp blocks, previously removed.
(6)Remove rigging pins P/N 98A27901006000 (Qty. 2).
(7)Connect hydraulic ground power cart and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(8)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(9)Remove safety clips and tags and close circuit breakers 1CG, 1CB, 2CB.
(10)On panel 428VU,
- press SERVO CTLS/G pushbutton switch.

E. Test
(1)Make certain that travel ranges of rudder are clear.
(2)To bleed replacement servo control hydraulic subsystem, operate LH and RH pedals very slowly, without reaching rudder travel limit.
(3)Repeat this operation ten times.
(4)Check that hydraulic connections are free from leaks.
R (5)Carry out operational test 1. A. (10) Test of rudder system with individual hydraulic system (Ref. 27-14-00, P. Block 501) supplying Green system.

F. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)Remove hydraulic fluid container and make certain that all excess fluid is cleaned off all components.
(3)Close access door 312AR.
(4)Remove warning notices.
(5)Check fluid level in hydraulic tank. Replenish as required (Ref. 12-12-29, P. Block 1).
(6)Shut down and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(7)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(8)Remove access platform.

SERVO CONTROL NON-RETURN (CHECK) VALVE 271164
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18 ft.)
B. 98A27901006000	Pin - Rigging, Rudder Control (Qty. 2)
C.	Warning Notices
D.	Circuit Breaker Safety Clips
E.	Container, Hydraulic Fluid Spillage
F.	Hydraulic Tube Blanking Plugs

Referenced Procedures

- 12-12-29, P. Block 1	Hydraulics
- 20-23-11, P. Block 1	Installation and Repair of Tubing
- 24-41-00, P. Block 301	AC External Power Control
- 27-14-00, P. Block 501	Hydraulic Actuation (Aileron)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

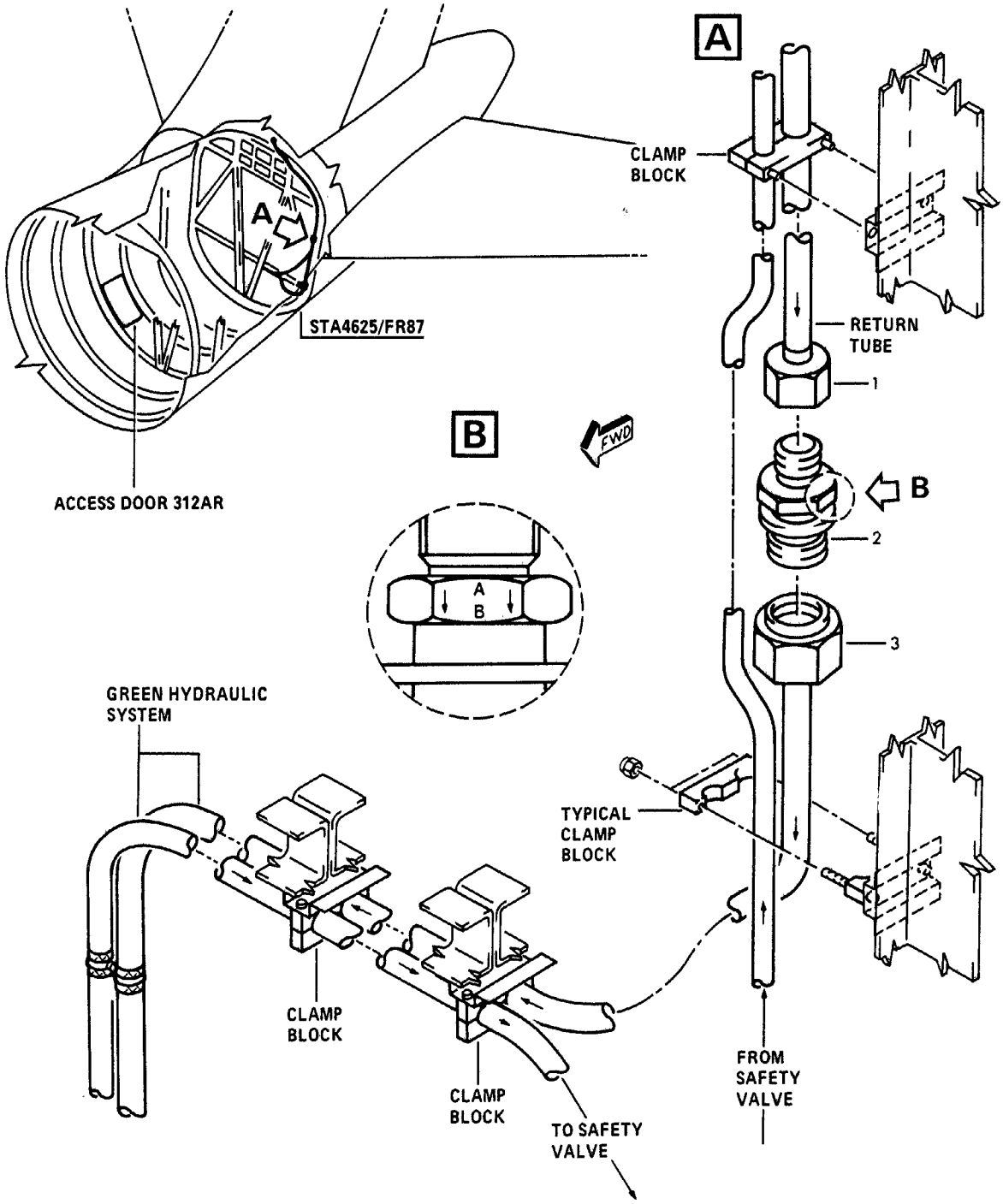
2. Procedure

A. Job Set-Up (Ref. Fig. 401)
(1)Position access platform.
(2)Make certain that rudder trim is set at zero.
(3)Make certain that rudder pedals are set at neutral and install rigging pins P/N 98A27901006000 (Qty. 2) in rudder control bellcranks on control mechanism mounting beam in avionics compartment.
(4)Display warning notices in flight compartment prohibiting operation of flight controls.
(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(6)Display warning notices prohibiting system repressurization of Green hydraulic system.
(7)Open access door 312AR.
(8)Position container for hydraulic fluid spillage.

B. Removal (Ref. Fig. 401)
(1)Remove clamp blocks as necessary.
(2)Disconnect return tubes (1, 3).
(3)Remove check valve (2).
(4)Install blanking plugs in ports and tubes.



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Servo Control Non-Return (Check) Valve
Figure 401

C. Installation (Ref. Fig. 401)
(1)Remove blanking plugs from ports and tubes.
(2)Position check valve (2) with port A uppermost (engraved arrows showing flow direction downwards). Ensure that arrows are clearly visible.
(4)Connect return tubes (1, 3) (Ref. 20-23-11, P. Block 1).
(5)Install clamp blocks previously removed.
(6)Remove rigging pins P/N 98A27901006000 (Qty. 2).
(7)Connect hydraulic ground power cart and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(8)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(9)Remove safety clips and tags and close circuit breakers 1CG, 1CB, 2CB.
(10)On panel 428VU:
- press SERVO CTLS/G pushbutton switch.

D. Test
(1)Make certain that travel ranges of rudder are clear.
(2)To bleed replacement servo control hydraulic subsystem, operate LH and RH pedals very slowly, without reaching rudder travel limit.
(3)Repeat this operation ten times.
(4)Check that hydraulic connections are free from leaks.
R (5)Carry out operational test 1. A. (10) Test of rudder system with
R individual hydraulic system (Ref. 27-14-00, P. Block 501) supplying
R Green system.

E. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)Remove hydraulic fluid container and make certain that all excess fluid is cleaned off all components.
(3)Close access door 312AR.
(4)Remove warning notices.
(5)Check fluid level in hydraulic tank. Replenish as required (Ref. 12-12-29, P. Block 1).
(6)Shut down and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(7)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(8)Remove access platform.

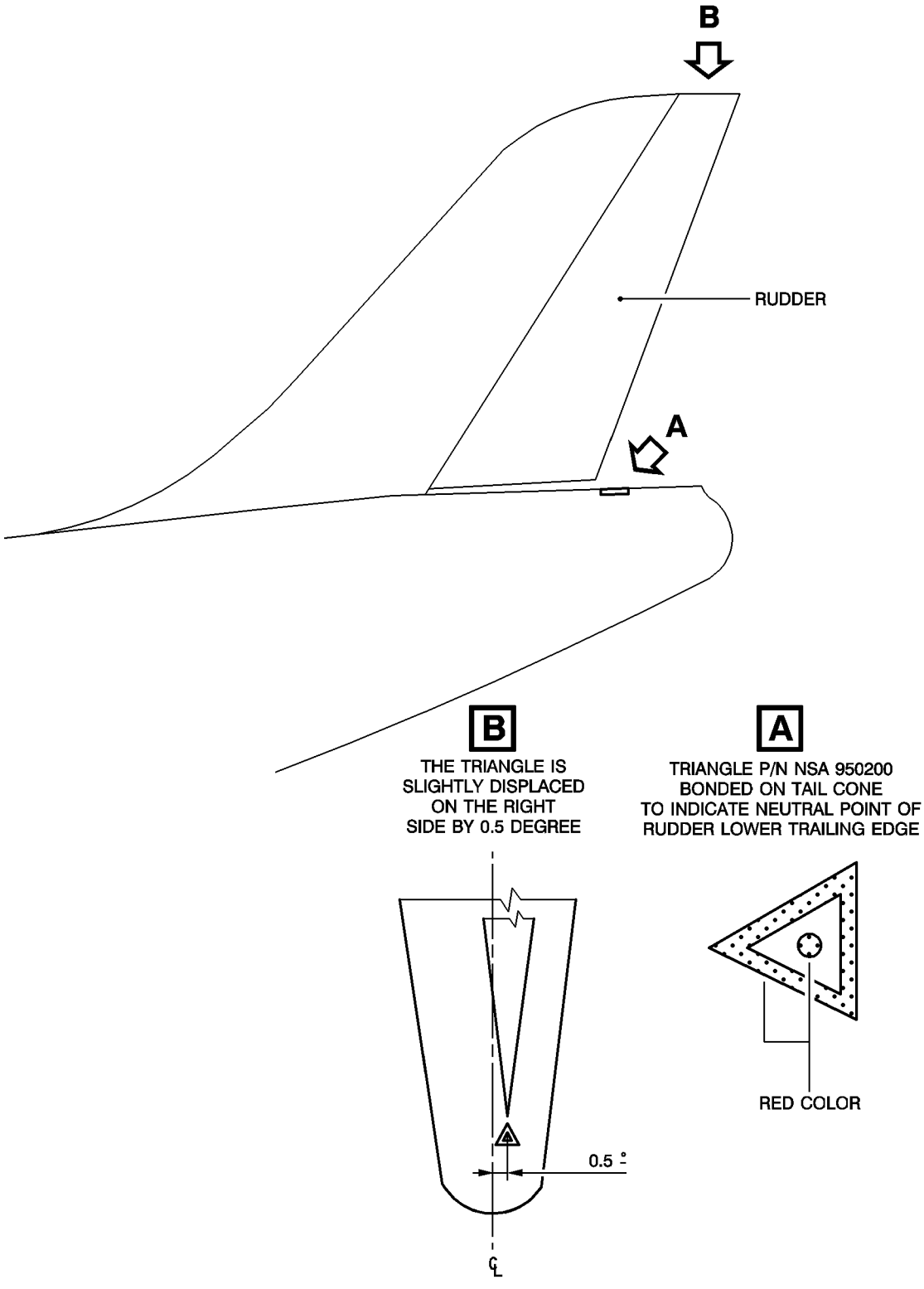
CONTROL SURFACE POSITION INDICATING (RUDDER)
DESCRIPTION AND OPERATION

1. General

Position of the rudder is indicated on the right ECAM display unit, together with the hydraulic systems available for the servo controls. (Ref. 27-15).
Rudder trim travel is displayed on a digital indicator (Ref. 27-22).
A special reference mark (triangle) bonded on the tail cone indicates the neutral point of the rudder lower trailing edge.

R NOTE : In order to compensate thermal expansion differences between the
R carbon structure and the rudder metallic mechanical controls, the
R triangle is normally slightly displaced on the right side by
R 0.5 degrees with respect to the aircraft center line.

R (Ref. Fig. 001)



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Special Reference Mark
Figure 001

R

CONTROL SURFACE POSITION INDICATING (RUDDER) - ADJUSTMENT/TEST

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Adjustment with Zeroing Equipment

A. Reason for the Job
- Adjustment of rudder position transmitter 10 CT.

B. Equipment and Materials

ITEM	DESIGNATION
(1)31-590-100	Zeroing Equipment - Synchro-Resolvers, Synchro-Transmitters and Wiring
(2)	Access Platform, 8 m (26 ft. 3 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)Connect hydraulic ground power unit and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU
Make certain that G pushbutton switch is pressed (in) and legends are off.

(d)Make certain that rudder trim control system is in neutral.

(e)Make certain that flap and slat control lever is in 1st notch position.

(f)Make certain that SPEED BRAKE control lever is in RET notch position, ground spoiler function not preselected.

(g)Using rudder trim control, move rudder to 0.5° left (value read on trim indicator).

(h)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/ SPLR/2 & 3	7CP	335/R62
133VU	CTL/SURF/POS	1CT	334/S61

(j)Position access platform
(k)Open access doors 325BL and 313AL
(l)Make certain that selector switch on equipment 31-590-100 is in STANDBY position and that sensitivity selector is in position 0.
(m)Supply equipment with 28VDC.
(n)Remove connector of position transmitter to be adjusted and connect corresponding wire harness between transmitter and equipment connector ; make certain that connectors are correctly mated.

D. Adjustment
(1)Adjustment of rudder position transmitter 10CT with zeroing equipment.
(a)Place equipment 31-590-100 control switch in ON position - AIRCRAFT/28VDC and INT/26V 400 Hz indicator lights come on.
(b)Place selector switch in CONT SURF/POS TRANS position.
(c)Loosen transmitter body attachment nut.
(d)Place sensitivity selector in 30° position.
(e)Rotate transmitter body to position galvanometer pointer to zero.
CAUTION : ROTATE TRANSMITTER GENTLY, USE OF EXCESSIVE FORCE WILL CAUSE BREAKAGE OF THE STOP PIN ON THE SPLINED SHAFT.
(f)Successively increase sensitivity by placing sensitivity selector in positions 15°, 3° and 15', and adjust transmitter to zero at each position. At end of adjustment, pointer must remain in a ±15' range.
(g)Tighten position transmitter attaching clamps and safety with lockwire ; make certain that adjustment remains unchanged.
(h)Return sensitivity selector to zero and selector switch to STANDBY position.
(j)Place zeroing equipment control switch in OFF position.
(k)Disconnect equipment wire harness connector from transmitter and connect aircraft connector.

E. Close-Up
(1)Remove power supply from equipment 31-590-100.
(2)Remove safety clips and tags and close circuit breakers.
(3)Move rudder trim to zero.
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(5)Close access doors.
(6)Remove safety barriers and access platforms.
(7)Shut down pressurization of hydraulic system and disconnect hydraulic ground power cart.
(8)De-energize the aircraft electrical network.

2. Adjustment without Zeroing Equipment

A. Reason for the Job
(1)Adjustment of rudder position transmitter 10 CT.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform - Adjustable to 8 m. (26 ft. 3 in.)
(2)	Digital Voltmeter
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Connect hydraulic ground power unit and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU
Make certain that G pushbutton switch is pressed (in) and legends are off.
(d)Make certain that rudder trim control system is in neutral.
(e)Make certain that flap and slat control lever is in 1st notch position.
(f)Make certain that SPEED BRAKE control lever is in RET notch position, ground spoiler function not preselected.
(g)Using rudder trim control, move rudder to 0.5° left (value read on trim indicator).
(h)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27
133VU	EFCU TRANSDUCERS/NORM SUPPLY/SPLR 6 & 7	7CP	335/R62
133VU	CTL/SURF/POS	1CT	334/S61

(h)Position access platform.
(j)Open access doors 325BL and 313AL.

D. Adjustment
(1)Adjustment of rudder position transmitter 10CT without zeroing equipment.
NOTE : Before connecting or disconnecting System Data Analog Converter 1WV rack, 90VU, open circuit breaker 1CT.
(a)Loosen attaching device and slowly turn transmitter body to set rudder pointers on ECAM scale to zero.
(b)Immobilize transmitter by tightening attaching device and safetying with lockwire.
(c)Remove System Data Analog Converter 1WV, rack 90VU.

(d)Using a 15VAC voltmeter (1/100 reading), measure voltage across contacts as per table below.

TRANSMITTER	CONNECTOR	VAC.A	VAC.B
10CT	AE	9B and 9C	9A and 9C

(e)When VAC.A = VAC.B with a difference ≤ 6/100VAC, transmitter is considered as adjusted.
If necessary, adjust position transmitter as follows :
- loosen screw securing transmitter.
- gradually turn transmitter until VAC.A = VAC.B with a difference ≤ 6/100 VAC.
- tighten screw securing transmitter and safetying with lockwire.
- repeat test to check values.

(f)Connect System Data Analog Converter 1WV, rack 90VU.

(g)Carry out functional test (Ref. Para 3).

R (h)To avoid incorrect pick off installation (180°), check of the
R adjustment using equipment 31-590-100 must be done at next A-check
R (Ref. Para. 1).

E. Close-Up

(1)Remove safety clips and tags and close circuit breakers.

(2)Move rudder trim to zero.

(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(4)Close access doors.

(5)Remove safety barriers and access platforms.

(6)Shut down pressurization of hydraulic system and disconnect hydraulic ground power cart.

(7)De-energize the aircraft electrical network.

3. Functional/Operational Test

A. Reason for the Job

(1)On right ECAM display unit, check correct operation of pointer on FLT CTL page, RUD scale with respect to rudder deflections.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 24-41-00, P. Block 301	AC External Power Control

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)Pressurize hydraulic systems either :

- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU, make certain that G, B and Y pushbutton switches are pressed (in) and legends are off.

(d)On panel 11VU, on ECAM control panel,

- press F/CTL pushbutton switch ; FLT CTL page appears on the right ECAM display unit.

(e)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	ARTF FEEL		Line 101
22VU	RUD/TRIM/SLOW	1CG	201/J27

(f)On RUD TRIM section of panel 408VU,

- make certain RUD TRIM indicator is at zero.

(g)Make certain that flap and slat control lever is in 1st notch position.

(h)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.

(2)Test

ACTION	RESULT
1. Slowly operate LH pedal (LH turn)	
	- On right ECAM display unit, on FLT CTL page, RUD pointer moves to the left mark.

R

ACTION	RESULT
2. Slowly operate RH pedal (RH turn)	
	- On right ECAM display unit, on FLT CTL page, RUD pointer moves to the right mark.
3. Slowly return pedals to neutral position	- RUD pointer returns to zero.

R

(3)Close-up
(a)Shut down pressurization of hydraulic systems. Where applicable, disconnect hydraulic ground power cart.
(b)De-energize the aircraft electrical network. (Ref. 24-41-00, P. Block 301).

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION. BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE. BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 8 m (26 ft.)
B. 98A27901006000	Pin - Rigging, Rudder Control (Qty. 2)
C.	Torque Wrench, 0.37 m.daN (32.7 lbf.in.)
D.	Circuit Breaker Safety Clips
E.	Electrical Connector Protective Caps
F.	Corrosion-Resistant Steel Lockwire, 1.0 mm (0.04 in.) dia
G.	Cotter pin
H.	Warning Notice
J. Material No. 05-027	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-25-00, P. Block 501	Control Surface Position Indicating (Rudder)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 51-75-10, P. Block 801	Repair of Paint Coatings
- 55-33-13, P. Block 401	Trailing Edge Access Panels
- 55-42-13, P. Block 401	Rudder Leading Edge Access Panels

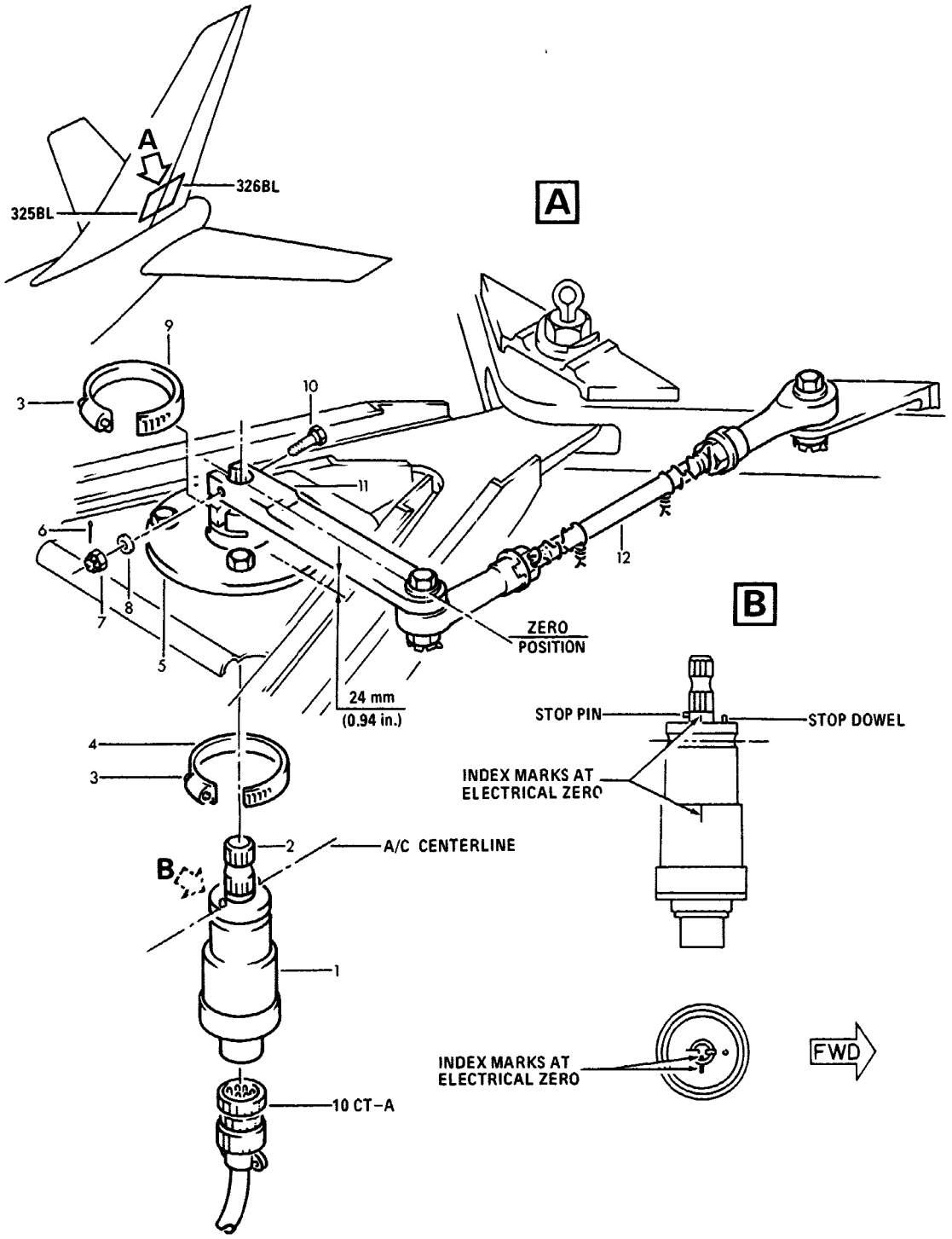
2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Make certain that rudder trim control is set at zero.
(3)Make certain that rudder pedals are set at neutral and install rigging pins P/N 98A27901006000, (Qty. 2) in rudder control bellcranks on control mechanism mounting beam in avionics compartment.
(4)Display warning notice in flight compartment prohibiting operation of flight controls.
(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	CG	201/J27
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64
133VU	CTL/SURF/POS	1CT	334/S61

R (6)Open trailing edge access panel 325BL and leading edge access panel 326DL
(Ref. 55-33-13 and 55-42-13, P. Blocks 401).

B. Removal (Ref. Fig. 401)
(1)Disconnect electrical connector from position transmitter (1) and install protective caps.
(2)Remove cotter pin (6), nut (7), washer (8) and bolt (10).
(3)Cut and remove lockwire from clamps (4, 9), loosen screws (3) and remove clamps (4, 9).
(4)Ease position transmitter (1) downwards out of flange (5), disengaging lever (11) from splined shaft (2).
(5)Secure lever (11) temporarily.



Rudder Position Transmitter
Figure 401

C. Installation (Ref. Fig. 401)
(1)Make certain that rudder neutral position is obtained (rudder trailing edge aligned with alignment mark riveted to tailcone top skin).
(2)Make certain that index marks on splined shaft (2) and position transmitter body are aligned (electrical zero position).
(3)Engage position transmitter (1) into flange (5) so that stop dowel is aligned with A/C centerline, facing forward.
(4)Install clamps (4, 9), but do not fully tighten screws (3), so that position transmitter (1) can be rotated in flange (5).
(5)Connect electrical connector 10CT-A to position transmitter (1).
(6)Remove safety clip and tag, close circuit breaker 1CT and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(7)If necessary, turn splined shaft (2) so that RUD pointer on RH (SYSTEM) CRT, main instrument panel 4VU, is brought to zero position.
(8)Maintain splined shaft (2) in this position, and engage with lever (11) (lever slot aligned with zero index marks on position transmitter).
(9)If necessary, adjust push rod (12).
(10)Install bolt (10), washer (8) and nut (7).
(11)TORQUE nut (7) to between 0.33 and 0.37 m.daN (29.2 and 32.7 lbf.in.) and safety with cotter pin (6).
(12)Move position transmitter (1) as required, in order to obtain dimension of 24 mm (0.94 in.) between flange (5) and lever (11).
(13)Remove safety clips and tags, and close circuit breakers 1CG, 1CB, 2CB.
(14)Remove rigging pins P/N 98A27901006000 (Qty. 2).

D. Adjustment
(1)Carry out adjustment of position transmitter (Ref. 27-25-00, P. Block 501).
(2)Fully tighten screws (3) and safety with lockwire.

E. Test
(1)Carry out functional test of position transmitter (Ref. 27-25-00, P. Block 501).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)On position transmitter, check moisture-removing oil coating (Mat. No. 05-027) for good condition and renew as necessary (Ref. 51-75-10, P. Block 801).
(3)Close leading edge access panel 326BL and trailing edge access panel 325BL (Ref. 55-42-13 and 55-33-13, P. Blocks 401).
(4)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(5)Remove warning notice.
(6)Remove access platform.

ELEVATOR - DESCRIPTION AND OPERATION

1. General
   (Ref. Fig. 001)
   Two elevators are hinged on the trimmable horizontal stabilizer (THS).
   The control system originates at the pilots' stations and consists of two interconnected (coupled) mechanical linkages running along each side of the fuselage (Ref. 27-31).
   In normal operation, the two elevators are controlled together.
   If jamming on one control linkage occurs during flight (takeoff excluded) pitch control is provided by the THS (Ref. 27-41).
   If jamming occurs at takeoff, during rotation, two uncoupling detent bell-cranks, one installed downstream of the Captain's control column and the other in the aft fuselage, between the two elevators, enable the elevator on the other side to be controlled by one or both pilots.
   A pitch uncoupling unit (locking rod plus solenoid), also in the aft fuselage, prevents accidental asymmetrical deflection of the elevators during flight, and allows uncoupling of the right and left control systems during takeoff (Ref. 27-31).
   Artificial feel (Ref. 27-33) is achieved by a dual system, the stiffness of which is dependent on flight conditions.
   Hydraulic actuation is achieved by three mechanical input servo controls per elevator (Ref. 27-34).
   Position of the elevators is indicated on the right ECAM display unit (Ref. 27-35).

2. Interface with Autopilot System (Ref. Chap. 22)
   An autopilot actuator is mounted adjacent to the left elevator. It drives the control via a detent lever which can be overridden by the pilots.
   Dynamometric rods are installed upstream of the tension regulators, for control wheel steering (Ref. Chap. 22).

3. Interface with the ECAM System (Ref. Chap 31)
   A stickshaker (electric motor) is installed on each control column.

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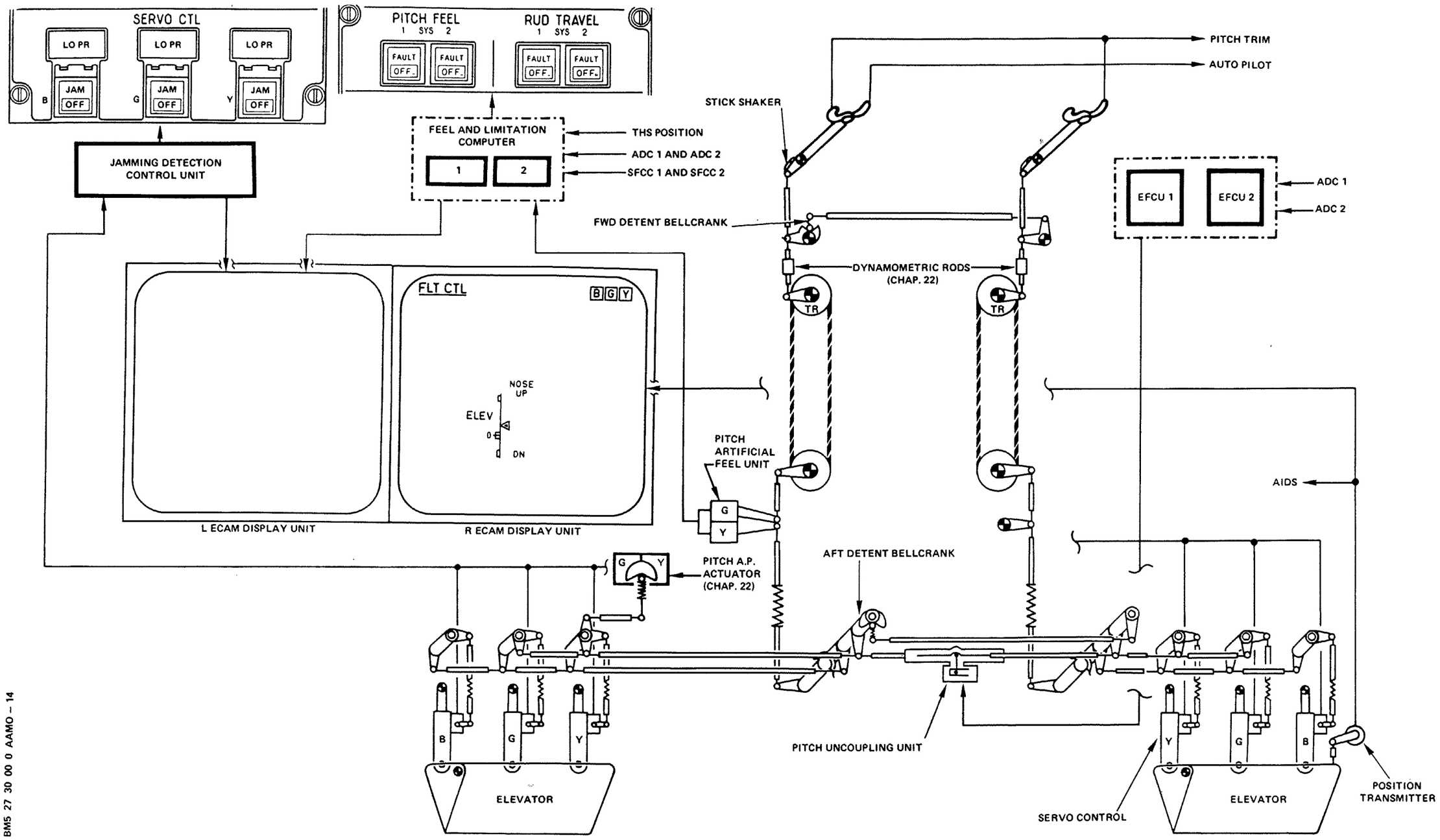

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Elevator
Figure 001

R ELEVATOR (CABLES) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Cables

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Cart - Hydraulic Ground Power Supply
(2)98A27901001000	Pin - Rigging, Elevator Control
(3)98A27307541000	Rigging - Pin Cable Quadrant, Elevator Mechanical Controls
(4)	Access Platform 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
(5)97A27302009000	Locking Equipment - Pitch Trim Control Wheel
R (6)FE214901 or FE101901	Locking Equipment - Cable Tension Regulator
(7)	Lockwire - Corrosion - Resistant Steel dia. 0.8 mm (0.032 in.)
(8)	Circuit Breaker Safety Clips
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 27-31-26, P. Block 401	Artificial Feel Unit Frame
- 27-30-00, P. Block 501	Elevator
- 27-31-16, P. Block 401	Cable Tension Regulator

B. Procedure

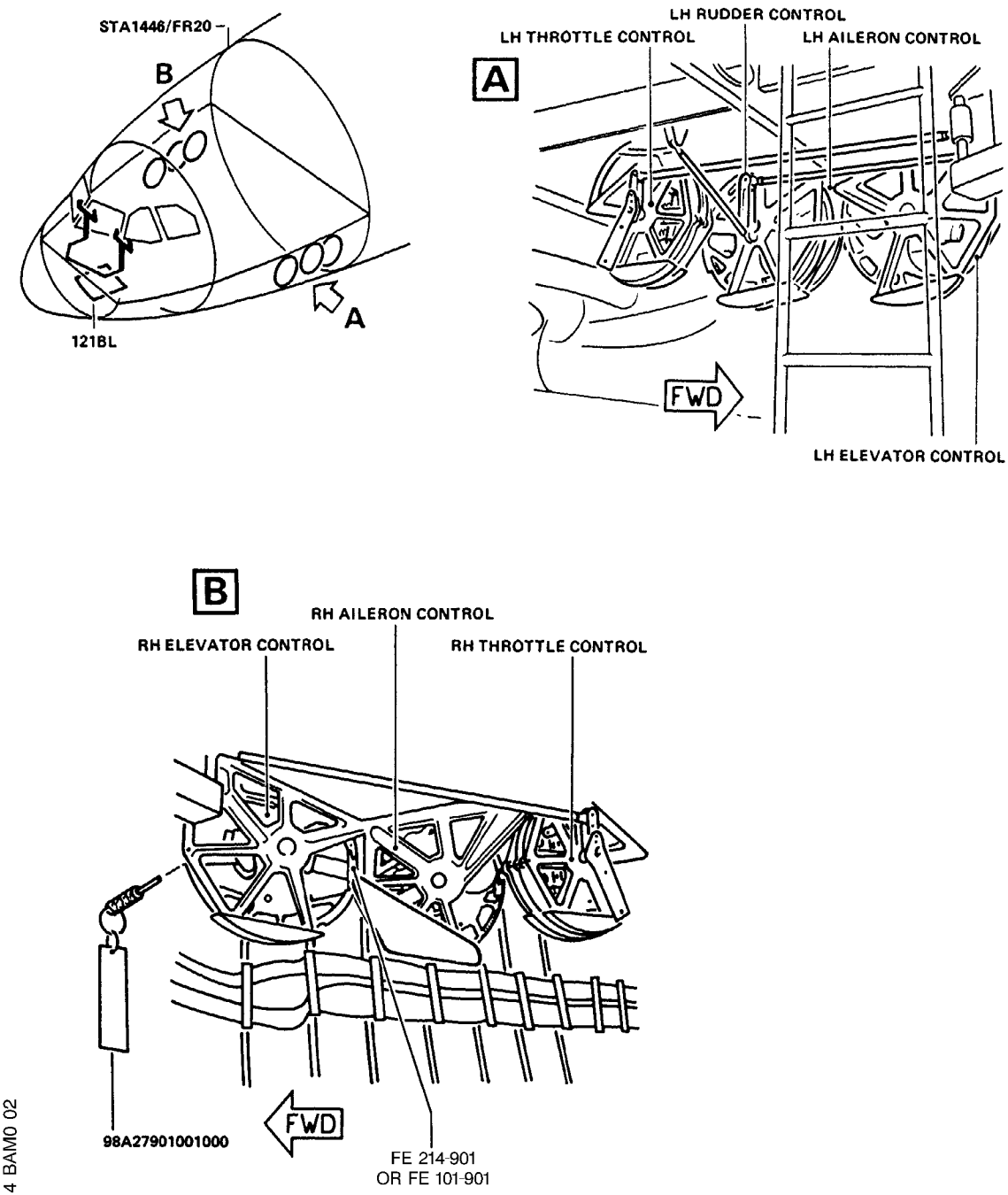
(1)Job set-up

R (Ref. Fig. 401)
(Ref. Fig. 402)

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)Pressurize Green hydraulic system
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
- using Green electric pumps (Ref. 29-21-00, P. Block 301).

(c)Make certain that pitch trim control wheel is at zero. Immobilize with locking equipment 97A27302009000.



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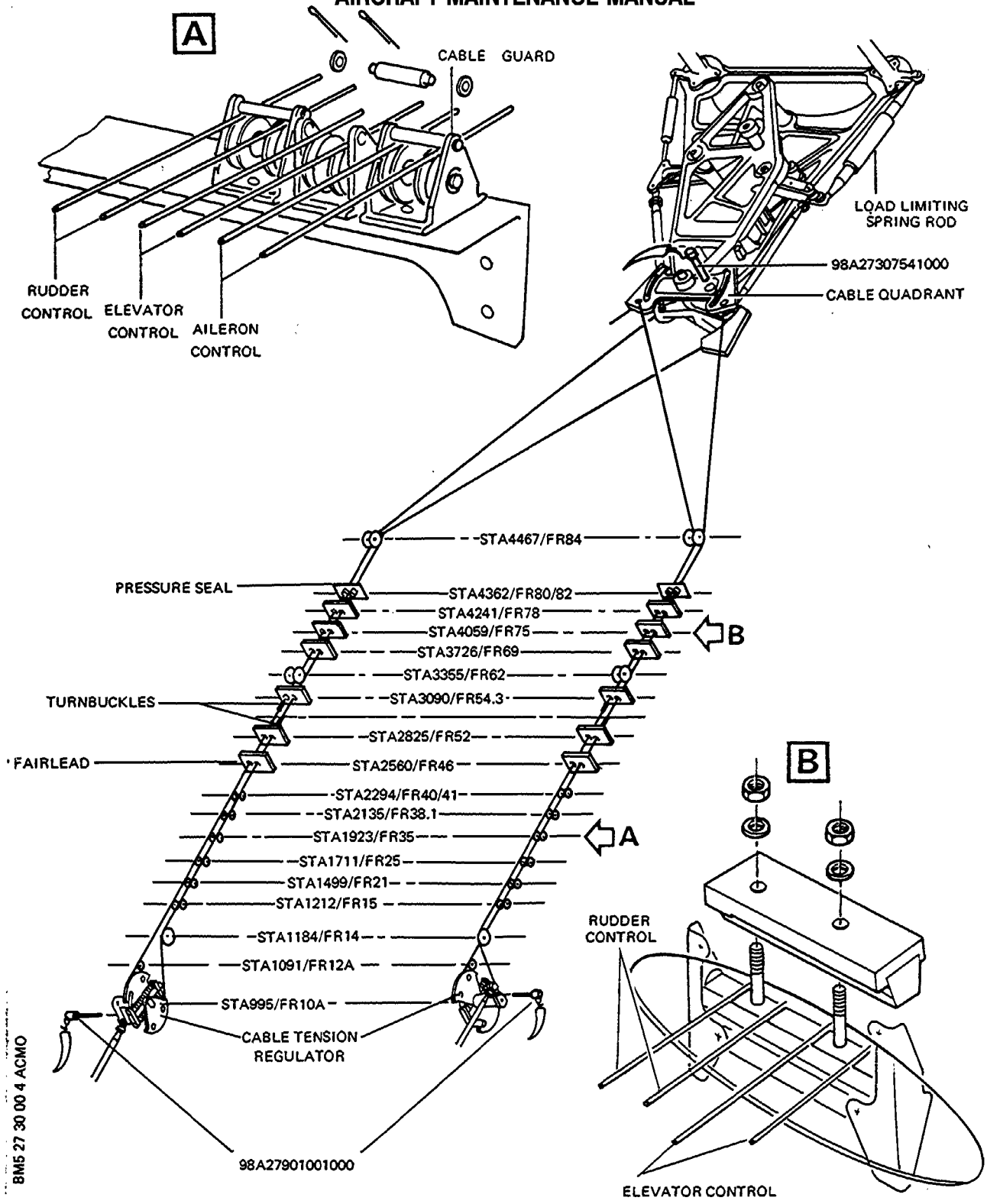
Rigging Pin Installation
Figure 401

R



Routing in Fuselage
Figure 402

(d)Display a warning notice prohibiting operation of control column.
(e)On panel 21VU open, safety and tag circuit breakers FAC1 and FAC2, line 103.
(f)Position access platform. Open access door 312AR.
(g)Remove both load limiting spring rods (Ref. 27-31-26, P. Block 401).
(h)Shut down pressurization of Green hydraulic system.
(j)Open access doors 121BL, 131AZ, 132AZ, 812.
(k)Depending on cable run to be removed, remove floor panels between STA2294/FR40/41 and STA3090/FR54.
(l)Depending on cable run to be removed, remove ceiling panels in forward (and aft) cargo compartment(s), along cable routing.
(m)Place control column in neutral position and immobilize corresponding cable tension regulators with rigging pins 98A27901001000.
(n)Immobilize cable quadrants on artificial feel unit with rigging pin 98A27307541000.
(p)Remove safety clips from turnbuckles and slowly reduce cable tension
R until cable tension regulator locking equipment FE214901 or FE101901,
R immobilizing the two quadrants of the regulator, can be engaged.
R NOTE : For cable tension regulator FE102, use cable tension regulator
R locking equipment FE101901.
R For cable tension regulator FE224, use cable tension regulator
R locking equipment FE214901.
NOTE : As removal/installation of LH and RH cable channels are identical, only removal/installation of LH channel is described.

(2)Removal of forward cable run
(a)Unscrew turnbuckles at ends of forward cable run and disengage end fitting of section to be removed.
(b)Disassemble upper sections of fairleads.
(c)Disassemble cable guards mounted on pulleys; if required disassemble pulleys.
(d)On cable tension regulator, remove cotter pins, nuts, retain washers and bolts from cable guards (Ref. 27-31-16, P. Block 401).
(e)Remove cable end fitting from retaining notch on cable tension regulator quadrant.
(f)Remove forward cable run.

(3)Installation of forward cable run
NOTE : If you cannot adjust the control cables, do a visual inspection on the pulleys and the tension regulator. If they are in good condition, replace the control cables.
(a)Engage cable on pulleys, cable guards and insert cable end fitting in retaining notch on cable tension regulator quadrant.
(b)Position cable guard on cable tension regulator, and install bolts, washers, nuts. Safety with cotter pins (Ref. 27-31-16, P. Block 401).
(c)Install cable guards on pulley mounts or re-assemble pulleys if required.
(d)Assemble upper sections of fairleads. Tighten nuts.
(e)Insert threaded end fittings into turnbuckle barrels and progressively and simultaneously tighten turnbuckles until locking equipment on tension regulator quadrants can be disengaged.
(f)Proceed with cable tension adjustment (Ref. 27-30-00, P. Block 501).

(4)Removal of aft cable run

(Ref. Fig. 403)

(a)Unscrew turnbuckle and disengage end fitting of section to be removed.

(b)Disassemble upper sections of fairleads.

(c)Remove cable guards attached on pulley mounts or remove pulleys if required.

(d)At pressure seal, STA4362/FR80/82

1 Cut lockwire, remove bolts (1). Retain washers (2).

2 Separate flange (4) from flange (3).

NOTE : Flange (3) remains on structure.

3 Remove circlip (6), sleeve (7) and separate the two halves of cable guide (5).

(e)On artificial feel unit, on cable quadrant remove cable end fitting from retaining notch.

(f)Remove cable run. Retain sleeve (7) and flange (4).

(5)Installation of aft cable run

NOTE : If you cannot adjust the control cables, do a visual inspection on the pulleys and the cable quadrant. If they are in good condition, replace the control cables.

(a)Insert cable end fitting in retaining notch on cable quadrant on artificial feel unit.

(b)Engage cable over pulleys.

(c)At pressure seal, STA4362/FR80/82

- Insert cable

CAUTION : DO NOT FORGET TO INSTALL FLANGE (4) AND SLEEVE (7). FLANGE (3) REMAINS ON STRUCTURE. MAKE CERTAIN THAT FLANGE (4) AND SLEEVE (7) ARE CORRECTLY POSITIONED.

(d)Engage cable on cable guards and over pulleys.

(e)Install upper sections of fairleads. Tighten nuts.

(f)Secure cable guards on pulley mounts.

(g)At pressure seals at STA4362/FR80/82.

1 Equip cable with guide cable halves (5) maintained by sleeve (7) and circlip (6).

NOTE : Flange (3) is in position on structure.

2 Install flange (4) and washers (2). Tighten bolts (1). Safety with lockwire.

NOTE : If you install a new aft control cable, cut the aft control cable of the elevator (Ref. 27-30-00, P. Block 501, Para. 3.), before you continue this procedure.

(h)Insert threaded end fitting into turnbuckle barrel and progressively and simultaneously tighten turnbuckles until locking equipment on tension regulator quadrants can be desengaged.

NOTE : Make certain that fairlead ball ends of pressure seals are free to rotate and that cable freely slide in cable pressure seals. If not replace pressure seal by a new one.

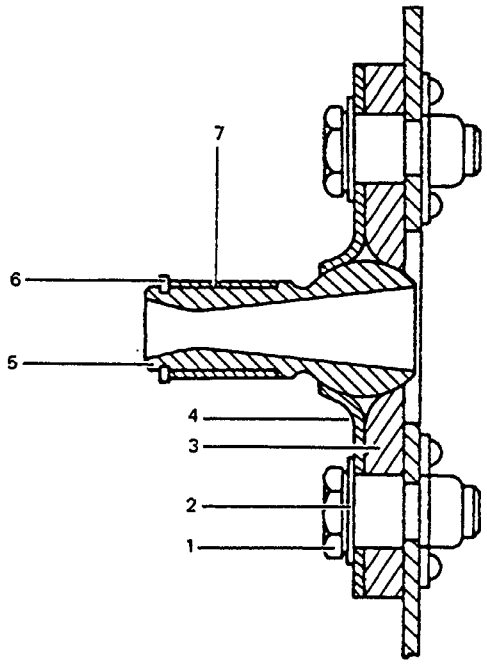
(j)Proceed with cable tension adjustment (Ref. 27-30-00, P. Block 501).

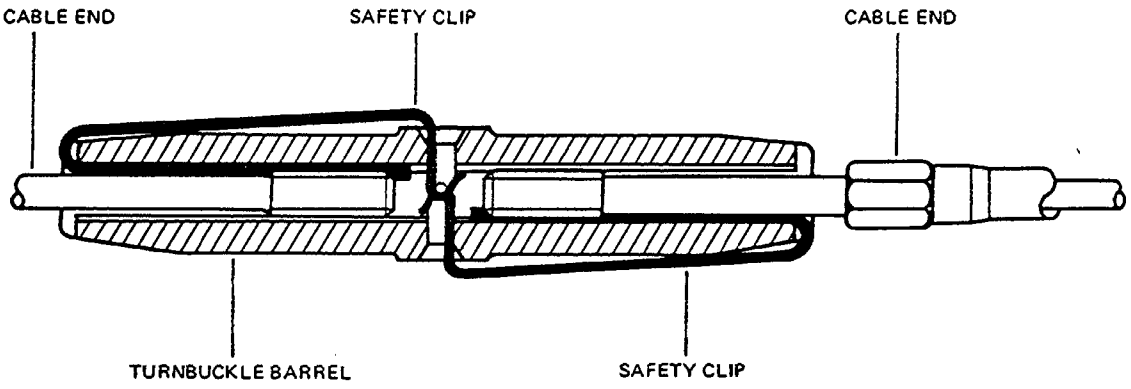
(6)Close-up

(a)Remove rigging pins and equipment.

(b)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(c)Install floor panels and ceiling panels in cargo compartments.





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Pressure Seal and Turnbuckle Safetying
Figure 403

(d)Pressurize Green hydraulic system.
(e)Install the two load limiting spring rods (Ref. 27-31-26, P. Block 401).
(f)Depressurize Green hydraulic system.
(g)Remove access platform.
(h)On panel 21VU, remove safety clips and tag and close circuit breakers, FAC1 and FAC 2, line 103.
(j)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(k)Close access doors.

CAUTION : THIS PROCEDURE MUST BE PERFORMED IN A HANGAR.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Adjustment of Pitch Control Linkage Cable Tension

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Tensiometer
(2)	Thermometer
(3)98A27901001000	Pin - Rigging, Elevator Control
(4)98A27307541000	Rigging - Pin Cable Quadrant, Elevator Mechanical Controls
(5)	Access Platform 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
(6)97A27302009000	Locking Equipment - Pitch Trim Control Wheel
(7)98A27901007000	Pin-Rigging, Elevator Control
(8)72-5-644	Retaining Fork - Dynamometric Rod
(9)0U131281	Pin - Rigging, Artificial Feel Unit, Elevator Mechanical Controls
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-30-00, P. Block 401	Elevator (Cables)
- 27-31-00, P. Block 501	Mechanical Control (Elevators)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization

B. Procedure

(Ref. Fig. 501)

(1)Job set-up

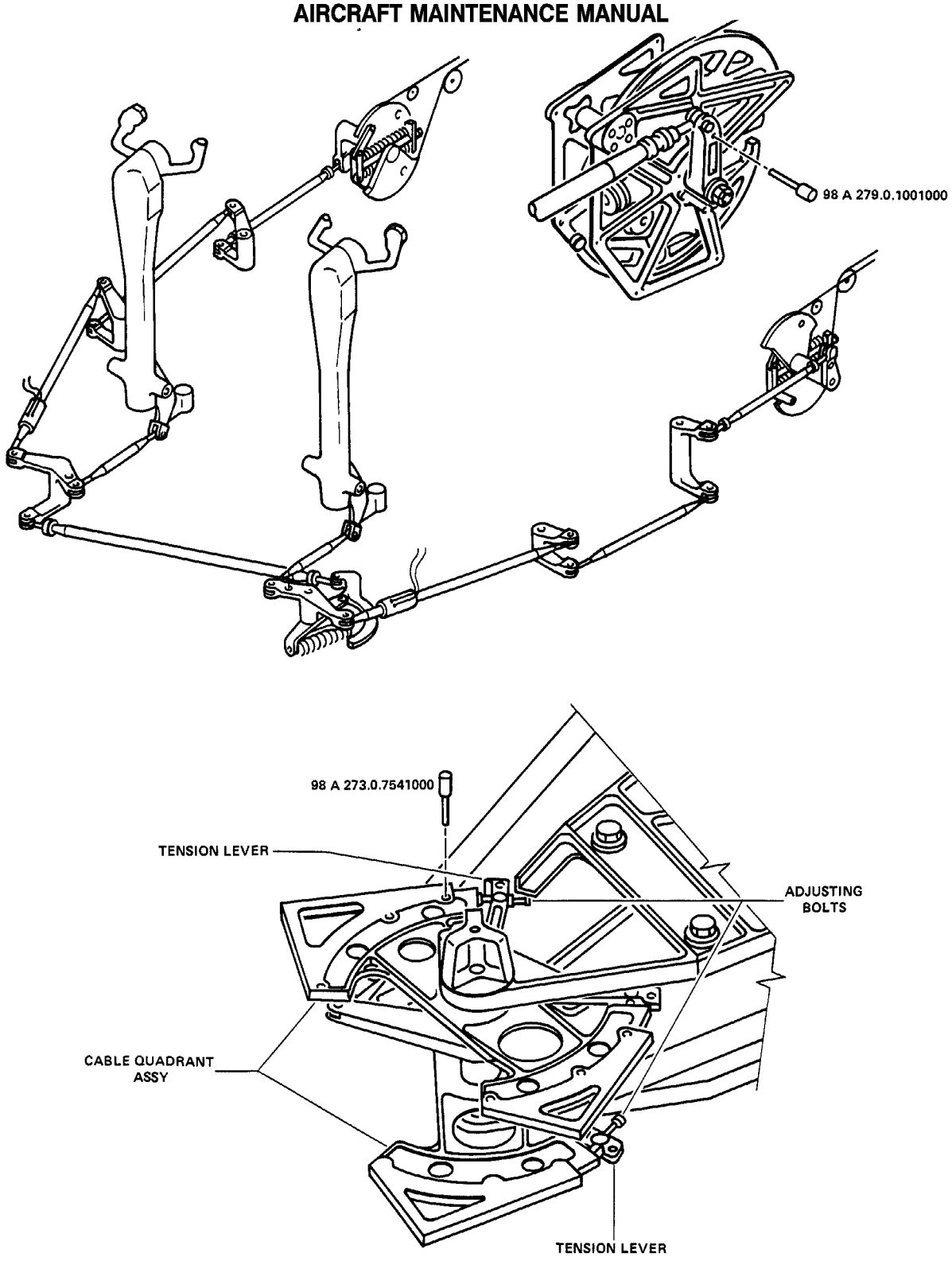
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)Pressurize

Green hydraulic system :

- Using hydraulic ground power cart (Ref. 29-10-00, P. Block 301).

(c)Make certain that pitch trim control wheel is at zero. Install rigging



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Tension Regulator/Artificial Feel Unit
Figure 501

pin OU190360 in THS actuator input lever and immobilize the wheel with locking equipment 97A27302009000.

(d)Display a warning notice prohibiting operation of pitch control.

(e)Open access door 121BL.

(f)Install retaining fork, dynamometric rod 72-5-644 on dynamometric rods and disconnect the interconnecting rod.

(g)Position access platform.

R (h)Open access doors 312AR, 313AL, 334CB, 344CB.

R (j)Disconnect Captain and First Officer channel spring rods (1) and (2)
R from artificial feel unit (Ref. Fig. 502).

(k)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(l)Move pitch control column at least twenty times and let it return to neutral position, check that rigging pin 98A27307541000 can be freely installed.

(m)Make sure that rigging pin OU131281 can be freely inserted in artificial feel unit.

(n)Make certain that rigging pin 98A27307541000 can be freely inserted in cable quadrants. If not, adjust the rod located between pilot cable quadrant and artificial feel output lever.

(p)Remove rigging pins 98A27307541000 and OU131281.

(q)Move control linkage slowly and let it return to neutral position.

(2)Adjustment of cable tension
(Ref. Fig. 503)

(a)Record ambient temperature.

NOTE : Prior to taking readings, make sure that the cable area temperature and the external temperature are the same at ± 2 deg. C (± 3.6 deg. F).

It is necessary to wait three hours before you start the adjustment in order to get a uniform stabilized temperature in the aircraft.

(b)Gradually adjust equally both cable tension until the pointer on the tension regulator is opposite the relevant compensation scale graduation determined against the ambient temperature by means of the cable tension adjustment graph.

NOTE : Adjust the cable tension using cable turnbuckle located under rear cargo ceiling panels (Fr 54.2).

NOTE : Select the nearest graduation value below the lower line of adjustment range (towards letter R).

NOTE : During and after tensioning operation, flex the two cables equally and release sharply. When releasing cables, check that tension regulator locking crossbeam slides freely.

(c)Slowly move pitch control and let it return to neutral position.

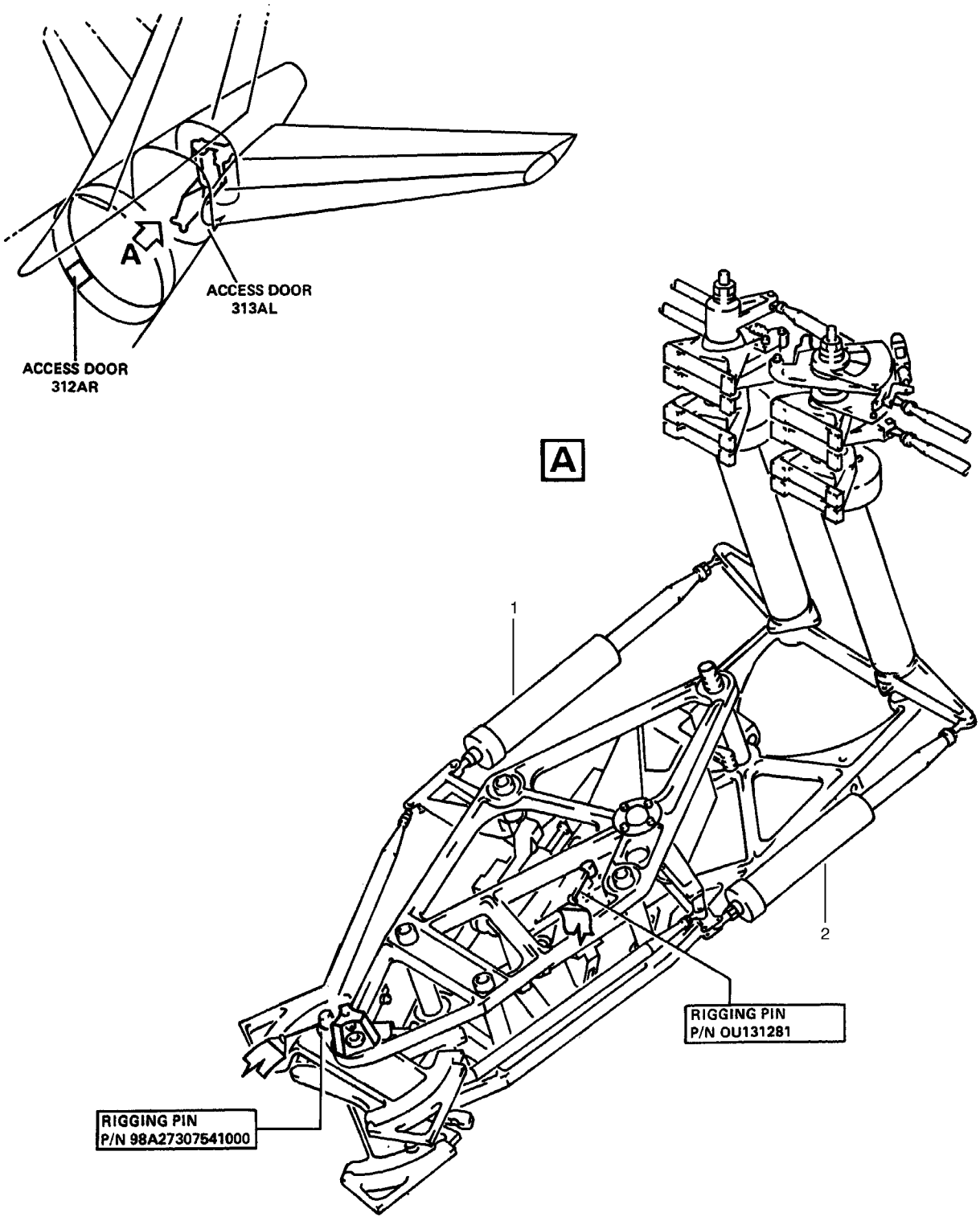
(d)Install rigging pin 98A27307541000 in cable quadrants.

(e)Check that rigging pin 98A27901001000 can be freely inserted in tension regulator input lever. If not, pull by hand on one cable to see which one has to be adjusted to allow rigging pin free insertion. Adjust the corresponding cable to have rigging pin free insertion using tension lever located on cable quadrant.

(f)Remove rigging pin from cable quadrant and tension regulator lever. Slowly move pitch control and let it come back to neutral position.

(g)Install rigging pin 98A27307541000 in cable quadrant.

(h)Check rigging pin 98A27901001000 free insertion in tension regulator



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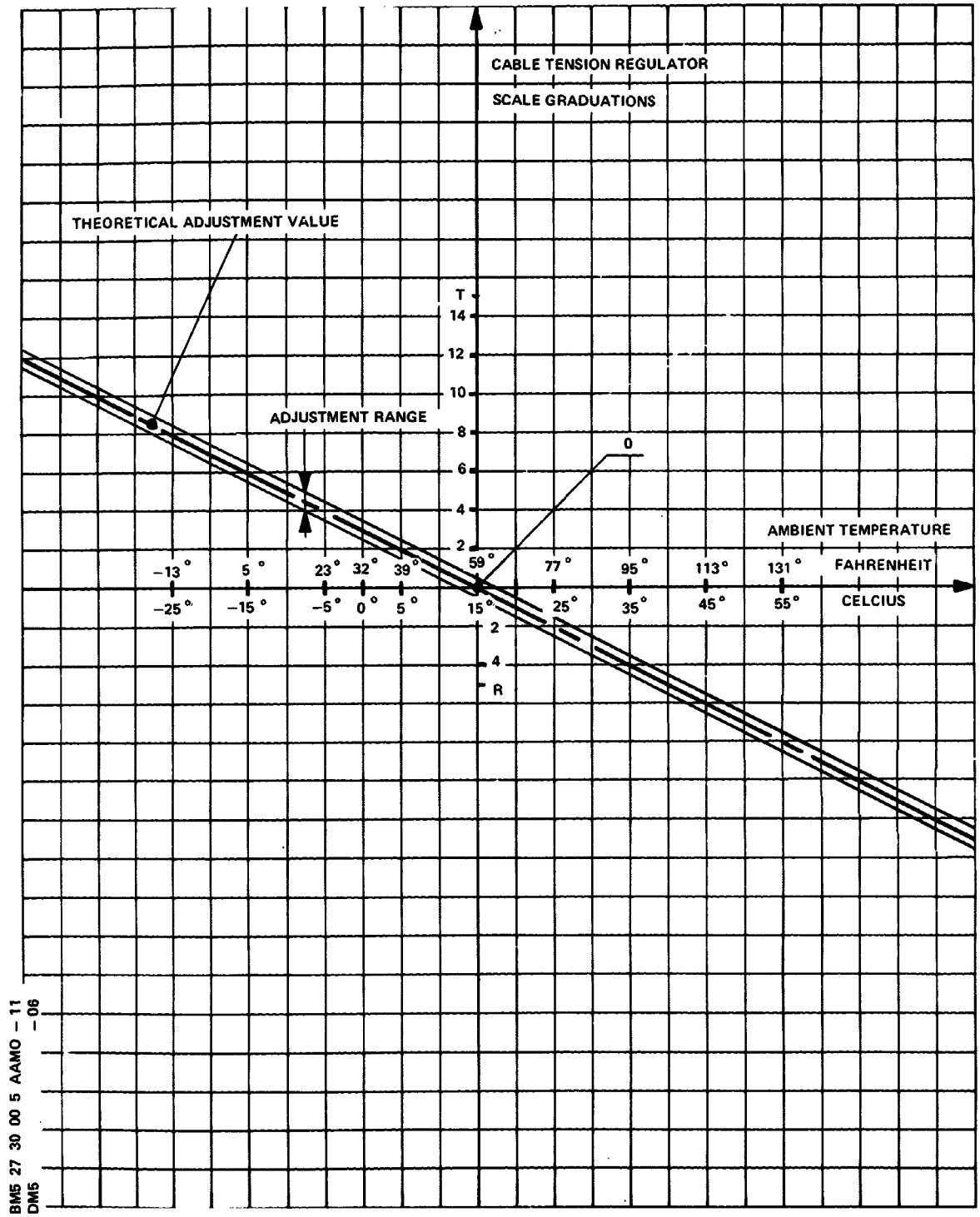
Artificial Feel Unit - Spring Rods Location
Figure 502

R



Pitch Control Cable Tension Adjustment Graph
Figure 503

input lever.
(j)Remove rigging pin 98A27901001000 from tension regulator.
NOTE : During rigging pin removal the tension regulator must not move.
(k)Remove rigging pin 98A27307541000 from cable quadrant.
(l)Perform the same rigging on the other channel.
(m)Remove rigging pins 98A27307541000, 98A27901001000 and 0U190360.
(n)Tighten nut on cable quadrant tension levers adjusting bolts. Refer also to step (2)(e).
(p)If you cannot adjust control cables, do a visual inspection of the elevator mechanical control for correct cable routing.
1 If the visual inspection is correct :
a Make a mark on each front cable.
b Pull cables to the rear until the position of the index agrees with the value found on the graph.
c Keep cables pulled and make a new mark on each front cable then release cables.
d Measure the length between the two marks of each cable :
- if the length is more than 40 mm (1.5748 in.), shorten control cables (Ref. Paragraph 2.).
- if the length is less than 40 mm (1.5748 in.), replace control cables (Ref. 27-30-00, P. Block 401).
(q)Perform adjustment of front part of the control linkage (Ref. 27.31.00, P. Block 501).
(r)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(s)Connect the rods from the artificial feel unit on Captain and First Officer side, if not yet performed.
(t)Remove access platform.

(3)Test
(a)Do the functional test of the elevators (Ref. 27-31-00, P. Block 501).
(b)Check that pointer on L and R cable tension regulators is still opposite the same graduation on compensation scale.

(4)Close-up
(a)Depressurize Green hydraulic system and disconnect hydraulic ground power cart.
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Close access doors.

2. Shortening of the Elevator Cable Length

CAUTION : THIS PROCEDURE MUST BE PERFORMED IN A HANGAR.

WARNING : MAKE SURE THAT THE SAFETY DEVICES AND THE WARNING NOTICES ARE IN POSITION BEFORE YOU START A TASK ON OR NEAR :
- THE FLIGHT CONTROLS
- THE FLIGHT CONTROL SURFACES
- THE LANDING GEAR AND THE RELATED DOORS
- COMPONENTS THAT MOVE.
MOVEMENT OF COMPONENTS CAN KILL OR INJURE PERSONS.

CAUTION : MAKE SURE THAT THE AIRCRAFT IS IN THE TEMPERATURE CONDITIONS (STABLE AMBIENT TEMPERATURE) SPECIFIED IN THE MAINTENANCE CONFIGURATION PARAGRAPH.
CHANGES IN THE TEMPERATURE CAN CAUSE INCORRECT MEASUREMENTS.

A. Reason for the Job

Do this procedure when it is no longer possible to adjust the length of the elevator control cable (turnbuckles and cable quadrant on the stops).

B. Job Set-up Information

(1)Equipment and materials

ITEM	DESIGNATION
(a)	Thermometer
(b)	Warning notice
(c)	Access platform 2.5 m (8 ft. 2 in.)
(d)	Access platform 5.0 m (16 ft. 5 in.)
(e)98A27307541000	Rigging Pin-Cable Quadrant, Elevators Mechanical Control
(f)FE214901	Locking Equipment - Cable Tension Regulator
(g)98A27901001000	Pin - Rigging, Elevator Control
Referenced Procedures	
- 12-33-21, P. Block 301	Ground Air Pre-conditioning
- 24-41-00, P. Block 301	AC External Power Control
- 27-30-00, P. Block 501	Elevators Control
- 29-10-00, P. Block 301	Main Hydraulic Power Pressurization/ Depressurization
- 52-30-00, P. Block 301	Cargo Compartment Doors
	Cable Fabrication Manual

C. Job Set-up

(1)Get access

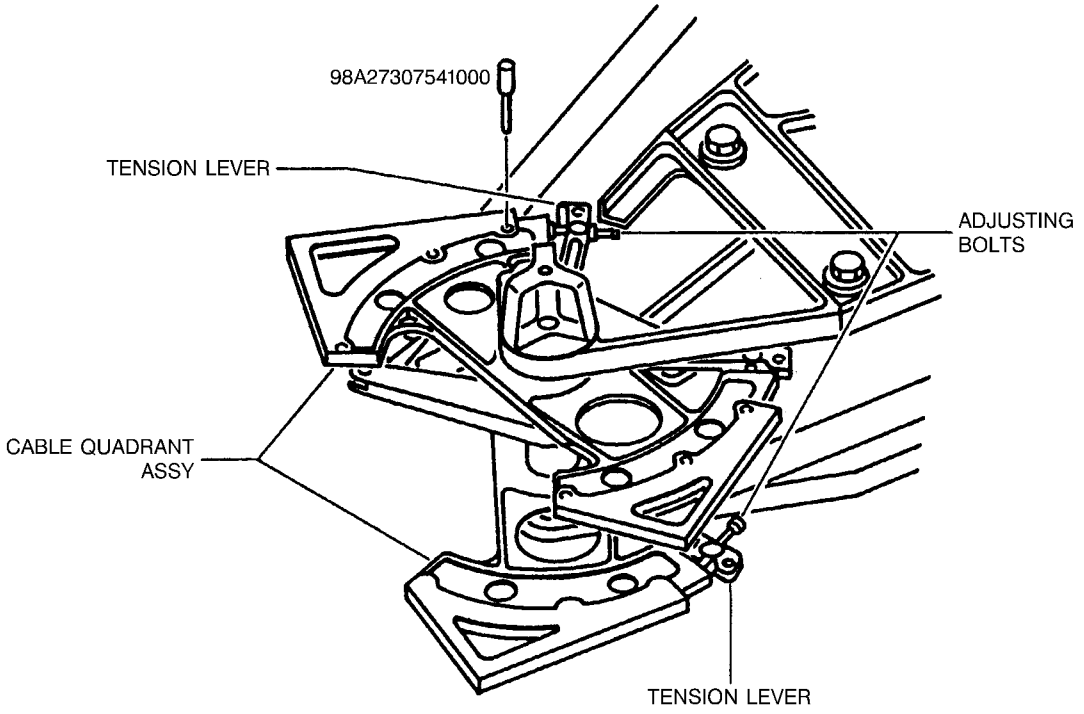
(a)Put the access platform in position below the access door 811.
(b)Open the access door 811.
(c)Put the access platform in position below the access door 312AR.
(d)Open the access door 312AR.
(e)Open the FWD and AFT cargo-compartment doors (Ref. 52-30-00, P. Block 301).
(f)Put the access platform in position at the FWD and AFT cargo-compartment door.
(g)In the zone 151, remove the cargo-compartment ceiling panels 151HC, 152HC.

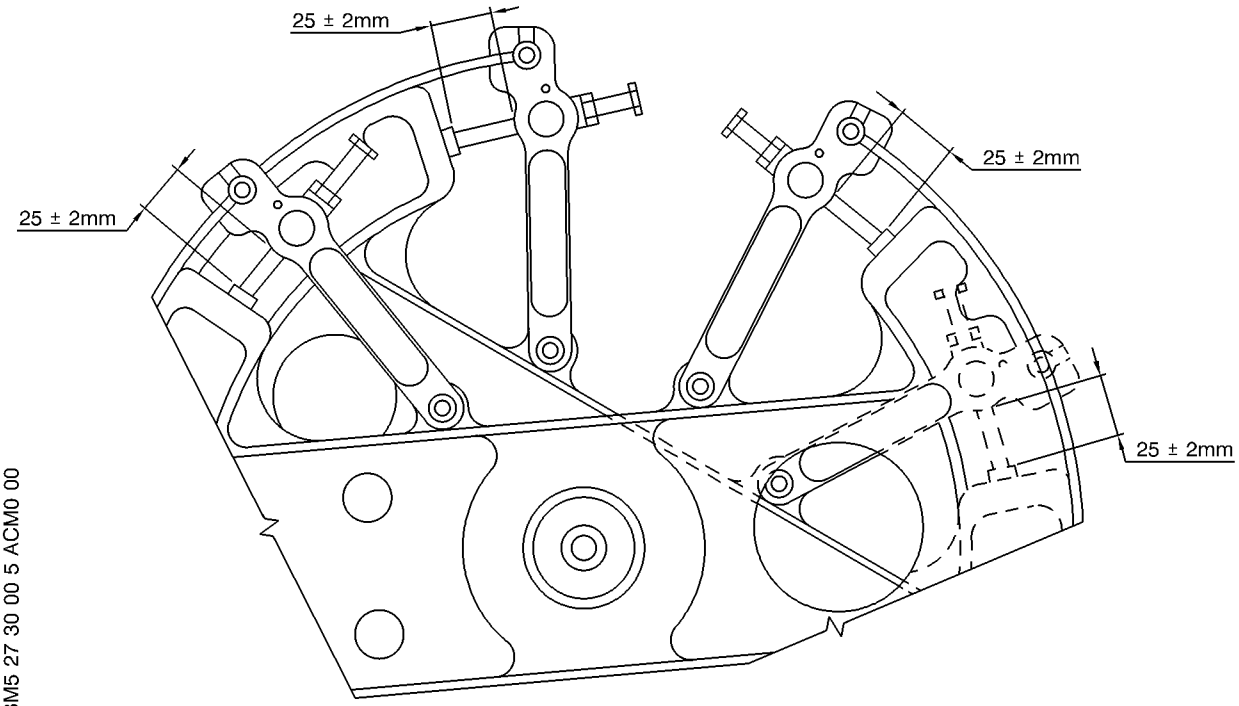
(2)Aircraft maintenance configuration

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b)Make sure that the air conditioning is de-energized (Ref. 12-33-21, P. Block 001).
(c)The aircraft must stay in a hangar for 3 hours at least with all its doors open.
(d)The ambient temperature should be withing a range of between 0 deg. C

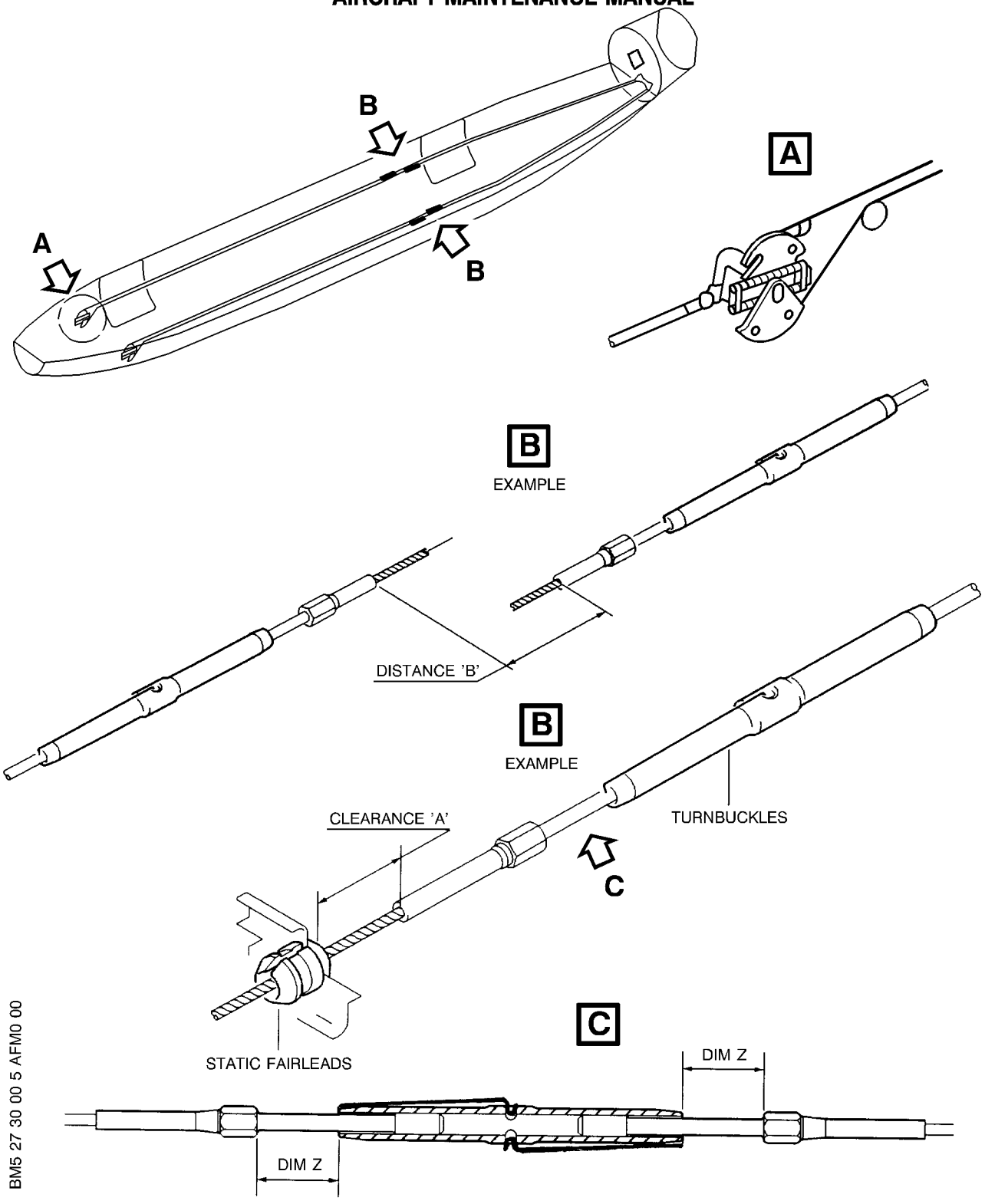
(32.00 deg. F) and 30 deg. C (86.00 deg. F).
NOTE : The cable routing area must not be lit by neon located close to the cable itself.
(e)Energize the aircraft electrical circuits (Ref. 24-41-00, P. Block 301).
(f)Pressurize the Green Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(g)Move the control column to the nose down stop and measure and record the clearances between the 4 turnbuckles and their static fairleads.
(h)Move the control column to the nose up stop and measure and record the clearances between the 4 turnbuckles and their static fairleads.
(j)Operate the control column fully more than ten times and set it to the zero position.
(k)Make sure that the pitch-trim control wheels are in the 'O' position.
(l)Put the warning notice in position in the flight compartment to tell persons not to operate the pitch trim and the control column.
(m)Install the rigging pin 98A27307541000 in the cable quadrant of the artificial feel beam.
(n)In the avionics compartment, insert the rigging pin 98A27901001000 in the elevator cable tension regulator input lever.
(p)Make sure that the locking equipment FE214901 is not installed on the tension regulator.
(q)Make sure that the dimension between the tension lever and the cable quadrant assy is 25 mm ± 2 mm (0.98 in. ± 0.079 in.) (Ref. Fig. 504).
(r)Depressurize the Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(s)De-energize the aircraft electrical circuits (Ref. 24-41-00, P. Block 301).

D. Procedure
(Ref. Fig. 505)
(Ref. Fig. 506)
(1)Shortening of the elevator cable length
(a)Measure and record the cable zone temperature and the external temperature with a thermometer. Make sure that the temperature is the same at +/- 2 deg. C (+/- 3.6 deg. F).
(b)Adjust all four turnbuckles to the dimension 'Z' = 30 mm (1.1811 in.).
(c)Define the value to shorten the cable length.
NOTE : Cut both cables by the same value.
1 Put marks on both cables where the cable routing is straight and nearby the structure.
2 In the fuselage between two static fairleads, pull simultaneously on both cables until the index of the tension regulator reaches the position related to the recorded ambient temperature.
NOTE : Pull the cables downwards to get the necessary force and measure the cable stroke 'Y' on the aircraft axis.
3 Measure with the marks (on the cables and on the structure) the cable stroke 'Y' on each cable to get the necessary cable length.
4 Subtract 40 mm (1.5748 in.) for each cable side from the value measured before.
NOTE : 40 mm (1.5748 in.) is the cable penetration into the terminal

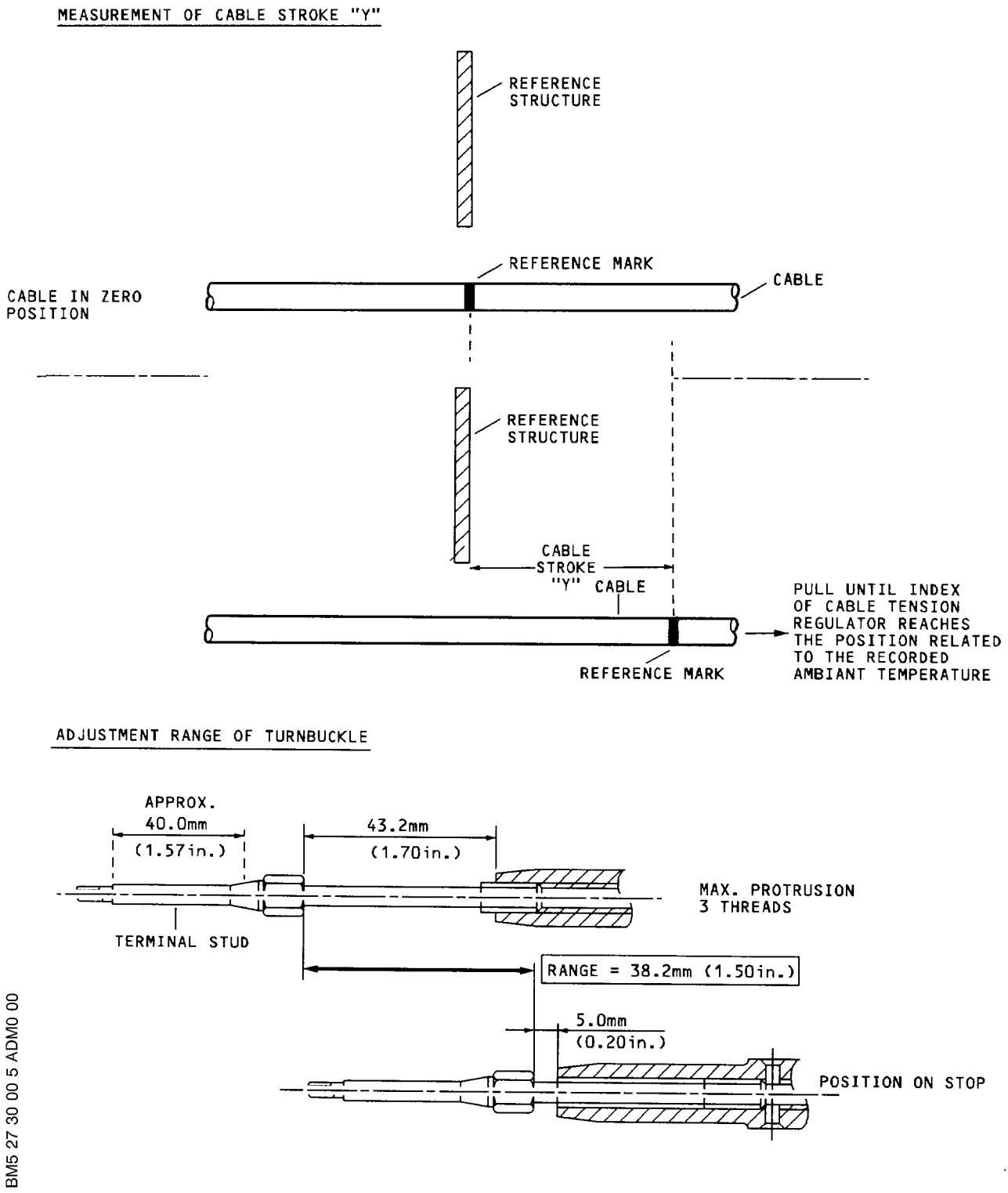




Cable Quadrant Adjustment
Figure 504



Elevator Cable Turnbuckles
Figure 505



Cable Stroke 'Y'
Figure 506

stud of one turnbuckle.

5 The value 'X' (to shorten the cable length) = 'Y' (cable stroke) - 40 mm (1.5748 in.).

Example : Measured cable stroke 'Y' for each cable = 110 mm
Cable penetration into the terminal stud = 40 mm
Value 'X' to shorten the cable length = 110 mm - 40 mm
= 70 mm
Cut both cables on each side by 70 mm (2.7559 in.).

(d)Use the measured clearance between the turnbuckles and the static fairleads to decide to cut the front or the rear cable juntion by the calculated value.

NOTE : After cutting, the clearances 'A' between the turnbuckles and the static fairleads must be minimum 40 mm (1.5748 in.) during full deflection of the elevator control.

NOTE : Cut both cables by the same value.

(e)Install the locking equipment FE214901 on the cable tension regulator.

(f)Install the new turnbuckles on the cable (Ref. Cable Fabrication Manual).

(g)Do the adjustment of the elevator cable tension (Ref. 27-30-00, P. Block 501).

(h)Make sure that the clearance 'A' between the four turnbuckles and the fairleads is minimum 40 mm (1.5748 in.) over the full travel range of the elevator control

R (Ref. Fig. 505).

(j)Make sure that the distance 'B' between the ends of the turnbuckles in each elevator control cable is more than 0 mm (0 in.) in any position

R (Ref. Fig. 505).

(k)Make sure that the turnbuckles are in the adjustment range of 38.2 mm (1.5039 in.)
(Ref. Fig. 506).

E. Close-up

(1)Close access

(a)Make sure that the work area is clean and clear of tools and other items.

(b)In the avionics compartment, remove the rigging pin 98A27901001000 in the elevator cable tension regulator input lever.

(c)Remove the locking equipment FE214901 from the cable tension regulator.

(d)Close the access door 312AR.

(e)Close the access door 811.

(f)Remove the access platform(s).

(g)In the zone 151, install the cargo-compartment ceiling panels 151HC, 152HC.

(h)Close the FWD and AFT cargo-compartment doors (Ref. 52-30-00, P. Block 301).

(j)Remove the ground support and maintenance equipment, the special and standard tools and all other items.

(2)Put the aircraft back to its initial configuration

(a)Remove the rigging pin 98A27307541000 from the cable quadrant of the artificial feel beam.

(b)Remove the warning notice(s).

3. Cutting of a New Aft Control Elevator Cable

CAUTION : THIS PROCEDURE MUST BE PERFORMED IN A HANGAR.

WARNING : MAKE SURE THAT THE SAFETY DEVICES AND THE WARNING NOTICES ARE IN POSITION BEFORE YOU START A TASK ON OR NEAR :
- THE FLIGHT CONTROLS
- THE FLIGHT CONTROL SURFACES
- THE LANDING GEAR AND THE RELATED DOORS
- COMPONENTS THAT MOVE.

WARNING : MAKE SURE THAT THE TRAVEL RANGES OF THE FLIGHT CONTROLS ARE CLEAR. MOVEMENT OF FLIGHT CONTROLS CAN CAUSE INJURY TO PERSONS AND/OR DAMAGE.

CAUTION : MAKE SURE THAT THE AIRCRAFT IS IN THE TEMPERATURE CONDITIONS (STABLE AMBIENT TEMPERATURE) SPECIFIED IN THE MAINTENANCE CONFIGURATION PARAGRAPH.
CHANGES IN THE TEMPERATURE CAN CAUSE INCORRECT MEASUREMENTS.

A. Reason for the Job

Do this procedure when you install a new aft control cable on the elevator.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Thermometer
(2)	Warning Notice
(3)	Access Platform 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
(4)98A27307541000	Rigging-Pin-Cable Quadrant, Elevator Mechanical Controls
(5)FE214901	Locking Equipment - Cable Tension Regulator
(6)98A27901001000	Pin - Rigging, Elevator Control
Referenced Procedures	
- 12-33-21, P. Block 001	Ground Air Pre-conditioning
- 24-41-00, P. Block 301	AC External Power Control
- 27-30-00, P. Block 401	Elevator (Cables)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	Cable Fabrication Manual

C. Procedure

(1)Job set-up

(a)Get access

1 Make sure that access platform is in position below the access door 812.

2 Make sure that the access door 812 is open.

3 Make sure that, in zone 151, the cargo-compartment ceiling panels 151HC, 152HC are removed.

(b)Aircraft maintenance configuration

NOTE : Let the temperature in the aircraft become stable for three hours before you start this procedure.

1 Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

2 Make sure that the air conditioning is de-energized (Ref. 12-33-21, P. Block 001).

3 Make sure that the Green, Blue and Yellow hydraulic systems are depressurized (Ref. 29-10-00, P Block 301).

4 The ambient temperature should be within a range of between 0 deg. C (32 deg. F) and 30 deg. C (86 deg. F).

NOTE : The cable routing area must not be lit by neon located close to the cable itself.

5 Make sure that the pitch/trim control wheels are in the '0' position.

6 Put the warning notice in position in the flight compartment to tell persons not to operate the pitch trim and control column.

7 Make sure that rigging pin 98A27307541000 is in position on the cable quadrant of the artificial feel beam.

8 Make sure that rigging pin 98A27901001000 is in position on the elevator cable tension regulator input lever.

9 Make sure that locking equipment FE214901 is in position on the cable tension regulator.

(Ref. Fig. 507)

(2)Measurement

(a)Measure and record the cable zone temperature and the external temperature with a thermometer. Make sure that the temperature is the same at ± 2 deg. C (± 3.6 deg. F).

(3)Cutting of the aft control cable of the elevator

(a)Pre-stretch cable to a value of 32 daN (71.94 lbf) using tensiometer.

(b)Measure the distance :

- for the right side :
  . between FR54.3 (FR54.2) and the right (left) aft control cable of the elevator.
- for the left side :
  . between FR54.3 (FR54.2) and the right (left) aft control cable of the elevator.

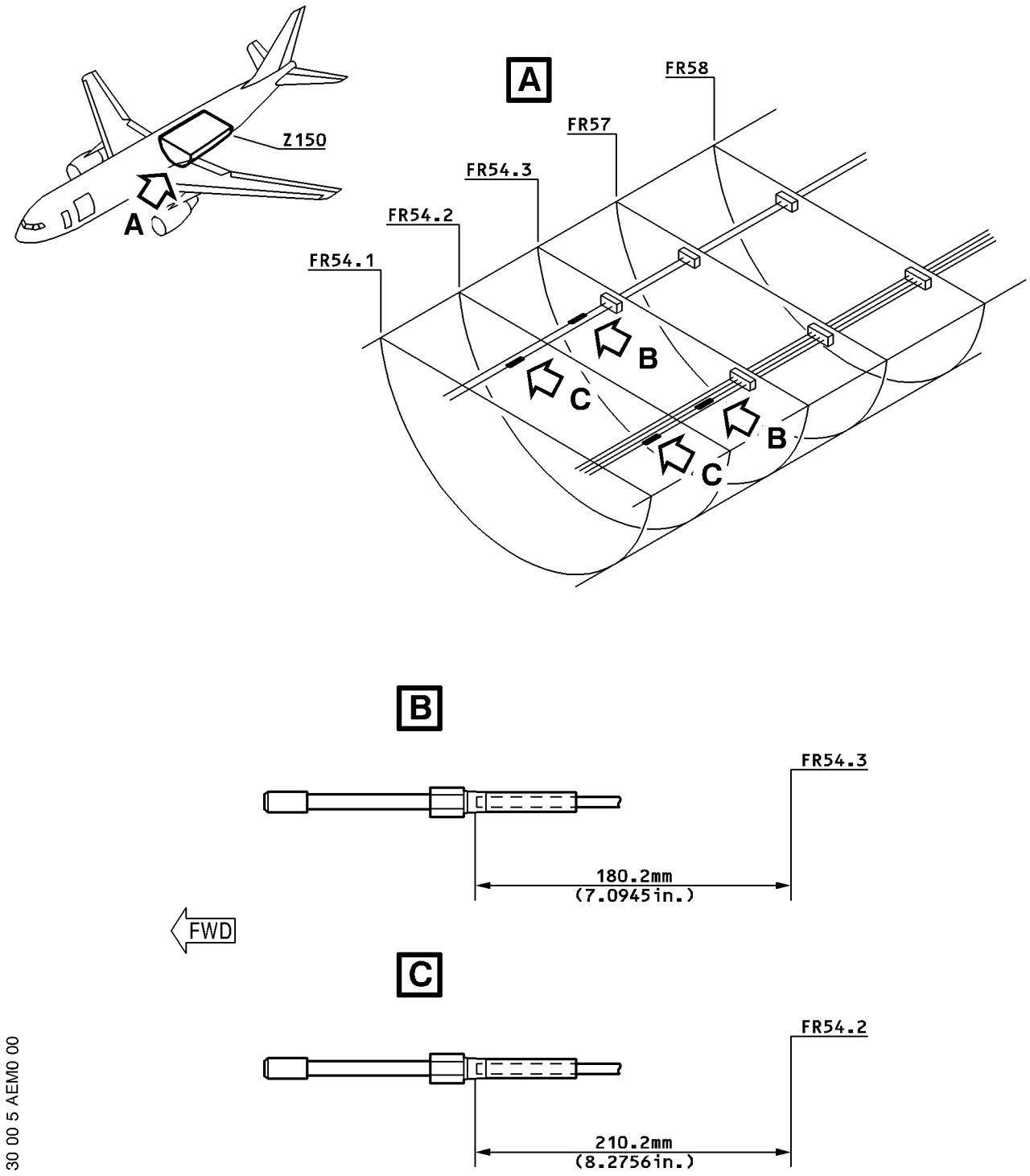
(c)Make a mark on each cable :

- for the right side :
  . for the right cable : at 180.2 mm (7.0944 in.).
  . for the left cable : at 210.2 mm (8.2755 in.).
- for the left side :
  . for the right cable : at 180.2 mm (7.0944 in.).
  . for the left cable : at 210.2 mm (8.2755 in.).

(d)Cut the cables at the marks you did before.

(e)Install a new stud terminal on the cable (Ref. CFM Cable Fabrication Manual).

(f)Continue installation of cables (Ref. 27-30-00, P. Block 401).



BM5 27 30 00 5 AEM0 00

Elevator Cable Cutting Measurement
Figure 507

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

A. Check of Cable Tension on Pitch Control Linkage
R B. General Visual Inspection of Actuators and Hydraulic Lines

2. Equipment and Materials

ITEM	DESIGNATION
(a) 98A27901001000	Pin - Rigging, Elevator Control
(b) 98A27307541000	Rigging Pin - Cable Quadrant, Elevator Mechanical Controls
(c)	Tensiometer
(d)	Thermometer
(e)	Access Platform, 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
(f) 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-30-00, P. Block 501	Elevator
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power

3. Procedure

A. Check of Cable Tension on Pitch Control Linkage
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics racks ventilation is correct.

R (b)Pressurize Green hydraulic system:
R - using ground power supply cart (Ref. 29-10-00, P. Block 301)
R - or using Green electric pumps (Ref. 29-21-00, P. Block 301).
R (c)Make certain that pitch trim control wheel is at zero. Immobilize control wheel with pitch trim control wheel locking equipment 97A27302009000.
R (d)Display a warning notice prohibiting operation of pitch control.
R (e)Open access door 121BL.
R (f)Immobilize L and R pitch cable tension regulators using elevator control rigging pins 98A27901001000.
R (g)Install access platform.
R (h)Open access door 312AR.
R (j)Immobilize cable quadrants on artificial feel beam using cable quadrant rigging pin 98A27307541000.

R (2)Check
R (a)Record ambient temperature.
R NOTE : Prior to taking readings, allow cable tension regulator area temperature to equalize outside temperature.
R (b)Make certain that pointer located on one of the quadrants of the regulator is opposite the relevant compensation scale graduation determined against the ambient temperature by means of the cable tension adjustment graph (Ref. 27-30-00, P. Block 501).
R (c)Position a tensiometer on each of the two cables near tension cable regulators at least 200 mm (7.87 in.) from junction or terminal. Check that tension of each cable is 22 ± 4.1daN (49.50 ± 9.23 lbf).
R (d)After check, remove all rigging pins and items of equipment.
R (e)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (f)Close all access doors. Remove access platform.

R (3)Close-up
R (a)Shut down pressurization of Green hydraulic system. If applicable, disconnect hydraulic ground power cart.
R (b)De-energize the aircraft electrical network and disconnect electrical ground power unit.

R B. General Visual Inspection of Actuators and Hydraulic Lines

(1)Equipment and Materials

ITEM	DESIGNATION
(a)	Access Platform 2 to 12 meters (6 ft. 7 in. to 39 ft. 4 in.)
(b)	Warning Notice Prohibiting Operation of Control Column
Referenced Procedures	
- 20-29-12, P. Block 1	Control Cable Check
- 20-29-14, P. Block 1	Control Cable Rejection Criteria
- 27-31-00, P. Block 601	Mechanical Control
- 55-13-13, P. Block 401	Trailing Edge Access Panels
- 55-22-13, P. Block 401	Leading Edge Access Panels

(2)Procedure

(a)Job set-up

1 Open access doors 121BL, 312AR and 313 AL. Open access panels 334AB, BB,CB - 344AB, BB, CB - 334BT,GB,JB - 344BT,EB,GB,JB (Ref. 55-13-13 and 55-22-13, P. Block 401). Remove cargo compartment ceiling panels located below cable run.

(b)Check

1 At all attachment and hinge fittings, check that:
- all nuts and bolts are fully tightened
- all safetying devices (cotter pins, lock plates, lockwire) are correctly installed.

2 Check that pins, bolts, washers, nuts are in satisfactory condition (no oxidation).

3 Make certain that identification placards are correctly fixed.

4 Make certain that bonding jumpers are in fully satisfactory condition.

5 Check hose clamps for correct diameter, satisfactory condition and correct installation. Check that there are no signs of wear on hoses at any attachment points due to vibration, pressure surges, etc.

6 Check that hoses are correctly positioned:
- that there is no friction with other lines, bulkheads or components
- that hoses are not twisted.

7 Check pipes for deformation, incipient cracks, and dents especially at elbows and at unions connecting pipes to components.

8 Check that there is no possibility of metal parts, clamps or rails causing damage to pipes at attachment points.

9 Make certain that pipe supports and clamps are correctly tightened.

10 Check condition of hydraulic equipment attach fittings and of safety devices.

11 Check for fluid leakage in the areas where hydraulic equipment is installed.

12 Check condition of fork and eye joints on components actuated

mechanically.

R 13 Check condition of pulleys (Ref. 20-29-14, P. Block 1). Check cables for wear (Ref. 20-29-12, P. Block 1).

R 14 Check bellcranks for corrosion or damage.

R 15 Carry out detailed visual inspection of duplex linkage for integrity.

(c)Close-up

1 Install floor panels and close access doors.

MECHANICAL CONTROL AND PITCH UNCOUPLING
DESCRIPTION AND OPERATION

1. General

Nose up and nose down attitudes are controlled by the Captain channel or the First Officer channel either of which operates the two elevators. The two elevators are linked by means of a pitch uncoupling unit.

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)

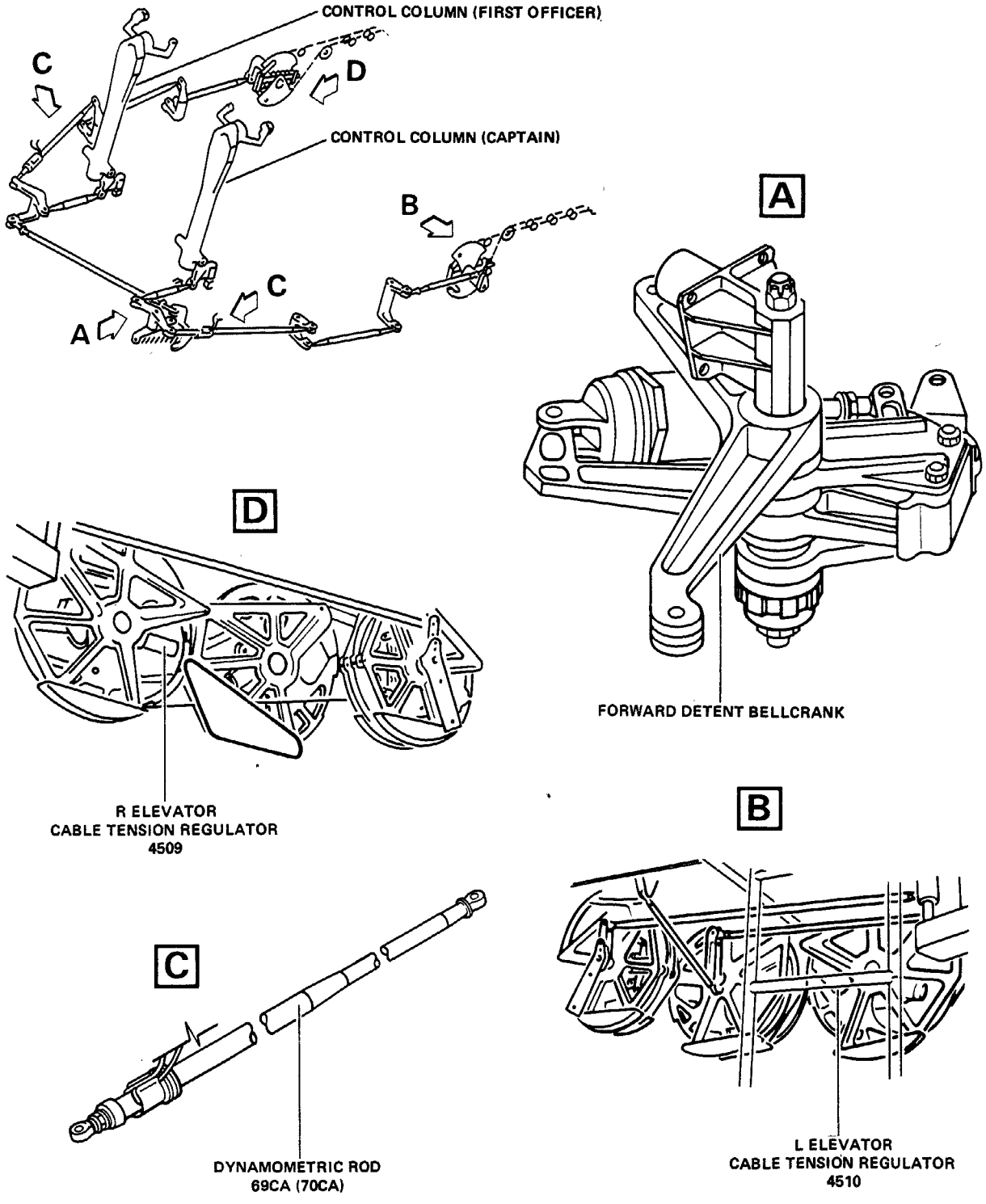
R **ON A/C 101-104,

R Post SB 31-2115 For A/C 101-104,

(Ref. Fig. 003)

**ON A/C ALL

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
274509	TENSION REG-ELEV/CABLE, R		122	121BL	27-31-16
274510	TENSION REG-ELEV/CABLE, L		121	121BL	27-31-16
	CONTROL COLUMN-CAPT		211		27-31-11
	CONTROL COLUMN-F/O		212		27-31-11
	TORQUE TUBE-VERT, WITH UNIVERSAL JOINT, L		311	312AR	27-31-21
	TORQUE TUBE-VERT, WITH UNIVERSAL JOINT, R		312	312AR	27-31-21
	ELEVATOR-L		335		27-31-24
	ELEVATOR-R		345		27-31-24
	FRAME-ARTIFICIAL FEEL UNIT		311	312AR	27-31-26
	BELLCRANK-FORWARD DETENT		121	121BL	27-31-31
	BELLCRANK-AFT DETENT		311	312AR	27-31-32
	PITCH UNCOUPLING UNIT		311	312AR	27-31-33
69CA	ROD-DYNAMOMETRIC		121	121BL	27-31-25
70CA	ROD-DYNAMOMETRIC		122	121BL	27-31-25
4CF	SOLENOID-PITCH UNCOUPLING		311	312AR	27-31-35



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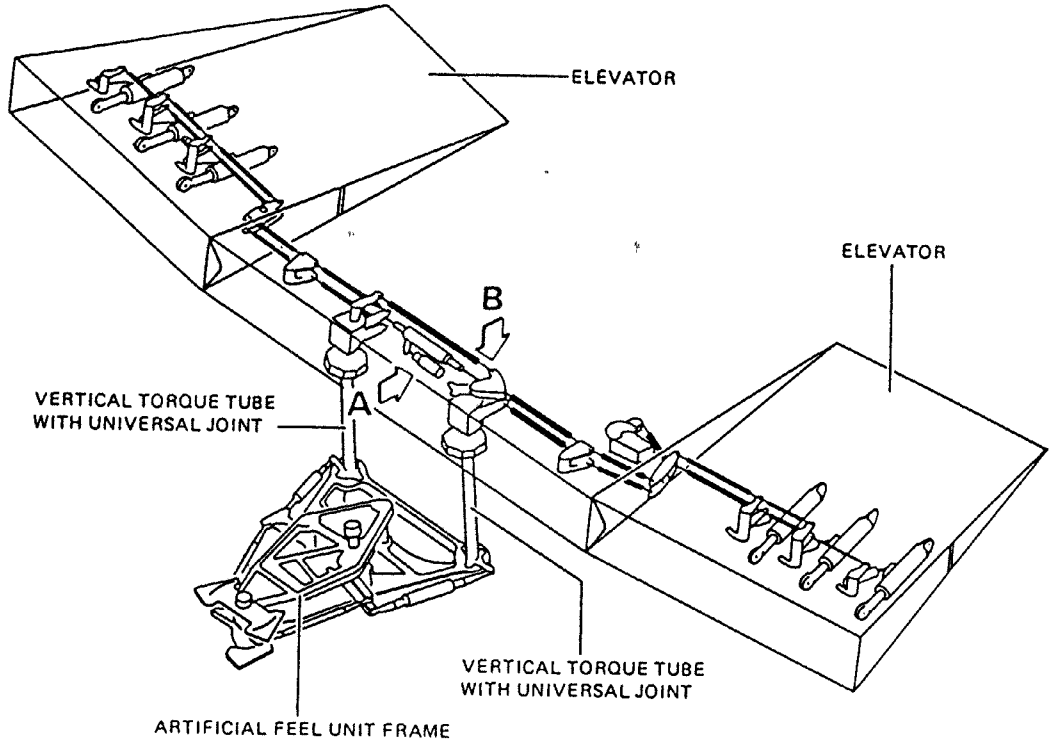
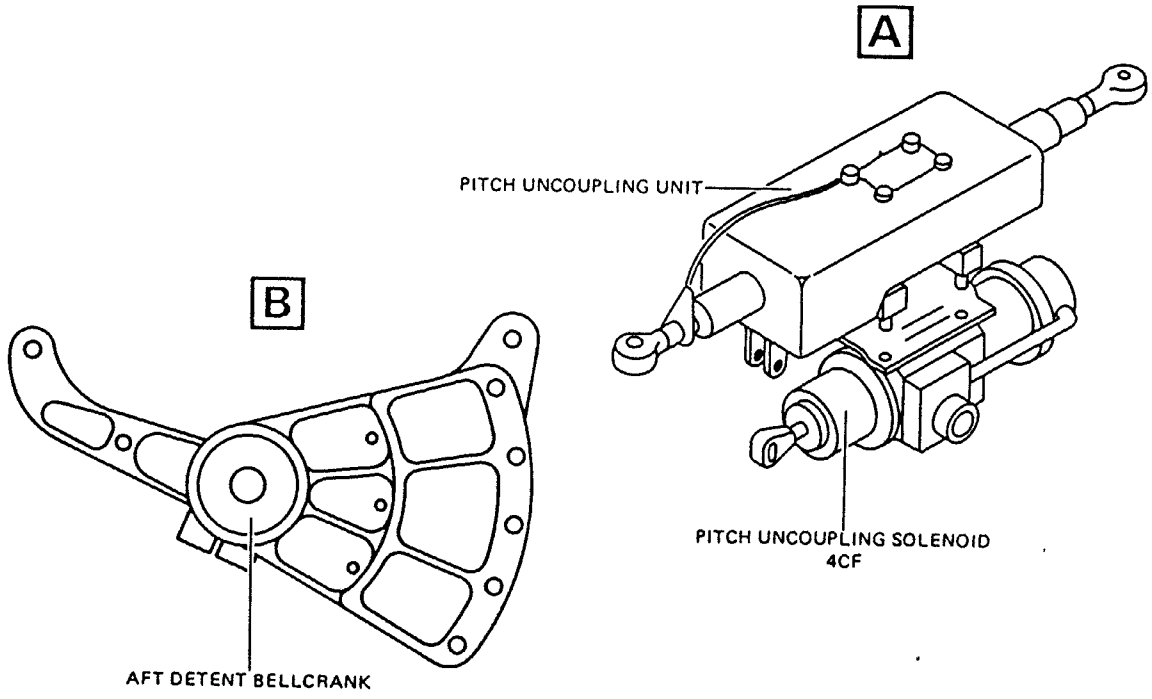
Component Location
Figure 001





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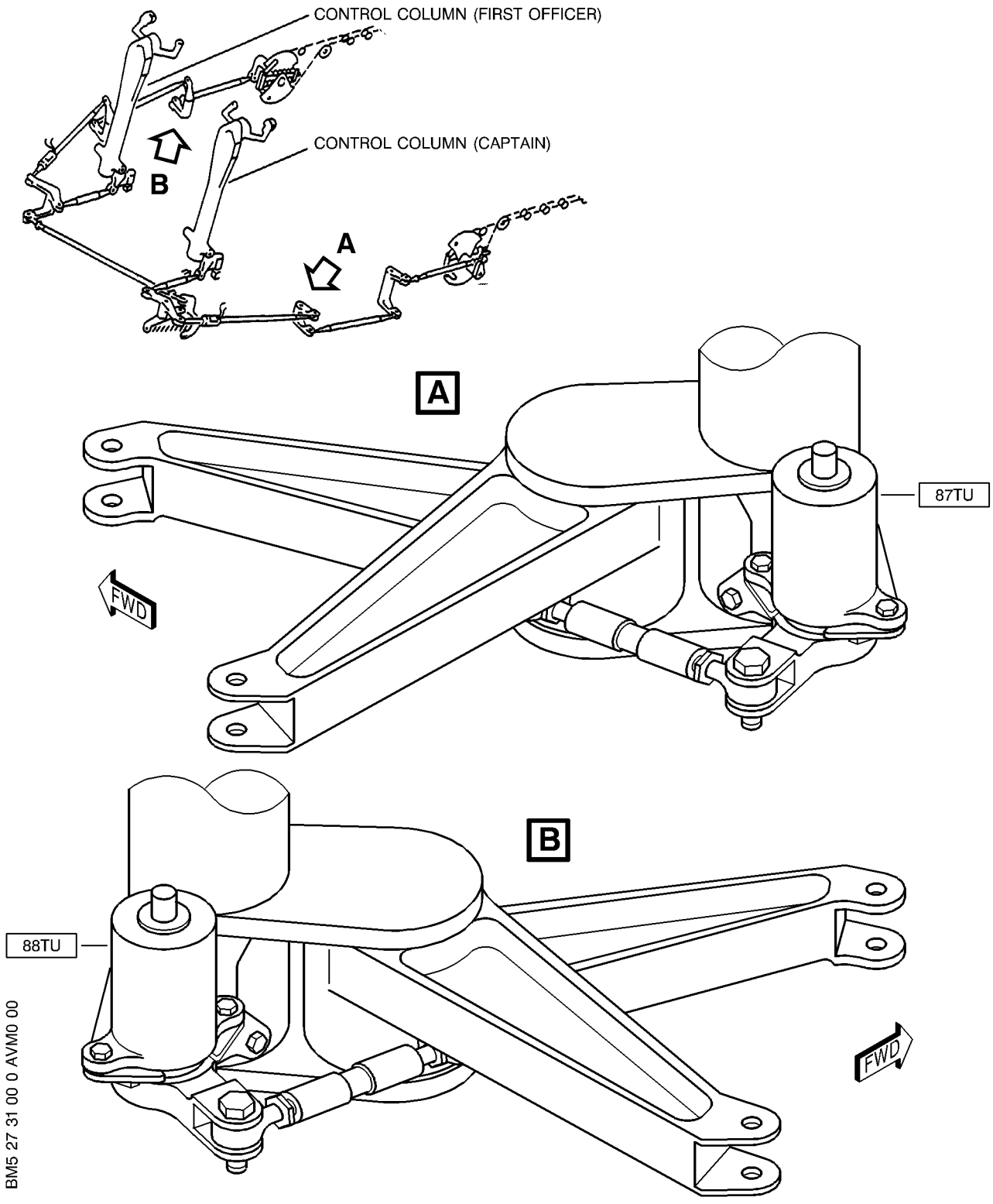
Component Location
Figure 002



Component Location
Figure 003

3. Elevator Mechanical Control

A. General (Ref. Fig. 004)
Each elevator is operated by three mechanically controlled servo controls. The inputs from the control columns are transmitted to the elevators by dual control systems, each system routed along one side of the fuselage. The left and right systems are interconnected at two points by detent bellcranks, one beneath the flight compartment floor, the other between the two elevators.

R **ON A/C 101-104,

R Post SB 31-2115 For A/C 101-104,

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
274509	TENSION REG-ELEV/CABLE, R		122	121BL	27-31-16
274510	TENSION REG-ELEV/CABLE, L		121	121BL	27-31-16
	CONTROL COLUMN-CAPT		211		27-31-11
	CONTROL COLUMN-F/O		212		27-31-11
	TORQUE TUBE-VERT, WITH UNIVERSAL JOINT, L		311	312AR	27-31-21
	TORQUE TUBE-VERT, WITH UNIVERSAL JOINT, R		312	312AR	27-31-21
	ELEVATOR-L		335		27-31-24
	ELEVATOR-R		345		27-31-24
	FRAME-ARTIFICIAL FEEL UNIT		311	312AR	27-31-26
	BELLCRANK-FORWARD DETENT		121	121BL	27-31-31
	BELLCRANK-AFT DETENT		311	312AR	27-31-32
	PITCH UNCOUPLING UNIT		311	312AR	27-31-33
69CA	ROD-DYNAMOMETRIC		121	121BL	27-31-25
70CA	ROD-DYNAMOMETRIC		122	121BL	27-31-25
4CF	SOLENOID-PITCH UNCOUPLING		311	312AR	27-31-35
87TU	XDCR UNIT-PITCH, CAPT		121	312AR	27-31-17
88TU	XDCR UNIT-PITCH, F/O		122	312AR	27-31-17

3. Elevator Mechanical Control

A. General (Ref. Fig. 004)
Each elevator is operated by three mechanically controlled servo controls. The inputs from the control columns are transmitted to the elevators by dual control systems, each system routed along one side of the fuselage. The left and right systems are interconnected at two points by detent bellcranks, one beneath the flight compartment floor, the other between the two elevators.

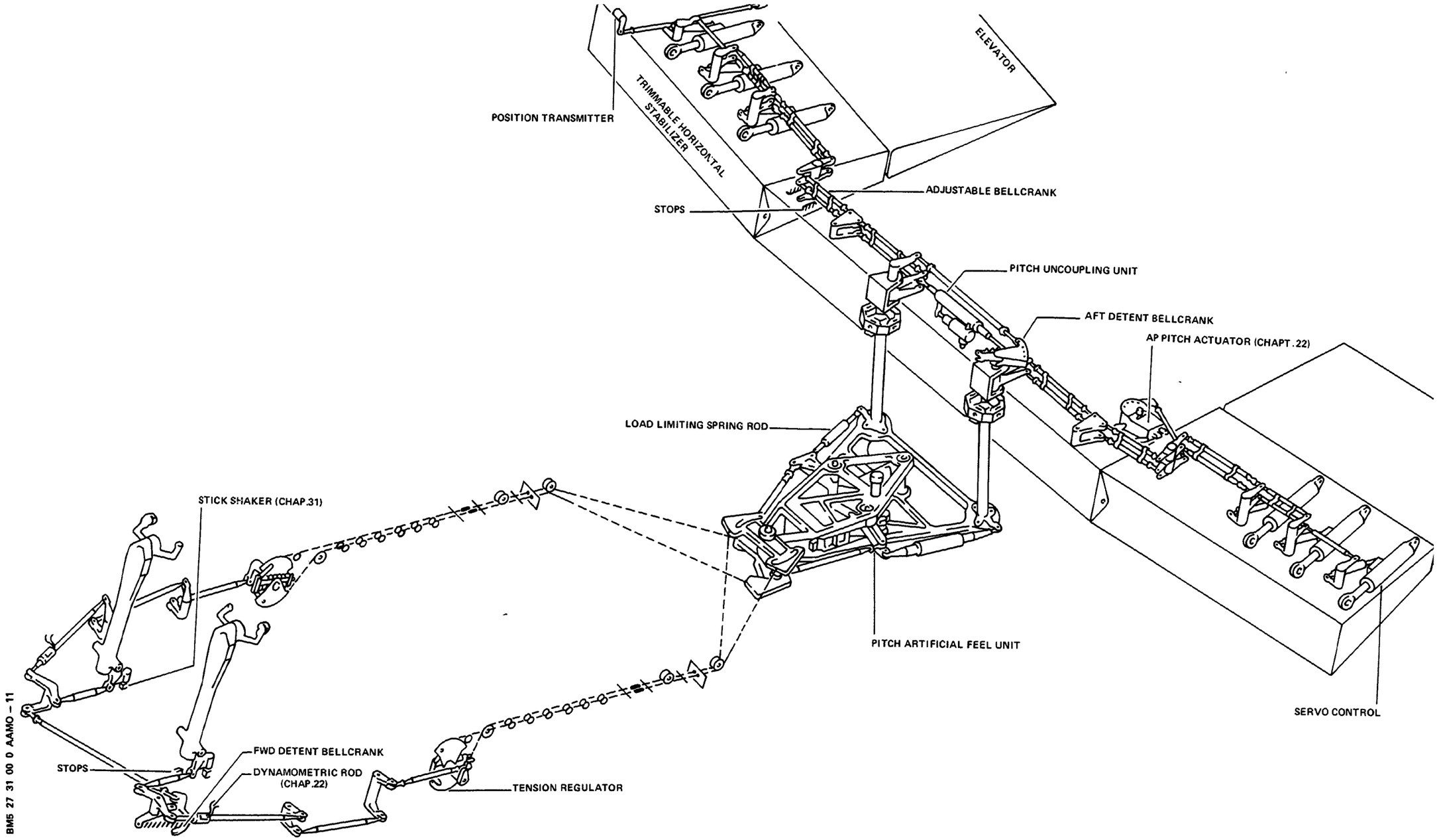
**ON A/C ALL

B. Component Description
(1)Cable tension regulators (Ref. 27-11) maintain a constant tension on the cables (22 ±4.1 daN/49.50 ±9.23 lbf).
(2)The servo control actuating spring rods :
- Provide flexibility in the control for any asymmetrical deflection of the elevators in ground gusts
- Prevent runaway of the control system, if an input lever jams on its servo control body.
(3)A load limiting spring rod in each system, downstream of the artificial feel unit, limits the design loads.
(4)Rods, cables (Ref. 27-11)
Rods : identical to those used in the aileron control system
Cables : identical to those used in the aileron control system
(5)Stops and rigging facilities
Control column stops : control column maximum travel is limited in both directions by non adjustable stops.
Elevator operational stops : maximum input to the servo controls is limited by adjustable stops located at a lever, close to each elevator.
Elevator travel stops : these are the stroke end stops (non adjustable) of the servo controls, never reached in normal operation.
Elevator structural stops, when the servo controls are not installed : the elevators rest on structural down stops, designed for that purpose, which are not able to withstand any load other than the weight of the elevators.
Adjustable levers : the length of a lever close to each elevator is adjustable in order to maintain maximum travel of the elevators within the design limits.
Rigging pins : Rigging pin holes are provided at convenient places to facilitate rigging.

R **ON A/C 101-104,

R Post SB 31-2115 For A/C 101-104,

(6)Pitch transducer units
Under floor, at level of Captain and F/O control columns, a transducer unit is installed on each pitch bellcrank. The transducer units supply



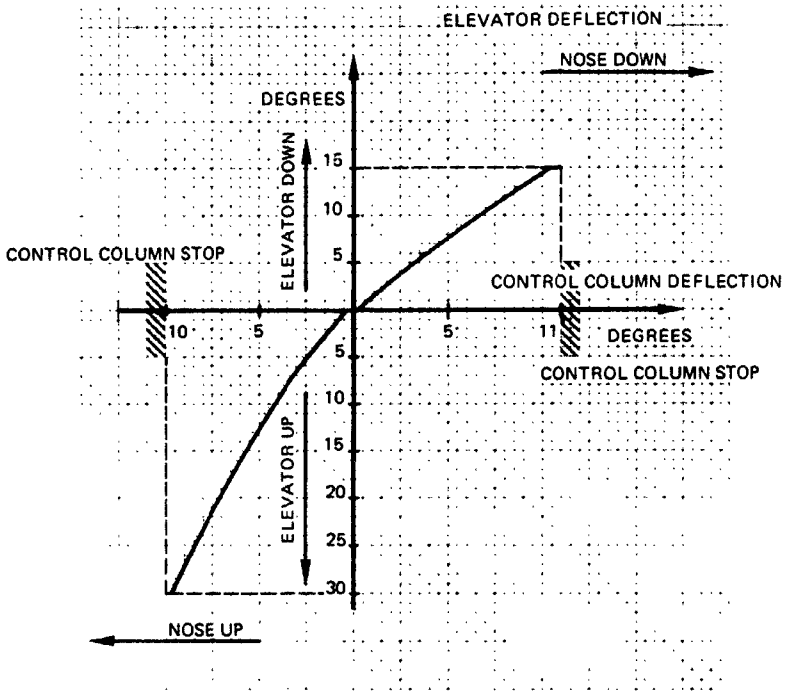
Elevator Mechanical Control
Figure 004

pitch control parameters to the DFDRs.

R **ON A/C ALL

C. Leading Particulars
(1)Control column radius : 799 mm (31.46 in.)
(2)Elevator deflection versus control column deflection (Ref. Fig. 005)
(3)Servo control actuating spring rod characteristics (Ref. Fig. 006)
(4)Load limiting spring rod characteristic (Ref. Fig. 007)

R NOTE : The elevator trailing edge might appear to be low (or
R asymmetrical compared to other side) when observed from the
R ground. This is expected behaviour when the hydraulics are
R switched off and the servo actuators can no longer hold the
R weight of the elevator surface. Observations from the ground
R should not be used as the reference for elevator zero position.



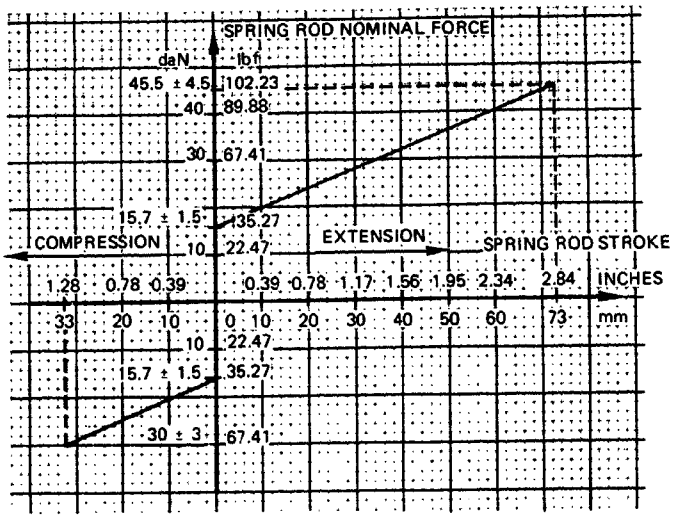
ELEVATOR DEFLECTION VERSUS CONTROL COLUMN DEFLECTION

	NOSE UP	NOSE DOWN
MAXIMUM OPERATIONAL DEFLECTION	$30^{o} \pm 1^{o}$	$15^{o} \pm 1^{o}$
STOPS ON SERVO CONTROLS (MID VALUE)	34^{o}	18.1^{o}
STRUCTURAL STOPS	35^{o}	19.5^{o}

STOPS

BM5 27 31 00 0 ACMO – 09

Elevator Deflection Versus Control Column Deflection - Stops
Figure 005



MAXIMUM FRICTION FORCE	AT THRESHOLD	AT MAXIMUM FORCE	
		EXTENSION	COMPRESSION
WHEN NEW			
INSTALLED ON AIRCRAFT			

DIAGRAM A SERVO CONTROL ACTUATING SPRING ROD CHARACTERISTIC AT ITS APPLICATION POINT

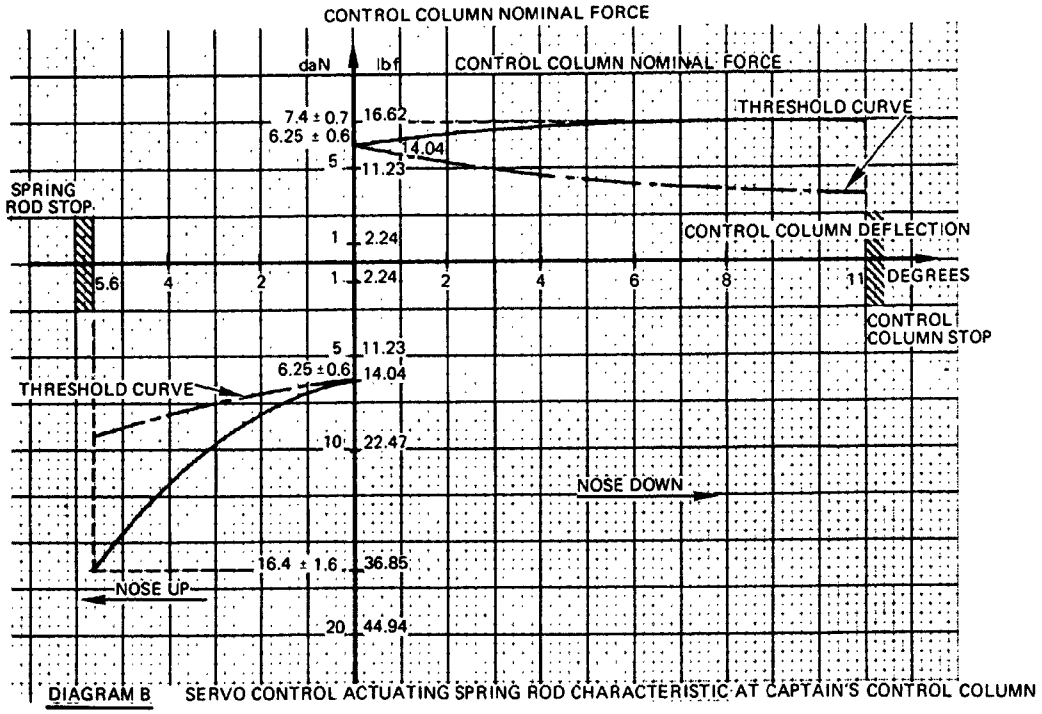
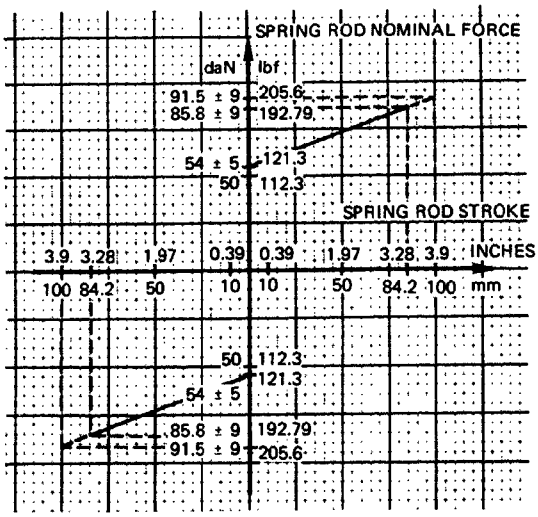


DIAGRAM B SERVO CONTROL ACTUATING SPRING ROD CHARACTERISTIC AT CAPTAIN'S CONTROL COLUMN

BM5 27 31 00 0 AEMO – 09

Servo Control Actuating Spring Rod Characteristic
Figure 006



MAXIMUM FRICTION FORCE	AT THRESHOLD	AT MAXIMUM FORCE
WHEN NEW		
INSTALLED ON AIRCRAFT		

DIAGRAM A LOAD LIMITING SPRING ROD CHARACTERISTIC AT ITS APPLICATION POINT

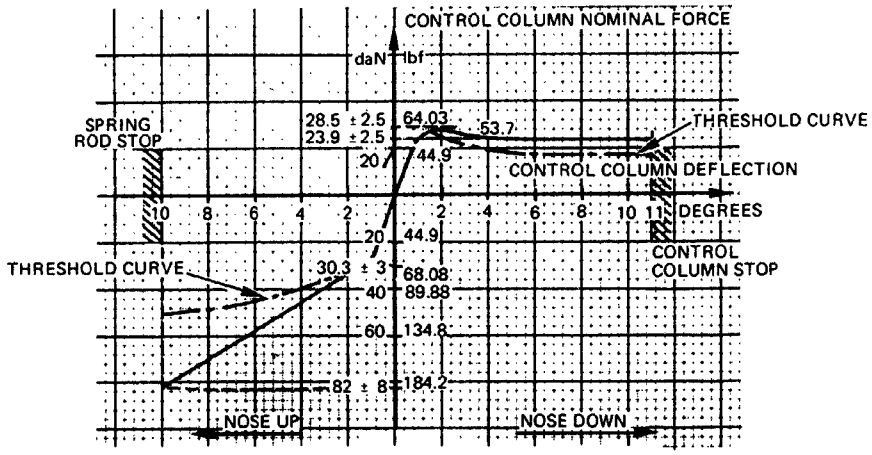


DIAGRAM B LOAD LIMITING SPRING ROD CHARACTERISTIC AT CAPTAIN'S CONTROL COLUMN

BM5 27 31 00 0 AGMO – 09

Load Limiting Spring Rod Characteristic
Figure 007

4. Pitch Uncoupling (Ref. Fig. 004, 008)

A. General

The two elevator control channels can be uncoupled during the takeoff phase in the event of jamming at any point on the control systems, by means of two detent bellcranks, one installed between the control columns, the other between the two elevators.

A pitch uncoupling unit, comprising a solenoid and rod prevents any inadvertent uncoupling of the two elevators after the takeoff phase, in order to prevent asymmetrical loads being applied to the structural attachments of the trimmable horizontal stabilizer.

The uncoupling unit solenoid is energized if airspeed Vc is higher than 30 kts and lower than 195 kts.

B. Component Description

(1)Solenoid

The solenoid includes the following components :

- A low resistance draw coil, allowing high intensity current to provide a high draw force when the coil is energized.
- A high resistance holding coil allowing low intensity current to provide permanent operation capability of the solenoid.
- Two end of stroke switches, one for direct draw coil energization, one for test purposes.
- A return spring, to lock the rod when the solenoid is de-energized.

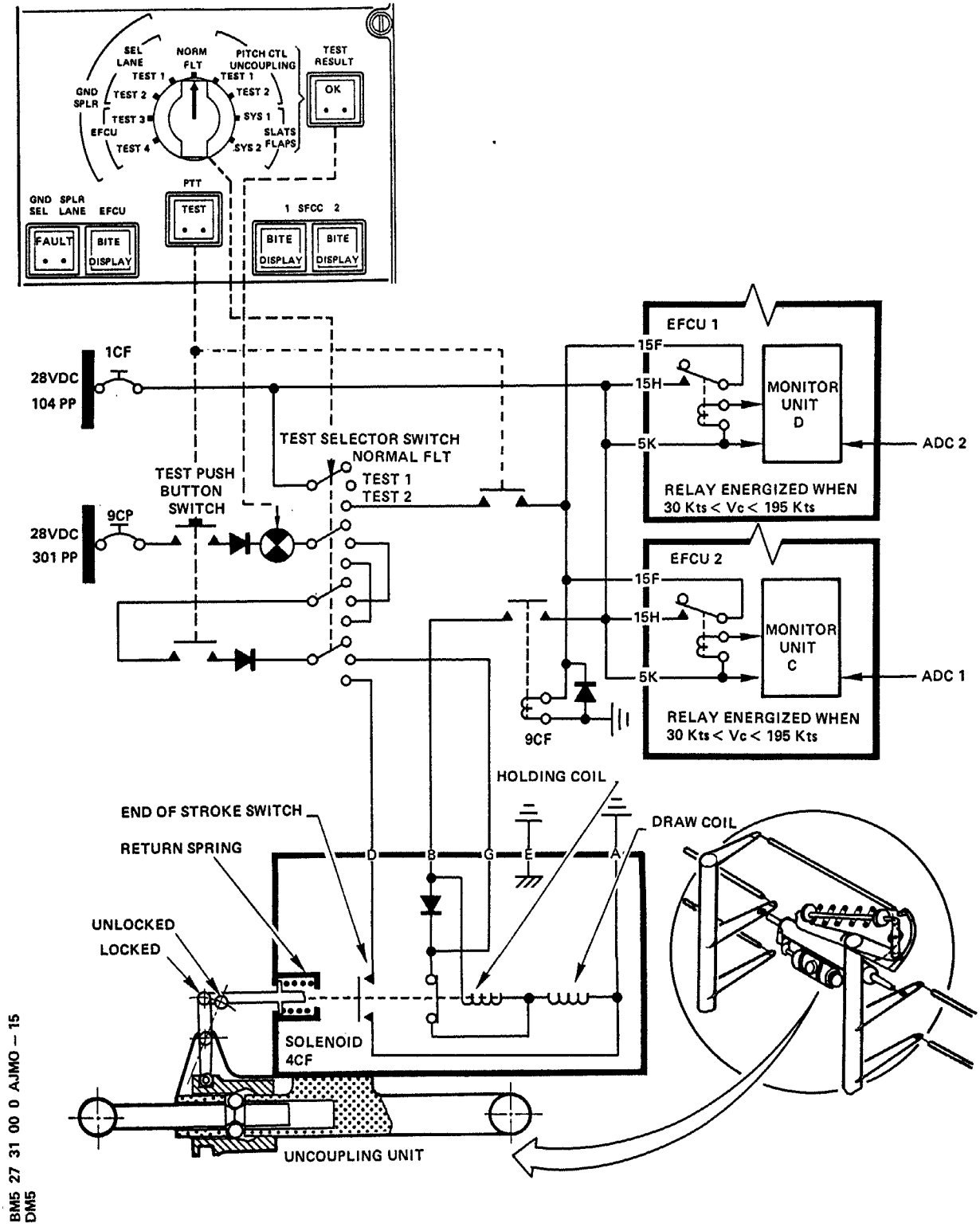
(2)Solenoid control

The solenoid is energized by contactor 9CF. Power is initially applied to the draw coil directly through a diode and an end of stroke switch (providing continuity when the solenoid is not energized).

When the solenoid reaches its end of stroke position the switch opens and voltage is then applied to the two coils in series.

The contactor coil is controlled by EFCU 1 (monitor unit D receiving data from ADC 2) in parallel with EFCU 2 (monitor unit C receiving data from ADC 1).

NOTE : The lower limit of 30 kts (minimum speed for which a Vc value can be obtained from the ADCs), has been introduced to prevent permanent energization of the solenoid and power contactor coil when the aircraft electrical network is energized on the ground.



Pitch Uncoupling
Figure 008

C. Maintenance

The electrical circuits must be tested periodically on the ground by means of a test selector switch and associated pushbutton switch on the **FLIGHT CONTROLS** maintenance panel.

The first test position, **PITCH CTL UNCOUPLING/TEST 1**, is used to check the solenoid in the de-energized position.

In the second test position, **PITCH CTL UNCOUPLING/TEST 2**, the contactor coil (**9CF**) is energized by the selector switch and the solenoid is checked in the energized position.

D. Leading Particulars

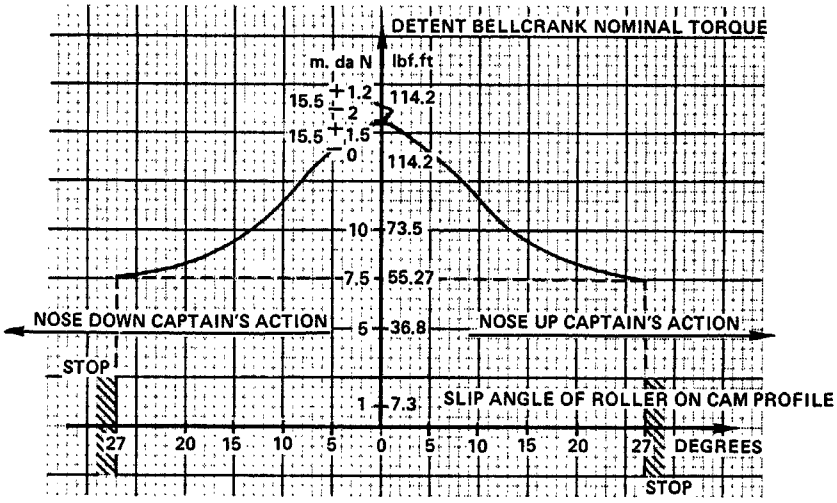
(1)Solenoid

Draw force	: 1.2 kg (2.65 lb) minimum (24V on ground at 20°C/68°F)
Travel	: 10 ± 0.15 mm (0.39 ± 0.006 in.)
Draw coil	: 6 ohms ± 5 %
Holding coil	: 40 ohms ± 5 %
Operating time	: 30 ms (time required to go from de-energized position to the end of stroke position).

(2)Forward detent bellcrank characteristic (Ref. Fig. 009)

(3)Aft detent bellcrank characteristic (Ref. Fig. 010)

(4)Control column force after jamming of rear left linkage (Ref. Fig. 011)



MAXIMUM FRICTION TORQUE	AT THRESHOLD	AT MAXIMUM TORQUE
WHEN NEW		
INSTALLED ON AIRCRAFT		

DIAGRAM A FORWARD DETENT BELLCRANK CHARACTERISTIC AT ITS APPLICATION POINT

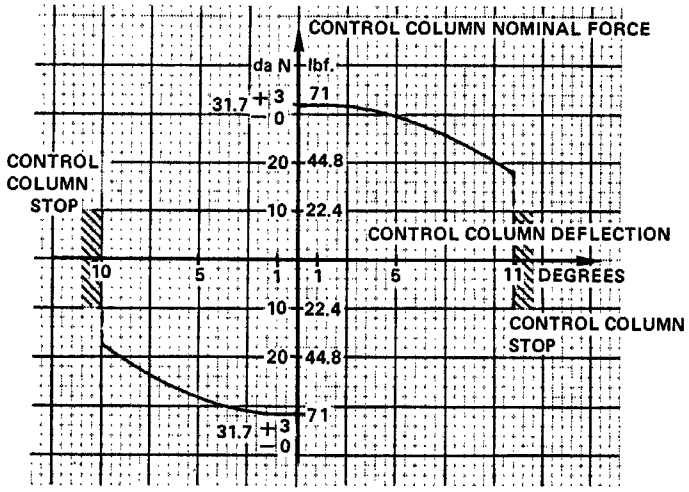
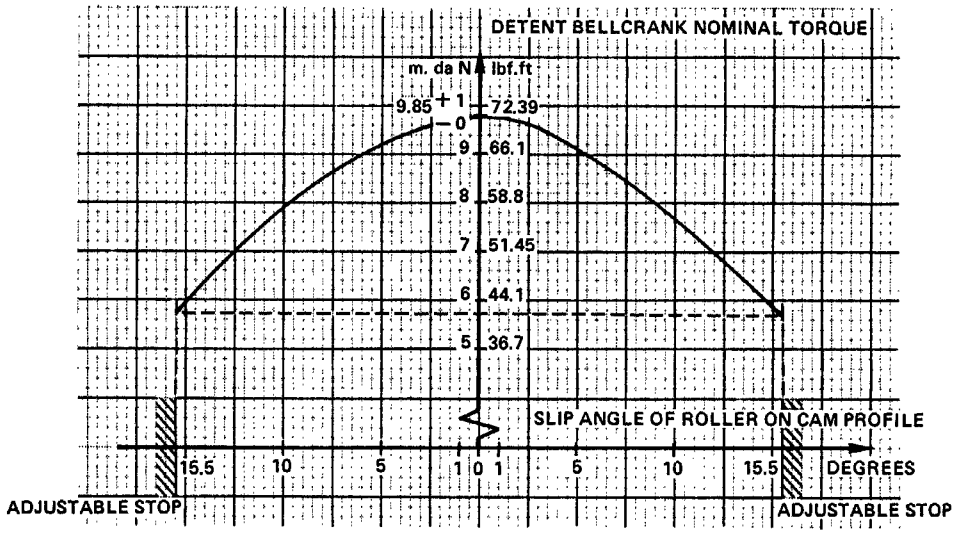


DIAGRAM B FORWARD DETENT BELLCRANK CHARACTERISTIC AT CAPTAIN'S CONTROL COLUMN

BM5 27 31 00 0 ALMO – 16

Forward Detent Bellcrank Characteristic
Figure 009



MAXIMUM FRICTION TORQUE	AT THRESHOLD	AT MAXIMUM TORQUE
WHEN NEW		
INSTALLED ON AIRCRAFT		

DIAGRAM A AFT DETENT BELLCRANK CHARACTERISTIC AT ITS APPLICATION POINT

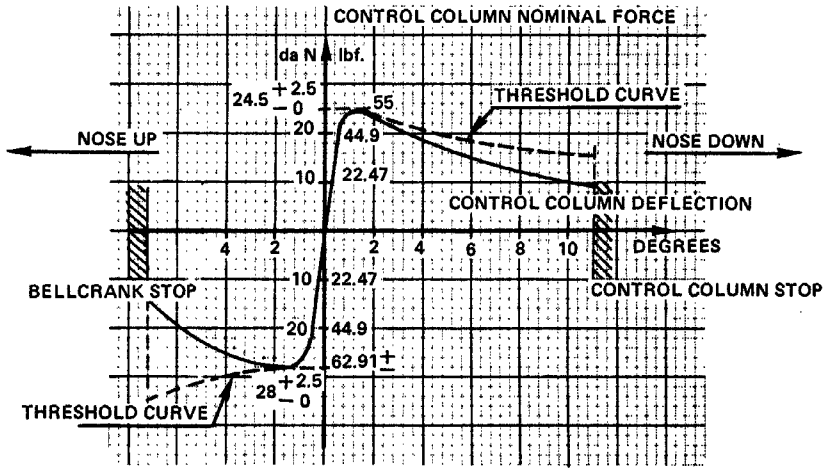
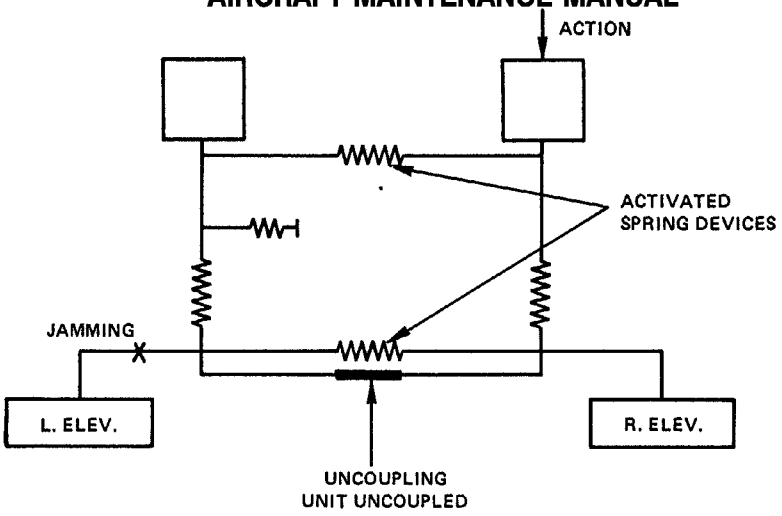
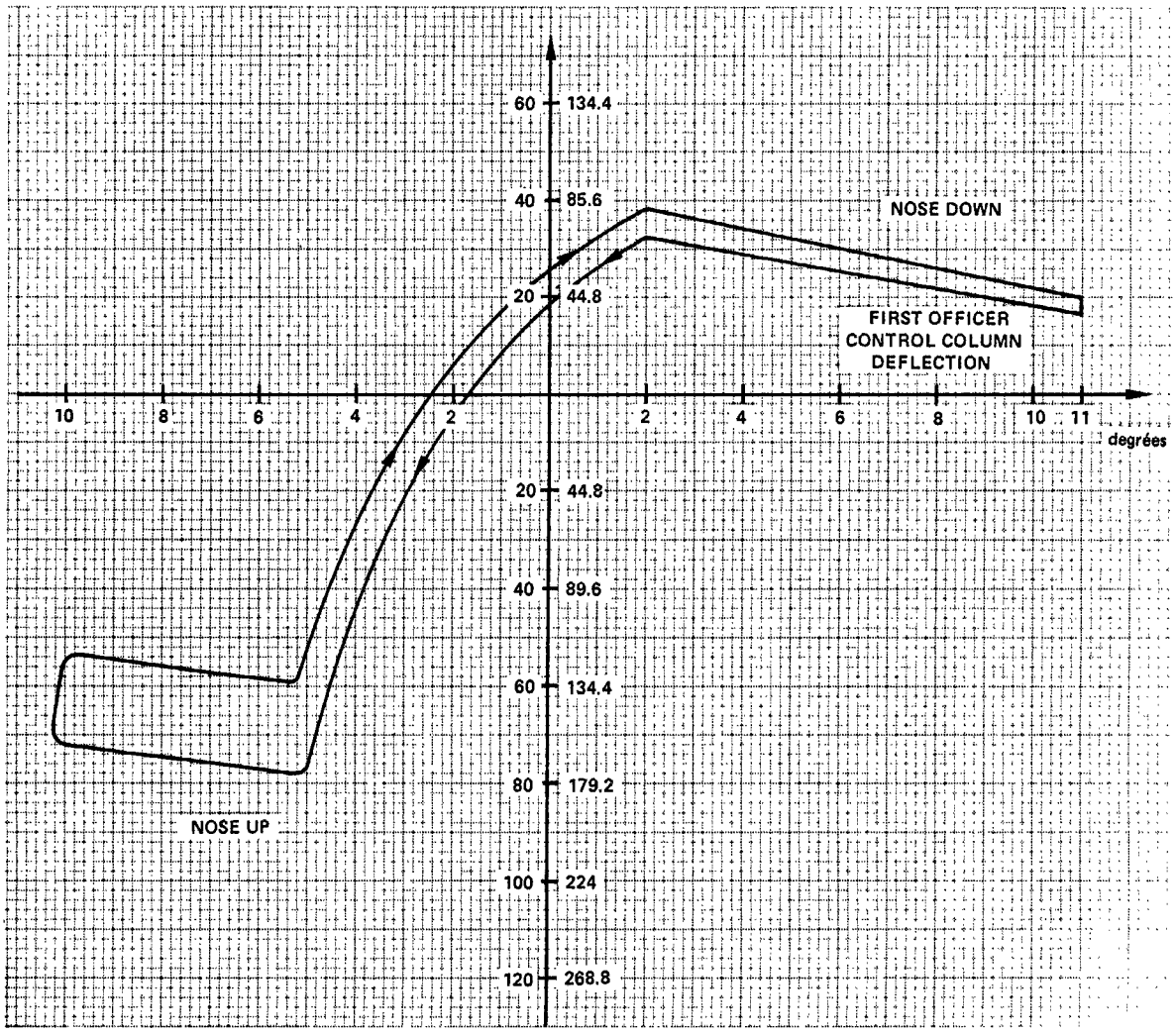


DIAGRAM B AFT DETENT BELLCRANK CHARACTERISTIC AT CAPTAIN'S CONTROL COLUMN

BM5 27 31 00 0 ANMO – 16

Aft Detent Bellcrank Characteristic
Figure 010





BM5 27 31 00 0 ASMO – 15 – 04
DM5

Elevator Control Forces and Deflections for 2 Cases of L Elevator Jamming with Pitch Uncoupling Uncoupled
Figure 011

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

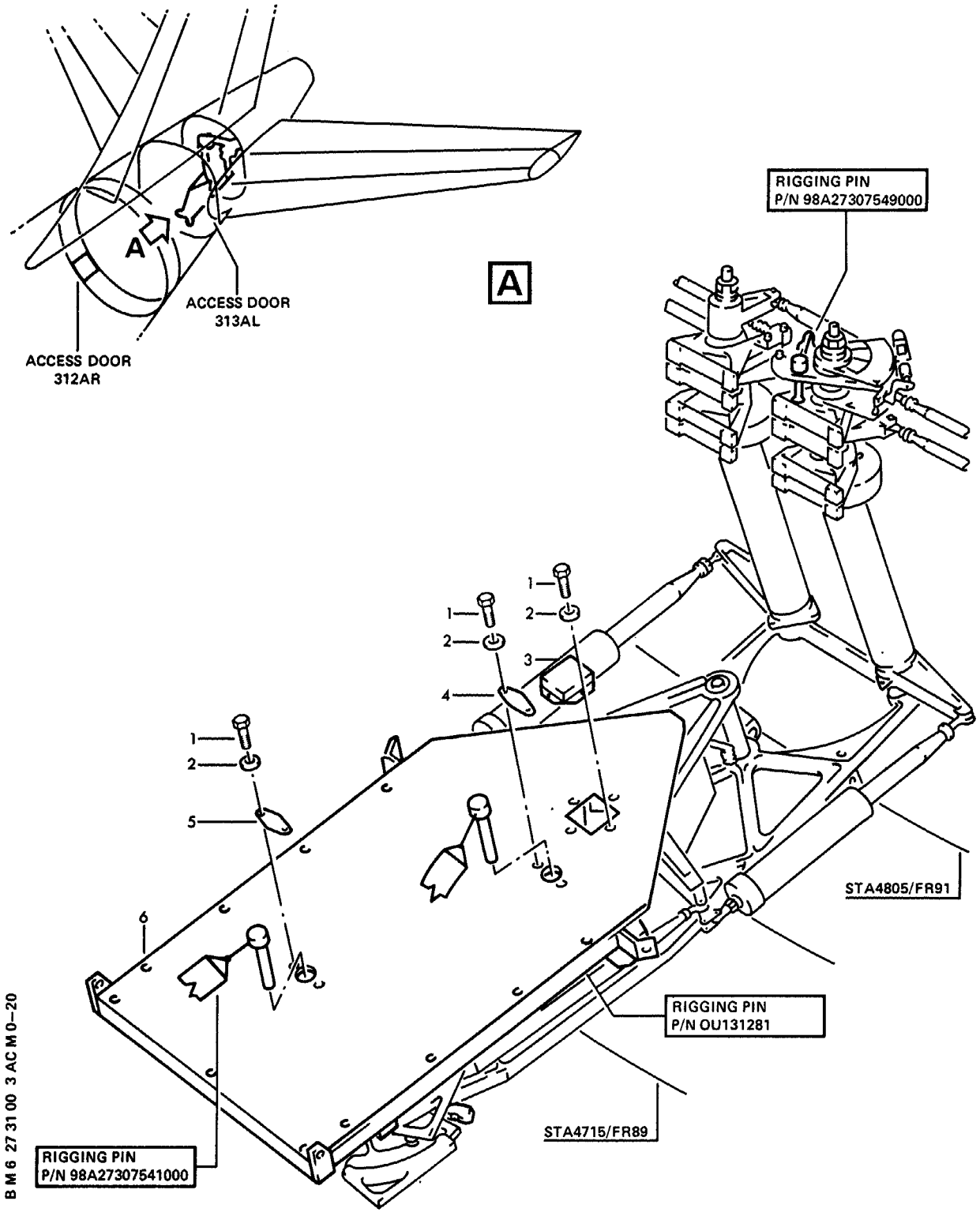
1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18 ft.)
B. OU131281	Pin - Rigging, Artificial Feel Unit, Elevator Mechanical Controls
C. 98A27307541000	Rigging Pin - Cable Quadrant, Elevator Mechanical Controls
D.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
E.	Warning Notices
Referenced Procedure	
- 53-10-37, P. Block 401	Aft Section and Catwalk Floor Panels

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Open access door 312AR and 313AL.
(3)Make certain that horizontal stabilizer pitch trim control is set at zero.
(4)Make certain that elevator controls are set at neutral.
(5)Display warning notice in flight compartment prohibiting operation of flight controls.
(6)Display warning notice prohibiting repressurization of hydraulic systems.

B. Installation of Rigging Pins (Ref. Fig. 301)



Artificial Feel Unit - Rigging
Figure 301

(1)Removal of Covers.

NOTE : To gain access to artificial feel unit remove maintenance floor panel. For removal and installation of maintenance floor panel refer to 53-10-37, P. Block 401.

NOTE : Removal of covers is required to gain access to the following:
- cover (3) for artificial feel torsion bar.
- cover(5) for installation of rigging pin P/N 98A27307541000 in cable quadrant.
- cover (4) for installation of rigging pin P/N 0U131281 in artificial feel unit.

(a)Remove bolts (1), washers (2) and covers (3, 4, 5).

(2)Install rigging pin P/N 98A27307541000 in cable quadrant.

(3)Install rigging pin P/N 0U131281 in artificial feel unit.

C. Removal of Rigging Pins (Ref. Fig. 301)

(1)Remove rigging pins P/N 98A27307541000 and P/N 0U131281.

(2)Position covers (3, 4, 5), install washers (2) and nuts (1).

D. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Close access doors 312AR and 313AL.

(3)Remove access platform.

(4)Remove warning notices.

R WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Adjustment of Elevator Mechanical Control

NOTE : Prior to adjusting rod length, perform cable adjustment and reconnect interconnecting rod after adjustment of front section mechanical control.

A. Reason for the Job

(1)Adjustment of cable tension.
(2)Adjustment of front section mechanical control.
(3)Adjustment of rear section mechanical control.
(4)Adjustment of autopilot.
(5)Elevator surface/servo control neutral adjustment.
(6)Adjustment of servo controls with the reference triangle.
(7)Adjustment of the position transmitter at RIB 14.
(8)Adjustment of deflections and functional test.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27901007000	Pin-Rigging, Elevator Control
(2)98A27901001000	Pin-Rigging, Elevator Control
(3)98A27307541000	Rigging - Pin Cable Quadrant, Elevator Mechanical Controls
(4)98A27307549000	Pin-Rigging, Elevator Control Bellcranks
(5)OU190360	Locking Pin-THS Actuator Mechanical Input Lever
(6)98A27309000000	Gauge - Elevator Neutral Setting
(7)98A27203500000	Measurement Base - Flight Control Surface Deflection
(8)	Clinometer
(9)OU131281	Pin-Rigging, Artificial Feel Unit, Elevator Mechanical Controls.
10)72-5-644	Retaining Fork, Dynamometric Rod
11)	Access Platform 3 m to 8 m (10 ft. to 26 ft. 3 in.)
12)	Lockwire - Corrosion Resistant Steel Dia.

ITEM	DESIGNATION
	0.8 mm (0.032 in.)
13)	Safety Barriers
14)	Circuit Breaker Safety Clips
15)	Warning Notices
16)	Reference Triangle
Referenced Procedures	
- 27-30-00, P. Block 501	Cable Adjustment
- 27-31-00, P. Block 301	Mechanical Control and Pitch Uncoupling
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 11-00-00, P. Block 001	Placards and Markings - General
- 27-31-26, P. Block 401	Artificial Feel Unit Frame

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up

(a)Initial conditions

- Correct electrical power supply (Ref. 24-41-00, P. Block 301).
- Forward services ventilation system in operation.

**ON A/C 101-104,

Post SB 31-2115 For A/C 101-104,

R WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Adjustment of Elevator Mechanical Control

NOTE : Prior to adjusting rod length, perform cable adjustment and reconnect interconnecting rod after adjustment of front section mechanical control.

A. Reason for the Job

(1)Adjustment of cable tension.
(2)Adjustment of front section mechanical control.
(3)Adjustment of rear section mechanical control.
(4)Adjustment of autopilot.
(5)Elevator surface/servo control neutral adjustment.
(6)Adjustment of servo controls with the reference triangle.
(7)Adjustment of the position transmitter at RIB 14.
(8)Adjustment of deflections and functional test.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27901007000	Pin-Rigging, Elevator Control
(2)98A27901001000	Pin-Rigging, Elevator Control
(3)98A27307541000	Rigging - Pin Cable Quadrant, Elevator Mechanical Controls
(4)98A27307549000	Pin-Rigging, Elevator Control Bellcranks
(5)OU190360	Locking Pin-THS Actuator Mechanical Input Lever
(6)98A27309000000	Gauge - Elevator Neutral Setting
(7)98A27203500000	Measurement Base - Flight Control Surface Deflection
(8)	Clinometer
(9)OU131281	Pin-Rigging, Artificial Feel Unit, Elevator Mechanical Controls.
10)72-5-644	Retaining Fork, Dynamometric Rod
11)	Access Platform 3 m to 8 m (10 ft. to 26 ft. 3 in.)
12)	Lockwire - Corrosion Resistant Steel Dia. 0.8 mm (0.032 in.)
13)	Safety Barriers
14)	Circuit Breaker Safety Clips
15)	Warning Notices
16)	Reference Triangle
Referenced Procedures	
- 11-00-00, P. Block 001	Placards and Markings - General
- 24-41-00, P. Block 301	AC External Power Control
- 27-30-00, P. Block 501	Cable Adjustment
- 27-31-00, P. Block 301	Mechanical Control and Pitch Uncoupling
- 27-31-26, P. Block 401	Artificial Feel Unit Frame
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE

ISOLATED.

(1)Job set-up

(a)Initial conditions

- Correct electrical power supply (Ref. 24-41-00, P. Block 301).
- Forward services ventilation system in operation.

**ON A/C ALL

- Overhead and lateral panel circuit breakers closed, particularly those associated with FLT CTL (133VU).
- Aircraft on ground (circuit breakers L/G PROX DET & RELAYS SYS1 and SYS2 closed, on panel 133VU).

(b)Pressurize Green, Blue and Yellow hydraulic systems using :

- electric pumps (Ref. 29-21-00, P. Block 301; 29-22-00, P. Block 301; 29-23-00, P. Block 301).
- or ground power cont. (Ref.29-10-00,P. Block 301).

(c)On SERVO CTL section of panel 428VU

- make certain that G, B and Y pushbutton switches are pressed (in) and JAM and OFF legends are off.

(d)Make certain that flap and slat control lever is in first notch position.

(e)Make certain that THS is at neutral by installation of the rigging pin OU190360 in THSA input lever.

(f)Move pitch control column at least twenty times to bleed servo controls and let it return to neutral position.

(g)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not pre-selected.

(h)Position access platforms and safety barriers.

(j)Open access doors 121BL, 312AR.

(k)On artificial feel unit remove covers (Ref. 27-31-00, P. Block 301).

R (l)Open, safety and tag the following circuit breakers.

PANEL	SERVICE	IDENT.	LOCATION
21VU	ARTF FEEL/FLC1/28VDC	5CY1	101/J 1
21VU	ARTF FEEL/FLC2/28VDC	5CY2	101/J 5
133VU	FLT-CTL/PITCH/UNCOUPLING/SOLENOID	1CF	331/V64

R (m)Make certain that rigging pin OU131281 can be freely inserted in artificial feel unit.

R (n)Disconnect Captain's and First Officer's channel spring rods (18), (19), (Ref. Fig. 502) from artificial feel unit, (Ref. 27-31-26, P. Block 401).

R (p)Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).

R (q)Display a warning notice prohibiting pressurization of Green, Blue and Yellow hydraulic systems, on ground connectors and on HYD PWR panel 427VU.

R (r)Display a warning notice prohibiting operation of pitch control.

R (s)Disconnect interconnecting rod (1) located under cockpit floor (Ref. Fig. 501).

R (t)Make certain that rigging pin 98A27307541000 can be freely inserted in cable quadrants. If not, adjust the rods (24), (25) located between pilot cable quadrant and artificial feel output lever in order to obtain rigging pin free insertion (Ref. Fig. 502).

R (u)Remove rigging pins 98A27307541000 and 0U131281.

R (v)Move control linkage slowly and let it return to neutral position.

R (w)Install rigging pin 98A27307541000 in cable quadrants.

R (x)Check that rigging pin 98A27901001000 can be freely inserted in tension regulator input lever. If not, pull by hand on one cable to see which one has to be adjusted to allow rigging pin free insertion. Adjust corresponding cable to allow rigging pin free insertion using tension lever located on cable quadrant. Remove rigging pin from cable quadrant and tension regulator lever. Slowly move pitch control and let it come back to neutral position. Install rigging pin 98A27307541000 in cable quadrant. Check rigging pin 98A27901001000 free insertion in tension regulator input lever.

R (y)Remove rigging pins.

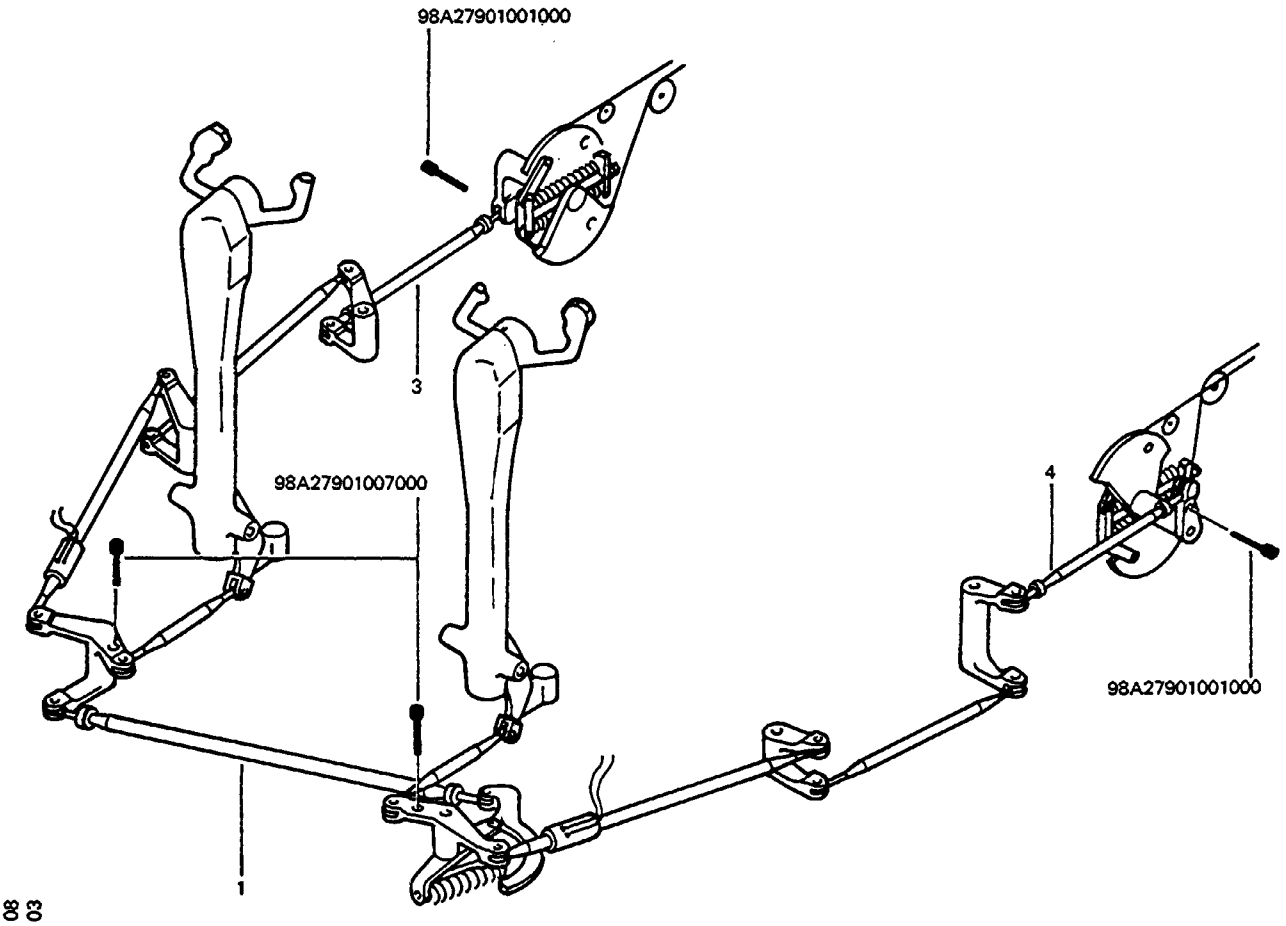
R (z)Perform the same rigging on the other cable channel.

D. Adjustment
(1)Adjustment of cable tension
Ref. 27-30-00, P. Block 501
(2)Adjustment of front section mechanical control
(Ref. Fig. 501)
(a)Insert rigging pin 98A27901007000 into left FWD detent bellcrank to immobilize Captain's control column.
(b)Immobilize First Officer's control column with rigging pin 98A27901007000.
(c)Install retaining fork 72-5-644 on each dynamometric rod.
(d)Immobilize Captain's and First Officer's tension regulators with rigging pins 98A27901001000. Free insertion and removal of rigging pins must be obtained.
If not, adjust length of rod (3 then 4) as follows :
Cut and remove lockwire, loosen nuts and disengage washers. Adjust length of rod. Engage washers, tighten nuts and wirelock (check that tightening has not modified the rigging).
(e)Remove all rigging pins and locking equipment.
(f)Install connecting rod (1).
Make certain that uncoupling unit of detent bellcrank remains at its threshold.
Free insertion and removal of rigging pin must be obtained.
If not, adjust length of connecting rod (1) as follows :
Cut and remove lockwire; loosen nuts and disengage washers. Adjust length of rod. Engage washers, tighten nuts and wirelock. Check that tightening has not modified the rigging.

R **ON A/C 101-104,

R Post SB 31-2115 For A/C 101-104,

(g)Check adjustment of pitch transducer unit 87TU, 88TU (Ref. 27-31-17, P. Block 401).



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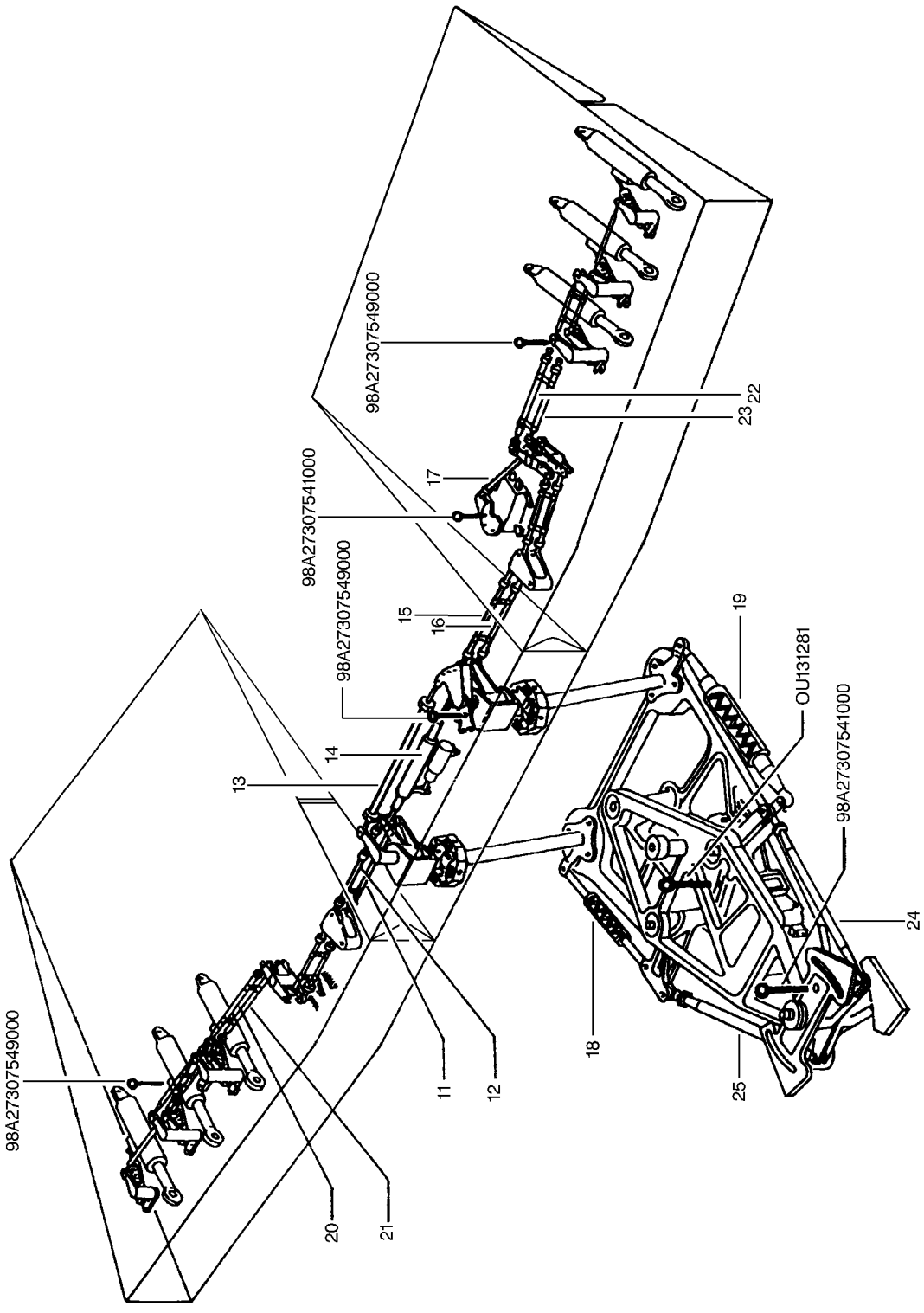
Front Section Mechanical Control
Figure 501

**ON A/C ALL

(3)Adjustment of rear section mechanical control
(Ref. Fig. 502)
(a)Immobilize cable quadrants with rigging pin 98A27307541000.
(b)Immobilize bellcrank of artificial feel unit with rigging pin 0U131281.
(c)Disconnect transmission rods (11, 12, 15 and 16) on trimmable horizontal stabilizer side.
(d)Immobilize torque tube upper bellcrank on Captain's channel with rigging pin 98A27307549000.
(e)Remove rods (13 and 14) connecting torque tube bellcranks on Captain's and First Officer's channels.
(f)Check and, if required, adjust length of adjustable rod (13) to achieve center to center distance equal to that between upper ends of Captain's and First Officer's torque tubes. Install rod, tighten and wirelock.
(g)If required, adjust length of pitch uncoupling unit rod (14) so that it can be installed free from any stress between the two lower bellcranks of torque tube upper sections in Captain's and First Officer's channels.
(h)Install and adjust length of spring rods (18 and 19) making certain they are at neutral (Ref. 27-31-26, P. Block 401).
(j)Pressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(k)Immobilize left and right bellcranks at RIB9 with rigging pins 98A27307549000.
(l)Connect transmission rods (11, 12, 15 and 16) on trimmable horizontal stabilizer side.
If required, adjust length of rods as follows :
Cut and remove lockwire, remove clamps, loosen nuts and disengage washers. Adjust length of rod. Engage washers, tighten nuts and wirelock. Install clamps.
(m)Remove all rigging pins and locking equipment.
R (n)Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00,
R P. Block 301).



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Rear Section - Mechanical Control
Figure 502

R

(4)Adjustment of Autopilot (Ref. Fig. 502)

R (a)Pressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00,
R P. Block 301).
R (b)Immobilize Left side bellcrank at RIB9 with rigging pin 98A27307549000.
R (c)Immobilize input rod of autopilot servo-motor with rigging pin 98A27307541000. Free insertion and removal of rigging pin must be obtained. If not, adjust length of control rod (17) as follows : Cut and remove lockwire, loosen nuts and disengage washers. Ajust length of rod. Engage washers, tighten nuts and wirelock.
R (d)Remove all rigging pins.
R (e)Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00,
R P. Block 301).

(5)Elevator surface/servo control neutral adjustment.

R NOTE : Prior to performing this adjustment, make certain that
R adjustment of rear section mechanical control in Para D.(3) has
R been performed.

NOTE : The elevator trailing edge might appear to be low (or asymmetrical compared to other side) when observed from the ground. This is expected behaviour when the hydraulics are switched off and the servo actuators can no longer hold the weight of the elevator surface. Observations from the ground should not be used as the reference for elevator zero position.

NOTE : The following adjustment procedure applies to left and right servo controls.
The two surfaces have to be rigged at the same time.

R (a)Pressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).

R (b)Move control column at full nose down and let it come back slowly to zero.

R (c)Release B and Y pushbutton switches on SERVO CTL section of panel 428VU.

R (d)Immobilize bellcrank at RIB8 with rigging pin 98A27307549000.

R (e)Position tool 98A27203500000 on upper surface of elevator in line with center servo-control and perpendicular to the axis of rotation of elevator.

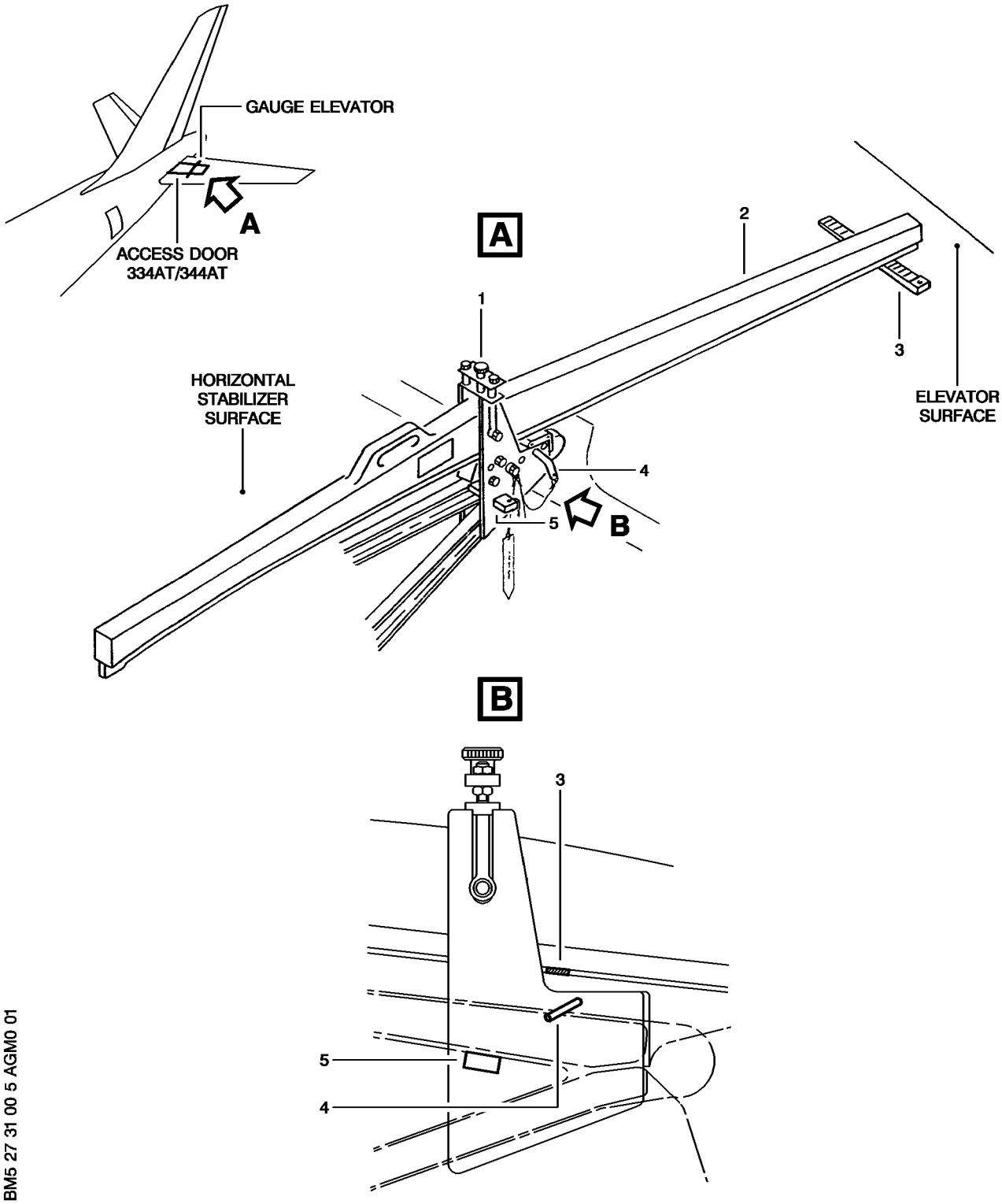
R (f)Install tool 98A27309000000 at RIB5. (Ref. Fig. 503)
- Make sure that elevator is below the neutral position.
- Make sure that pitch-trim control wheels are set to 0 position.
- Put a warning notice on pitch-trim control wheels and on control column to tell persons not to move THS and elevators.
- Open access door 334AT(344AT).
- Turn adjuster knob (1) counterclockwise until setting bar (2) is in its highest position.
- Install tool on elevator hinge 1. Secure with pin (4) and wedge (5).
- Turn adjuster knob (1) to lower setting bar (2) until pad at front end touches THS and gap between setting bar and support block is 5 mm (0.196 in.) ; use measuring gauge (3) to set this distance.

R (g)Adjust length of actuating spring rod of center servo control until gap between upper surface of elevator and bottom of setting bar (2) is 5 ± 0.5 mm (0.196 ± 0.019 in.).
The gap is indicated by a scale on the measuring gauge (3).
NOTE : In case of elevator neutral position check, a gap of 5 ± 2 mm (0.196 ± 0.786 in.) between the upper surface of the elevator and the bottom of the setting bar is permitted.

R (h)Lock adjustable end fitting of spring rod and check that the "0" position of elevator has not been modified by the tightening operation.
Make certain that spring rod is at neutral. Wirelock.
Install a new reference triangle on tail cone in line with trailing edge of elevator (Ref. 11-00-00, P. Block 001) (Ref. Fig. 504).

(j)Place clinometer on its tool 98A27203500000 and record the value of angle "B" which shall be used as reference for the following operations.

(k)Remove tool 98A27309000000, close access door 334AT(344AT).



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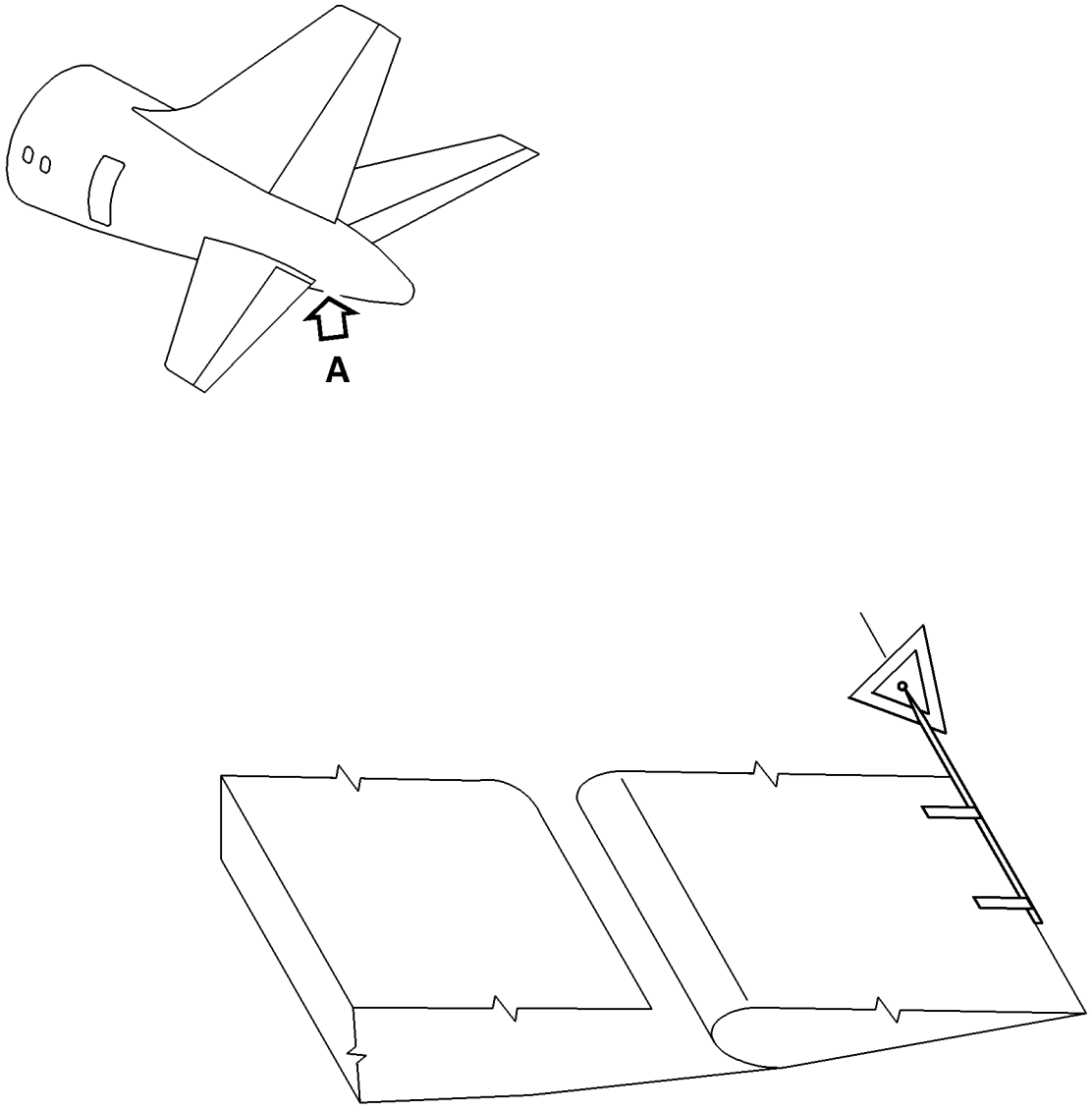
Installation of the Elevator Neutral Setting Gauge
Figure 503



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Installation of Reference Triangle
Figure 504

(l)On SERVO CTL section of panel 428VU
- Press Y pushbutton switch
- Release G pushbutton switch

(m)Reduce length of actuator spring rod of inner servo control input rod to lower elevator until clinometer reads an angle greater than angle "B". For example B + 30'.

(n)Gradually increase length of actuating spring rod of inner servo control until angle "B" ±2' is obtained; this becomes angle "C".

(p)Lock adjustable end fitting of rod and check that the previously recorded angle "C" has not been modified by the tightening operation. Make certain that spring rod is at neutral. Wirelock end fitting.

(q)On SERVO CTL section of panel 428VU
- Press B pushbutton switch
- Release Y pushbutton switch

(r)Reduce length of actuating spring rod of outer servo control to lower elevator until clinometer reads an angle greater than "B". For example B + 30'.

(s)Gradually increase length of actuating spring rod of outer servo control until an angle "D" is obtained, so that the difference from angles B and D is less than 2'.

(t)Lock adjustable end fitting of servo control actuating spring rod. Check that actuating spring rod is at neutral. Wirelock end fitting of rod.

(u)On SERVO CTL section of panel 428VU
- press G and Y pushbutton switches.

(v)Record angle "E" read on clinometer. The value of this angle must be within range of the previously recorded values of angles B, C and D. If not, repeat above adjustment operations.

(w)Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).

(6)Adjustment of servo controls with the reference triangle.
(a)Pressurize Green, Blue and Yellow hydraulic systems either :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301) and Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(b)On SERVO CTL section of panel 428VU
- release SERVO CTL, B and Y (JAM/OFF) pushbutton switches.

(c)Check that elevator trailing edge is in line with, or in limits of the center of gravity of the reference triangle located on the rear cone.
NOTE : Maximum tolerance of the elevator trailing edge is 0.7 mm (0.027 in.) on the upper side, 0.7 mm (0.027 in.) on the lower side with respect to the reference triangle axis.
NOTE : This reference triangle must be taken into account for subsequent adjustments.
If not, adjust length of rod. To this end, cut and remove lockwire, loosen nuts, disengage washers, adjust length of rod, engage washers, tighten nuts.

(d)On SERVO CTL section of panel 428VU
- press SERVO CTL, B (JAM/OFF) pushbutton switch
- release SERVO CTL, G (JAM/OFF) pushbutton switch.

(e)Check that elevator trailing edge is in line with, or in limits of the center of gravity of the reference triangle located on the rear cone.
If not, adjust length of rod. To this end, cut lockwire, loosen nuts, disengage washers. Adjust rod to length, engage washers, fully tighten nuts.

(f)On SERVO CTL section of panel 428VU
- press SERVO CTL/Y (JAM/OFF) pushbutton switch
- release SERVO CTL/B (JAM/OFF) pushbutton switch.

(g)Check that elevator trailing edge is in line with, or in limits of the center of gravity of the reference triangle located on the rear cone.
If not, adjust length of rod.
To this end, cut and remove lockwire, loosen nuts, disengage washers.
Adjust rod to length, engage washers, tighten nuts.

(h)On SERVO CTL section of panel 428VU
- press SERVO CTL/G and B (JAM/OFF) pushbutton switches.

(j)Check that elevator trailing edge is in line with, or in limits of the center of gravity of the reference triangle located on the rear cone.
If not, perform again adjustment of rods.

(k)Safety nuts with lockwire.

(l)Remove rigging pins.

(7)Adjust position transmitter at RIB 14 (Ref. 27-35-00, P. Block 501).

(8)Adjustment of deflections and functional test (Ref. Fig. 502)
(a)Perform 20 complete nose up and nose down cycles at very low speed without reaching servocontrol stops, in order to bleed hydraulic systems.

(b)Slowly move Captain control column to nose down position and insert a 0.5 mm shim on its own stop.

(c)Using clinometer and taking angle "E" as a reference, check that

elevator deflection is 15° + 1°30' - 1° (10' asymmetry).
If deflection is not obtained, proceed as follows :
- Move control column to zero and install rigging pins 98A27307549000 in left and right bellcranks and in detent bellcrank.
- Check that elevators are at zero (check of angle "E").
- Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
- Disconnect rods (20), (21), (22), (23) at adjustable bellcrank side.
- Adjust length of adjustable bellcranks by a same value (in the same direction).
  NOTE : Deflection is increased by screwing adjusting screw of adjustable bellcranks.
- Re-adjust length of rods (20), (21), (22), (23) so that they can be installed freely, tighten adjustable end fittings and hinges. Do not safety at this stage.
- Connect hydraulic ground power cart and pressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
- Remove rigging pins.

(d)Slowly move Captain control column to nose down position and insert a 0.5 mm shim on its own stop.
(e)Using clinometer check that elevator deflection is 15° + 1°30' - 1° (10' asymmetry). If not, repeat above adjustment operations.
(f)When nose down deflection is obtained, adjust stops of left and right adjustable bellcranks in this position.
(g)Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(h)Lock and safety adjustable end fittings and hinges of rods on left and right sides.
(j)Install, lock and safety clamps.
(k)Lock and safety adjustment system of adjustable bellcranks on left and right sides.
(l)Connect hydraulic ground power cart and pressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(m)Slowly move Captain control column to nose up stop position.
(n)Check that elevator deflection is - 30° ± 1° when there is a play of 0.3 mm to 0.6 mm between control column and its stop.
(p)When nose up deflection is obtained, adjust stops of left and right adjustable bellcranks in this position. Lock and safety.
(q)Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).

E. Close-Up
(1)Remove all rigging pins and locking equipment.
(2)Install cover assembly (Ref. 27-31-26, P. Block 401).
(3)Remove safety clips and tags and close circuit breakers 1CF, 5CY1 and 5CY2.
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(5)Close access doors and panels.
(6)Remove safety barriers and access platforms.
(7)Depressurize hydraulic systems and disconnect hydraulic ground power

cart.

(8) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Operational Test

A. Reason for the Job
(1)To check correct operation of pitch uncoupling solenoid.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up
(a)Initial conditions
- Correct electrical power supply.
- Forward services ventilation system in operation.
R - Overhead and lateral panel circuit breakers closed, particularly
R those associated with FLT CTL (133 VU).
R - Aircraft on ground (circuits breakers L/G PROX DET & RELAYS SYS1
R and SYS2 closed, on panel 133VU).

D. Test

ACTION	RESULT
1. On FLIGHT CONTROLS section of panel 471VU - Place selector switch in PITCH CTL UNCOUPLING/TEST 1 position.	- TEST legend of PTT pushbutton switch comes on.
2. On FLIGHT CONTROLS section of panel 471VU - Press PTT pushbutton switch.	- OK legend of TEST RESULT annunciator comes on - TEST legend of PTT pushbutton switch remains on (Solenoid 4CF is not energized)
- Release PTT pushbutton switch.	- TEST legend of PTT pushbutton switch remains on. - OK legend of TEST RESULT annunciator goes off
3. On FLIGHT CONTROLS section of panel 471VU - Place selector switch in	- TEST legend of PTT pushbutton

ACTION	RESULT
PITCH CTL UNCOUPLING/TEST 2 position.	switch remains on.
4. On FLIGHT CONTROLS section of panel 471VU - Press PTT pushbutton switch.	- OK legend of TEST RESULT annunciator comes on - TEST legend of PTT pushbutton switch remains on (Solenoid 4CF is energized)
- Release PTT pushbutton switch	- TEST legend of PTT pushbutton switch remains on. - OK legend of TEST RESULT annunciator goes off.
5. On FLIGHT CONTROLS section of panel 471VU - Place selector switch in NORM FLT position.	- TEST legend of PTT pushbutton switch goes off.

E. Close-up

(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

3. Functional Test

A. Reason for the Job
To check correct operation of Elevator Controls.

B. Equipment and Materials

ITEM	DESIGNATION
(1)97A27302009000	Locking Equipment - Pitch Trim Control Wheel
(2)OU131281	Pin - Rigging, Artificial Feel Unit, Elevator Mechanical Controls
(3)98A27903501001	Measuring Equipment - Pitch and Roll Operating Load
(4)97A27902016000	Spring Scale Assy
(5)98A27901007000	Pin - Rigging, Elevator Control
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-31-26, P. Block 401	Frame - Artificial Feel Unit
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up
(a)Initial conditions
- Correct electrical power supply (Ref. 24-41-00, P. Block 301).
- Forward services ventilation system in operation.
R - Overhead and lateral panel circuit breakers closed, particularly
R those associated with FLT CTL (133VU).
R - Aircraft on ground (circuit breakers L/G PROX DET & RELAYS SYS1
R and SYS2 closed, on panel 133VU).

(b)Pressurize hydraulic systems either :
- using Green hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU
- make certain that G, B and Y pushbutton switches are pressed (in) and JAM and OFF legends are off.

(d)On panel 11VU, on ECAM control panel
- press F/CTL pushbutton switch ; FLT CTL page appears on right ECAM display unit.

(e)Make certain that trim control wheels are in zero position. Lock in this position with locking equipment 97A27302009000.
(f)Make certain that flap and slat control lever is in first notch position (flaps and slats retracted).
(g)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.

D.Test
(1)Functional Test

ACTION	RESULT
1. Slowly move control column until it reaches nose down stop.	- Elevators deflect downwards. - On right ECAM display unit, on FLT CTL page, ELEV pointer moves to the lower mark.
2. Return control column to zero position.	- Elevators return to neutral position. - On right ECAM display unit, on FLT CTL page, ELEV pointer returns to zero.
3. Slowly move control column until it reaches nose up stop.	- Elevators deflect upwards. - On right ECAM display unit, on FLT CTL page, ELEV pointer moves to the upper mark.
4. Return control column to zero position.	- Elevators return to neutral position. - On right ECAM display unit, on FLT CTL page, ELEV pointer returns to zero.

(2)Functional test of pitch control uncoupling and coupling (Ref. Fig. 505)

(a)Open safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1/FAC2		Line 103

(b)Open access door 312AR.

(c)On artificial feel unit, remove cover assembly (Ref. 27-31-26, P. Block 401).

(d)Insert rigging pin 0U131281 in artificial feel unit input lever.

(e)Insert rigging pin 98A27901007000 into left FWD detent bellcrank to lock Captain's control column.

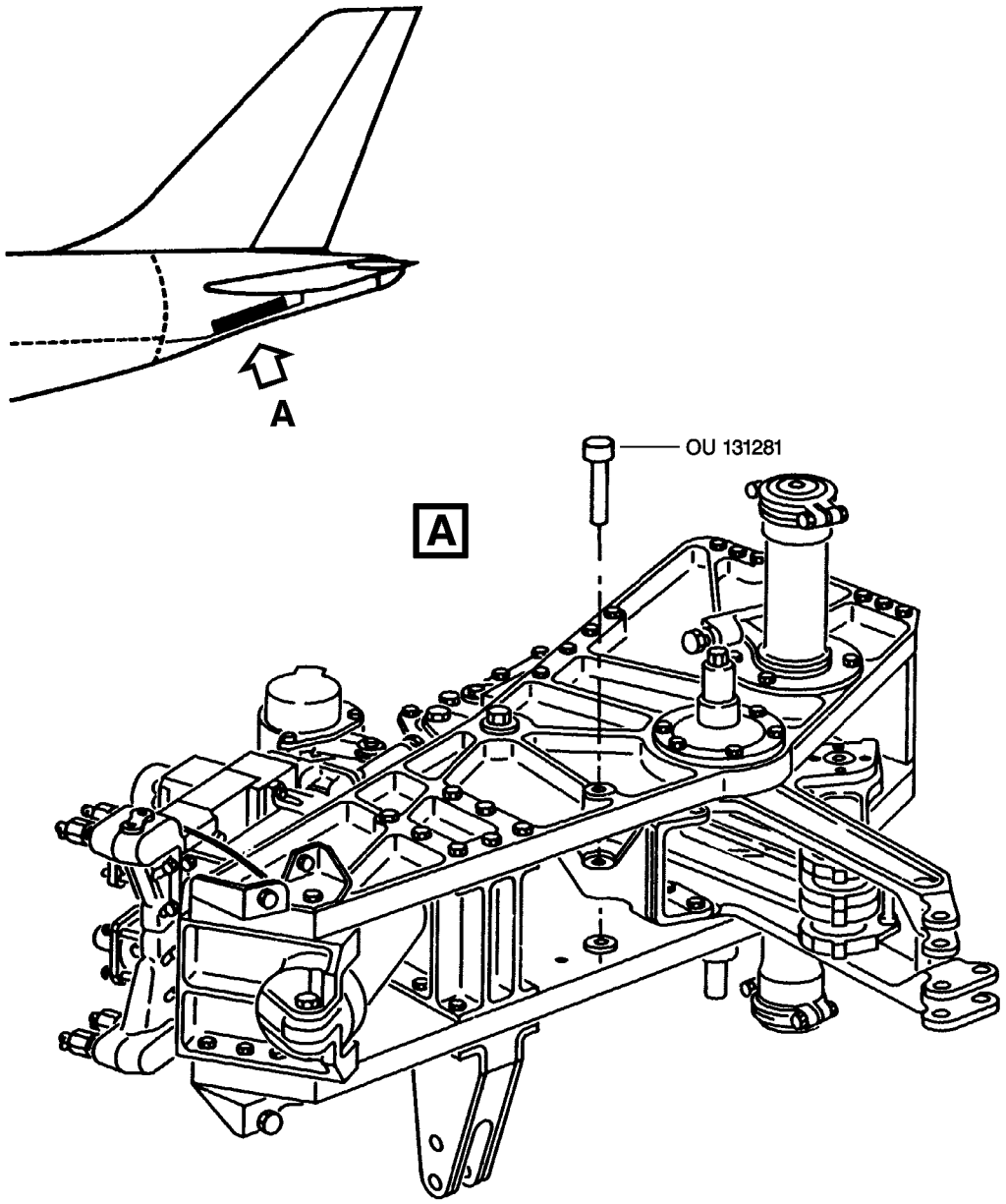
(f)Install measuring equipment 98A27903501001 with spring scale assy 97A27902016000 on control wheel.

ACTION	RESULT
1. On FLIGHT CONTROLS section of panel 471VU	
- Place selector switch in PITCH CTL UNCOUPLING/TEST 2 position.	- TEST legend of PTT pushbutton switch comes on.
- Press and hold PTT pushbutton switch.	- OK legend of TEST RESULT annunciator comes on.
- Move First Officer's control column in nose up direction by applying a force of 70 daN + 10-15 daN (157.5 lbf + 22.5 - 33.75 lbf) to activate the detent system.	- Visually check for displacement of right elevator only. NOTE : Left elevator can have a deflection of up to 39 mm (1.54 in.).
- Move First Officer's control column in nose down direction by applying a force of 35 daN ± 7.5 daN (78.75 lbf ± 16.9 lbf) to activate the detent system.	- Visually check for displacement of right elevator only. NOTE : Left elevator can have a deflection of up to 39 mm (1.54 in.).
- Release PTT pushbutton switch.	- OK legend of TEST RESULT annunciator goes off.
2. On FLIGHT CONTROLS section of panel 471VU	
- Place selector switch in PITCH CTL UNCOUPLING/TEST 1 position.	
- Press and hold PTT pushbutton switch.	- OK legend of TEST RESULT pushbutton switch comes on.

ACTION	RESULT
- Move First Officer's control column in nose up direction by applying a force equal to or slightly higher than force in step 1 to activate the detent system.	- Visually check for displacement of both elevators.
- Move First Officer's control column in nose down direction by applying a force equal to or slightly higher than force in step 1 to activate the detent system.	- Visually check for displacement of both elevators.
- Release PTT pushbutton switch.	- OK legend of TEST RESULT pushbutton switch goes off.
- Place selector switch in NORM FLT position.	- TEST legend of PTT pushbutton switch goes off.

3. CLose circuit breakers
   FAC1 and FAC2.

E. Close-up
   (1)Install cover assembly (Ref. 27-31-26, P. Block 401).
   (2)Remove rigging pins and all locking equipment and tool.
   (3)Shut down hydraulic power supply. Depressurize systems. Where applicable, disconnect hydraulic ground power cart.
   (4)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



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Rigging Point - Artificial Feel Unit
Figure 505

4. System Test

A. Reason for the Job
Measurement of elevator deflection and testing of elevator control operating load.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27308005000	Protractor - Control Surface Deflection
or	
TR12-18	Rigmaster System
TR31	Rigmaster System - Protractor
or	
TR60	Rigmaster System
or	
3028000	Clinometer
98A27203500000	Measurement Base - Flight Control Surface Deflection
(2)98A27901007000	Pin - Rigging - Elevator Control
(3)98A27307541000	Rigging - Pin Cable Quadrant Elevator Mechanical Controls
(4)OU131281	Pin - Rigging - Artificial Feel Unit, Elevator Mechanical Controls
(5)98A27903501001	Measuring Equipment - Operating loads
(6)97A27302009000	Locking Equipment - Pitch Trim Control Wheel
(7)97A27902016000	Spring Scale Assy
(8)	Access Platform Adjustable 3 to 8 m (10 ft to 26 ft 3 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

C. Procedure
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up
(a)Initial conditions
- Correct electrical power supply (Ref. 24-41-00, P. Block 301).
- Forward services ventilation system in operation.
- Overhead and lateral panel circuit breakers closed particularly those associated with FLT CTL (133VU).
- Aircraft on ground (circuit breakers L/G PROX DET & RELAYS SYS 1 and SYS 2 closed, on panel 133VU).

(b)Connect hydraulic ground power cart and pressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU, make certain that G, B and Y pushbutton switches are pressed in and all legends are off.
(d)Make certain that pitch trim control wheel is set to zero and

immobilize with locking equipment 97A27302009000.
(e)Install access platform and safety barriers.
(f)Open access door 312AR.
(g)Using rigging pin 98A27901007000, immobilize Captain's and First Officer's control column bellcrancks in neutral position.
(h)Insert rigging pin 98A27307541000 in cable quadrant.
(j)Insert rigging pin 0U131281 in artificial feel unit input lever.
R (k)Install protractors 98A27308005000 or tools TR12-18 and TR31 or TR60
R or clinometer 3028000 and flight control surface deflection measurement
R base 98A27203500000 .
(l)Remove all rigging pins.
(m)Install measuring equipment 98A27903501001 on control wheel.

D. Test

CAUTION : DURING THE FOLLOWING TEST MAX. LOAD VALUES OF 60 da.N (134.8 lbf) FOR NOSE UP POSITION AND 30 da.N (67.41 lbf). FOR NOSE DOWN POSITION MUST NOT BE EXCEEDED TO AVOID DAMAGE TO CONTROL.

NOTE : On FLT CTL page of right ECAM display unit, ELEV and STAB pointers reproduce deflection of elevators and THS.

ACTION	RESULT
1. Move control column to nose up stop.	Right and left elevators deflect by -30° ± 1°. (762 mm ± 25 mm) (30 in. ± 0.984 in.)
Using tool 97A27902016000, measure load exerted at control column.	Make certain that load is 30 da.N ± 3.5 da.N (67.41 lbf ± 7.86 lbf)
2. Return control column to neutral.	Right and left elevators return to zero.
3. Move control column to nose down stop.	Right and left elevators deflect by +15° ± 1°. (385 mm ± 38 mm) (15.16 in. ± 1.5 in.)
Using tool 97A27902016000, measure load exerted at control column.	Make certain that load is 15 da.N ± 1.5 da.N (33.7 lbf ± 3.37 lbf)
4. Return control column to neutral.	Right and left elevators return to zero. NOTE : The allowance for non return to zero from nose up position together with nose down position is a total of 25'.
5. Remove locking equipment and place pitch trim control wheel in full nose up position.	
6. Move control column to nose up stop.	

ACTION	RESULT
7. Move control column from full nose up to full nose down position.	
8. Return control column to neutral.	Right and left elevators return to zero. NOTE : The allowance for non return to zero from nose up position together with nose down position is a total of 40'.
9. Turn pitch trim control wheel to full nose down position.	
10. Move control column to full nose up position.	
11. Move control column from full nose up position to full nose down position.	
12. Return control column to neutral.	Right and left elevators return to zero. NOTE : The allowance for non return to zero from nose up position together with nose down position is a total of 40'.
13. Return pitch trim control wheel to zero.	

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 312AR.
(3)Remove safety barriers and remove access platforms.
(4)Shut down and disconnect hydraulic ground power cart.
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. BLock 301).

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

R A. Check Elevator Hinge Bearings for Excessive Play and General Condition.
Detailed visual inspection of hinge bearings (in situ, as far as visible) for general condition

B. Detailed Inspection of Cables in Rear Part of Aft Pressure Bulkhead

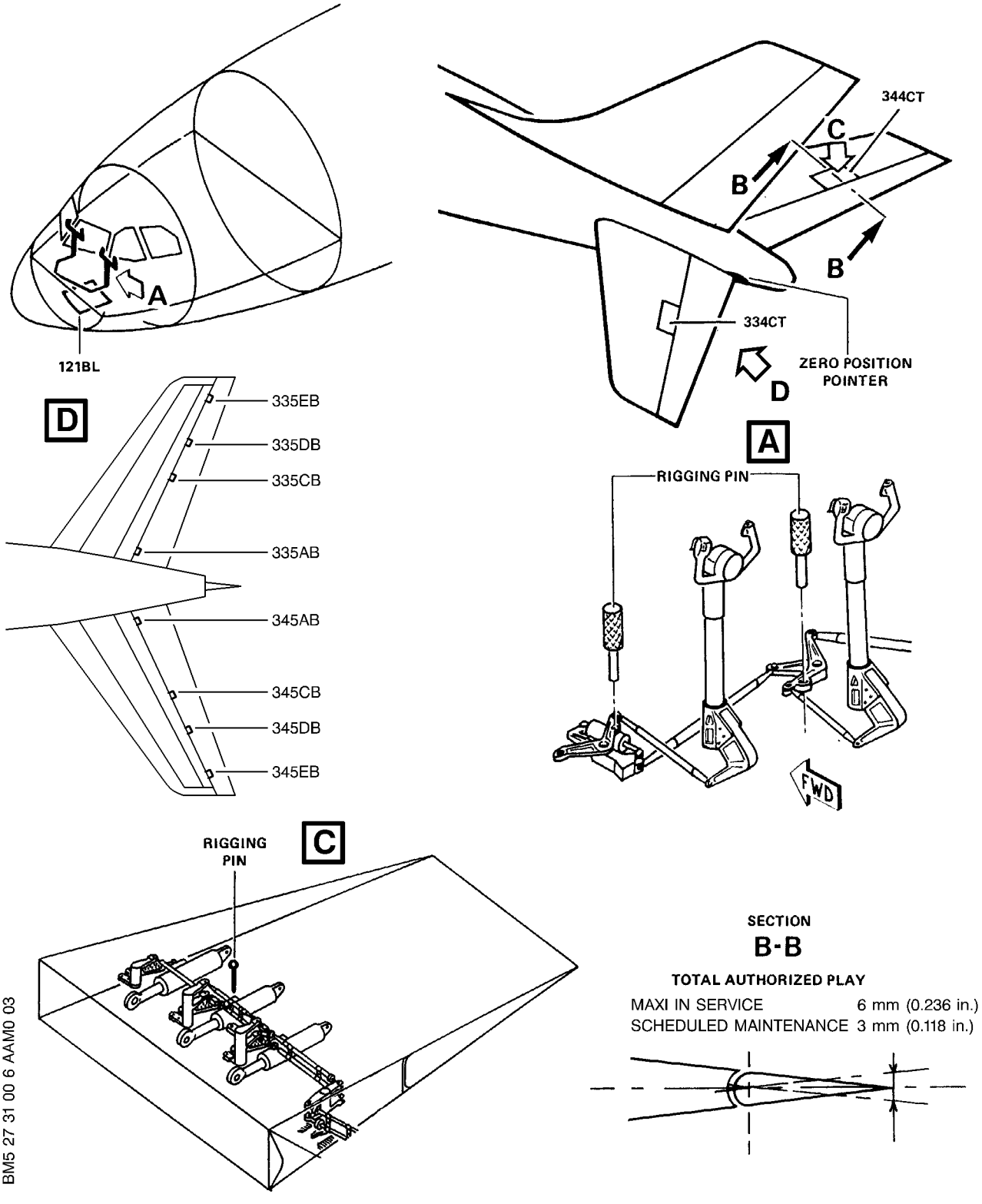
2. Procedure

R A. Check Elevator Hinge Bearings for Excessive Play and General Condition.
Detailed visual inspection of hinge bearings (in situ, as far as visible) for general condition

(1)Equipment and materials

ITEM	DESIGNATION
(a) 98A27901007000	Pin-Rigging, Elevator Control
(b) 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
(c) 98A27307549000	Pin-Rigging, Elevator Control Bellcranks
(d) 0U190360	Pin-Rigging, THS Actuator Mechanical Input Lever
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-31-00, P. Block 501	Elevator Mechanical Control
- 27-34-11, P. Block 601	Elevator Servo Control
- 29-21-00, P. Block 301	Green Auxiliary Hydraulic Power
- 29-22-00, P. Block 301	Blue Auxiliary Hydraulic Power
- 29-23-00, P. Block 301	Yellow Auxiliary Hydraulic Power
- 55-26-11, P. Block 601	Elevator Attach Fittings

(2)Job set-up
(Ref. Fig. 601, 602)



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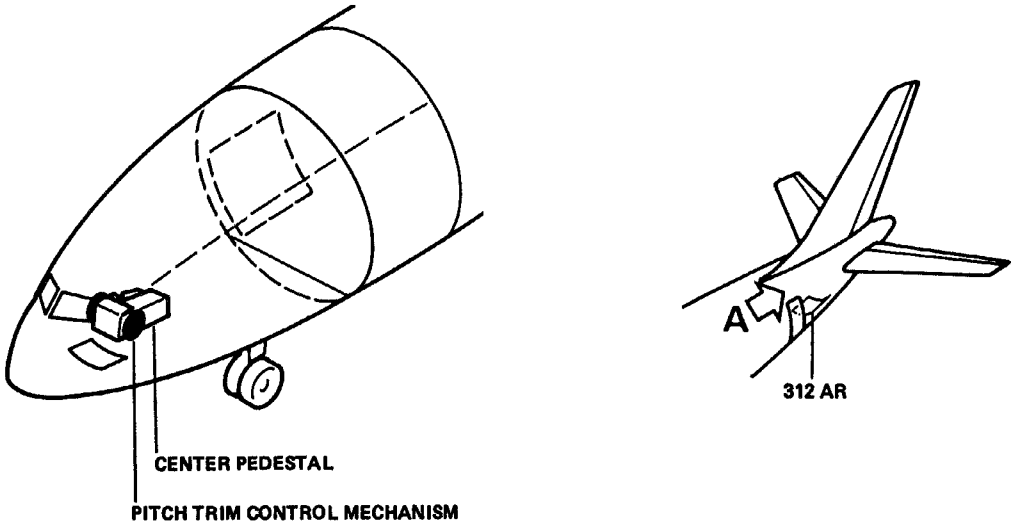
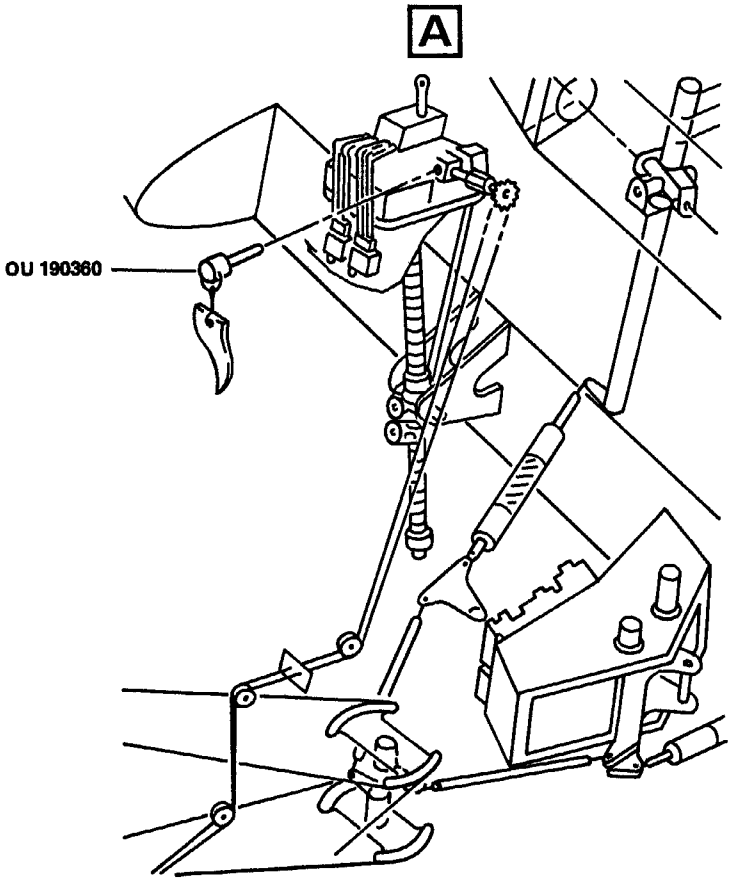
Component Location and Rigging Points
Figure 601

R





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Location of Rigging Points
Figure 602

R (a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R Make certain that electronics racks ventilation is correct.
R (b)Pressurize Green hydraulic system (Ref. 29-21-00, P. Block 301),
R Blue hydraulic system (Ref. 29-22-00, P. Block 301), Yellow hydraulic
R system (Ref. 29-23-00, P. Block 301).
R (c)Position access platform.
R (d)Open access door 312AR.
R (e)Place pitch trim wheels in zero position, and insert rigging pin
R 0U190360.
R (f)Display a warning notice prohibiting operation of the pitch controls.
R (g)Place control columns in neutral position, and insert rigging pin
R 98A27901007000
R in load limiting bellcrank assembly below Captain's control column.
R (h)On trimmable horizontal stabilizer, open access doors 334CT and 344CT.
R (j)Insert rigging pins 98A27307549000 in RH and LH bellcranks at RIB9.
R If rigging pins cannot be inserted, adjust elevator mechanical controls
R (Ref. 27-31-00, P. Block 501).
R (k)Open access panels 335AB, 335CB, 335DB, 335EB (left side) and 345AB,
R 345CB, 345DB, 345EB (right side).

R (3)Check of the elevator servo control and hinge bearings
R (a)Do a visual check of the servo control bearings.
R (b)Do a visual check of the elevator hinge bearings.
R (c)Make sure that the liners are not damaged.

R (4)Check
R (a)In flight compartment, on the panel 428VU :
R - press (in) the Green servo control pushbutton switch and release
R (out) the Blue and Yellow servo control pushbutton switches.
R (b)On trailing edge, opposite center servo control, apply a reasonable
R hand pressure upward in order to eliminate any play with no bending
R of the surface and note the position on the rear cone.
R (c)On trailing edge, opposite center servo control, apply a reasonable
R hand pressure downward in order to eliminate any play with no bending
R of the surface and note the position on the rear cone.
R (d)Using the two opposite marks on the rear cone, measure the play at
R trailing edge.
R (e)In flight compartment, on panel 428VU :
R - press (in) the Blue servo control pushbutton switch and release
R (out) the Green servo control pushbutton switch.
R (f)On trailing edge, opposite center servo control, apply a reasonable
R hand pressure upward in order to eliminate any play with no bending of
R the surface and note the position on the rear cone.
R (g)On trailing edge, opposite center servo control, apply a reasonable
R hand pressure downward in order to eliminate any play with no bending
R of the surface and note the position on the rear cone.
R (h)Using the two opposite marks on the rear cone, measure the play at
R trailing edge.
R (j)In flight compartment, on panel 428VU :
R - press (in) the Yellow servo control pushbutton switch and release
R (out) the Blue servo control pushbutton switch.

R (k)On trailing edge, opposite center servo control, apply a reasonable
R hand pressure upward in order to eliminate any play with no bending of
R the surface and note the position on the rear cone.
R (l)On trailing edge, opposite center servo control, apply a reasonable
R hand pressure downward in order to eliminate any play with no bending
R of the surface and note the position on the rear cone.
R (m)Using the two opposite marks on the rear cone, measure the play at
R trailing edge. For each measurement, if play exceeds total authorized
R value (Ref. Fig. 601) proceed with inspection/check of elevator attach
R fittings (Ref. 55-26-11, P. Block 601) and servo control hinge bearings
R (Ref. 27-34-11, P. Block 601).

R (5)Close-Up
R (a)Remove rigging pins.
R (b)Shut off Green hydraulic power supply. (Ref. 29-21-00, P. Block 301),
R Blue hydraulic power supply (Ref. 29-22-00, P. Block 301), Yellow
R hydraulic power supply (Ref. 29-23-00, P. Block 301).
R (c)De-energize the aircraft electrical network (Ref. 24-41-00,
R P. Block 301).
R (d)Make certain that working area is clean and clear of tools and
R miscellaneous items of equipment.
R (e)Close access doors and access panels.
R (f)Remove access platform.

R B. Detailed Inspection of Cables in Rear Part of Aft Pressure Bulkhead

R (1)Equipment and materials

ITEM	DESIGNATION
(a)	Access Platform 2 to 5,50 m (6 ft. to 18 ft.)

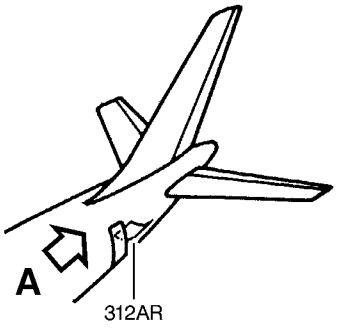
Referenced Procedures

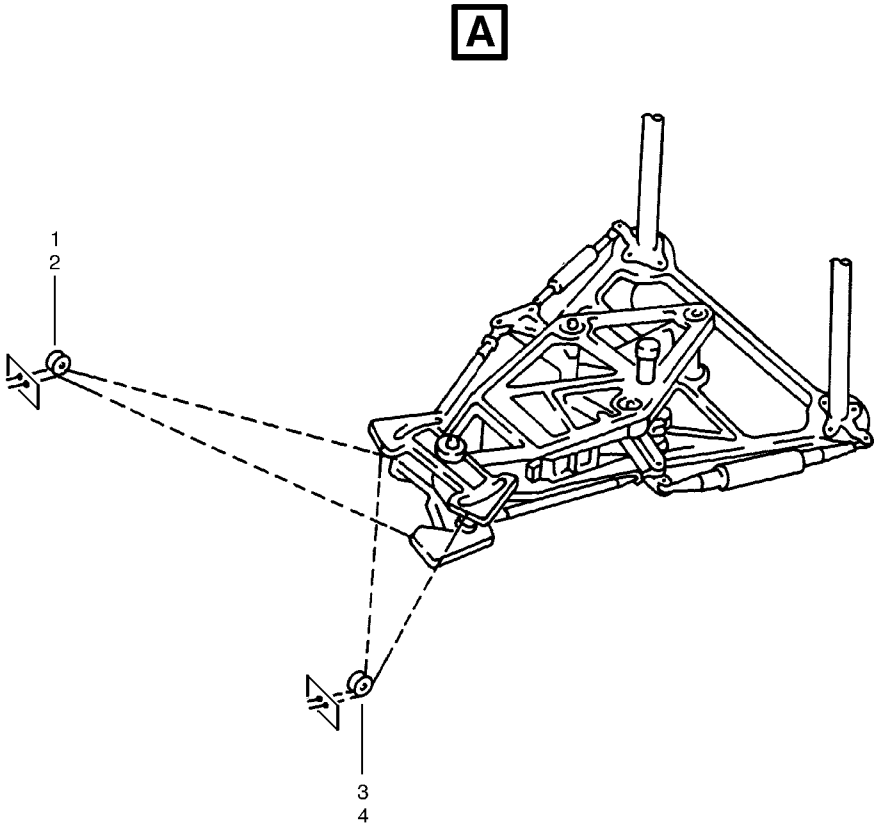
- 20-29-12, P. Block 1	Control Cable Check
- 20-29-13, P. Block 1	Cable Cleaning and Application of Protective Finishes on Cables
- 20-29-14, P. Block 1	Control Cable Rejection Criteria
- 24-41-00, P. Block 301	AC External Power Control
- 27-30-00, P. Block 401	Elevator (Cables) - Removal/Installation
- 29-21-00, P. Block 301	Green Auxiliary Hydraulic Power

R (2)Job set-up
R (Ref. Fig. 603)
R (a)Position access platform.
R (b)Open access door 312AR.
R (c)Remove the control cable protective cover to get access to pulleys (1) and (2).
R (d)Remove the floor panels and control cable protective cover to get access to pulleys (3) and (4).
R (e)Make certain that trim control wheels are in zero position.
R (f)Make certain that flap and slat control lever is in first notch position.
R (g)Make certain that SPEED BRAKE control lever is in RET position.

R (3)Inspection of cables
R (a)Check condition of pulleys (Ref. 20-29-14, P. Block 1).
R (b)Clean control cables (Ref. 20-29-13, P. Block 1).
R (c)Check cables for wear and corrosion (Ref. 20-29-12, P. Block 1).
R (d)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
R (e)Pressurize Green hydraulic system using Green electric pumps (Ref. 29-21-00, P. Block 301).
R WARNING : MAKE SURE THAT THE PULLEYS AND CONTROL CABLES ARE CLEAR. MOVEMENT OF THE CONTROL COLUMN CAN CAUSE INJURY TO PERSONS.
R (f)Slowly move control column up to move the cables and maintain it.
R (g)Check condition of pulleys (Ref. 20-29-14, P. Block 1).
R (h)Clean control cables (Ref. 20-29-13, P. Block 1).
R (j)Check cables for wear and corrosion (Ref. 20-29-12, P. Block 1).

R WARNING : MAKE SURE THAT THE PULLEYS AND CONTROL CABLES ARE CLEAR. MOVEMENT OF THE CONTROL COLUMN CAN CAUSE INJURY TO PERSONS.
R (k)Slowly move control column down to move the cables and maintain it.
R (l)Check condition of pulleys (Ref. 20-29-14, P. Block 1).
R (m)Clean control cables (Ref. 20-29-13, P. Block 1).
R (n)Check cables for wear and corrosion (Ref. 20-29-12, P. Block 1).





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Location of Cables and Pulleys
Figure 603

R

R (p)If the corroded and/or broken wires are found to be outside the limit,
R replace the control cables (Ref. 27-30-00, P. Block 401).
R (q)Protect the control cables (Ref. 20-29-13, P. Block 1).

R (4)Close-Up
R (a)Shut off Green hydraulic power supply (Ref. 29-21-00, P. Block 301).
R (b)De-energize the aircraft electrical network (Ref. 24-41-00,
R P. Block 301).
R (c)Make certain that working area is clean and clear of tools and
R miscellaneous items of equipment.
R (d)Install the removed control cable protective covers and floor panels.
R (e)Close access door 312AR.
R (f)Remove access platform.

CONTROL COLUMN

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Lockwire - Corrosion Resistant Steel, Dia. 0.8 mm (0.032 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 25-11-11, P. Block 401	Captain Seat
- 25-11-12, P. Block 401	First Officer Seat
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

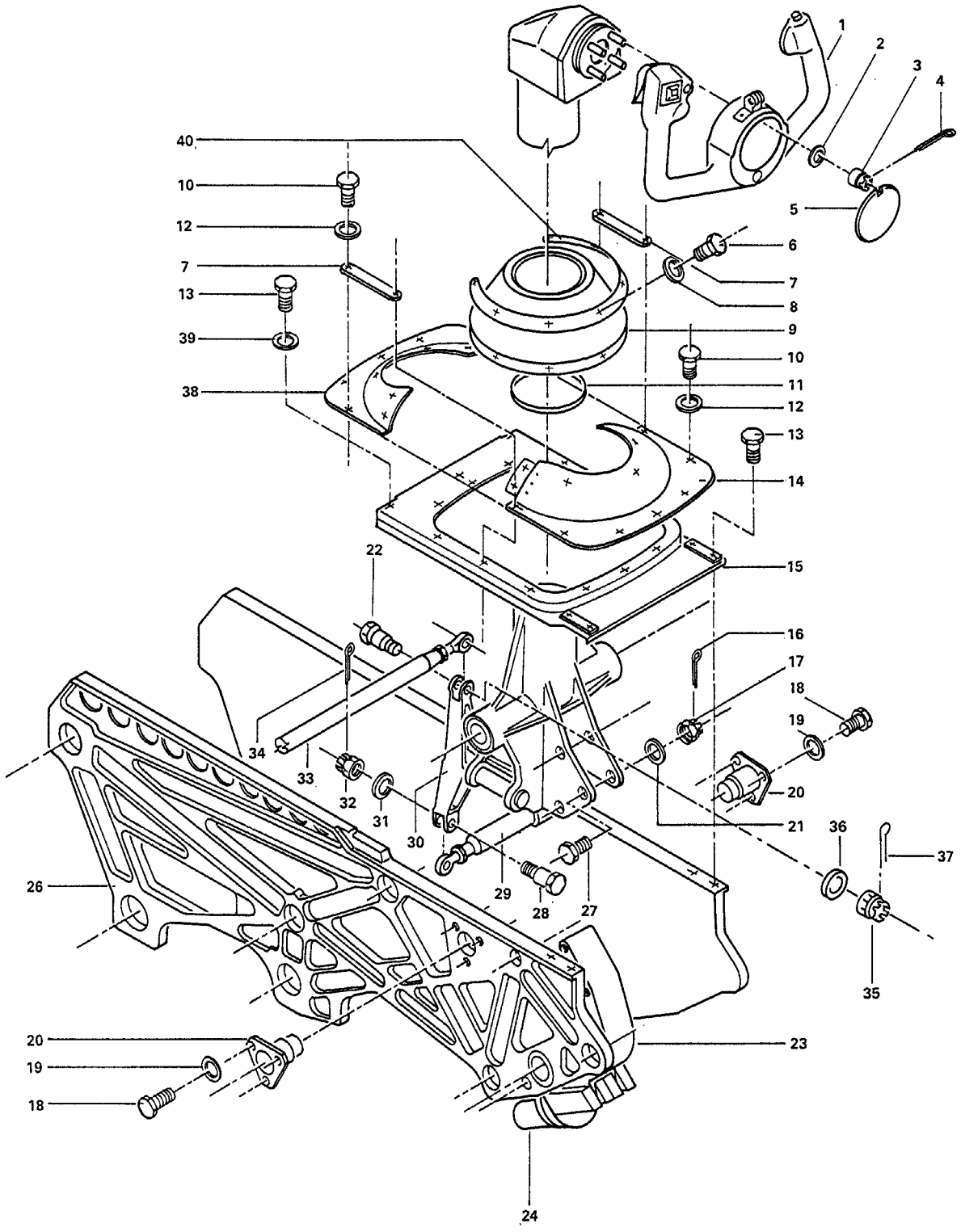
PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1		Line 103
21VU	FAC2		Line 103
21VU	AFS/AP1-FD1/FCC1/28VDC	306CA1	102/H 3
21VU	AFS/AP2-FD2/FCC2/28VDC	306CA2	102/H 6
21VU	STICK SHAKER		Line 109
22VU	AUDIO SYS/CTL PNL/CAPT	30RN	205/E19
22VU	AUDIO SYS/CTL PNL/F/O	31RN	205/E20
22VU	AUDIO SYS/CTL PNL/THIRD OCCUPANT	32RN	205/E18

(2)Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P.

Block 301).
(3)Remove Captain seat (Ref. 25-11-11, P. Block 401) or First Officer seat (Ref. 25-11-12, P. Block 401).

B. Removal
(Ref. Fig. 401)
(1)Removal of control column boot.
(a)Remove cover plate (5) from control wheel (1) ; remove cotter pins (4) the four nuts (3) and washers (2), then control wheel (1).
(b)Remove attachment bolts (6), washers (8), retaining plate (40) and clamp (11), then remove bellows (9).
(c)Remove bolts (10), washers (12) and link plates (7), then remove mounting base halves (14) and (38).
(d)Remove bolts (13) and washers (39) to remove cover (15).
(2)Removal of Control Column
(a)Open access door 121BL.
(b)Under flight compartment floor, between STA794 and STA815(FR2 and FR3) :
1 Disconnect connectors 785VC and 787VC (Captain side) or 784VDC and 786VC (First Officer side).
2 Disconnect bonding lead 75VN3 (Captain side) or 74VN3 (First Officer side).
(c)Remove floor panels 211EF (212EF) at location of control column mounting beam.
(d)Remove cotter pin (37), nut (35), washer (36) and bolt (22) to disconnect rod (33) from roll control bellcrank (30).
(e)Remove cotter pin (34), nut (32), washer (31) and bolt (28) to disconnect interconnecting spring rod (29) from roll control bellcrank (30).
(f)Clear wiring away from stick shaker (24).
(g)Remove cotter pins (16), nuts (17), washers (21) and bolts (27) to disconnect pitch control bellcrank (23) from control column.
(h)On left and right sides of control mechanism mounting beam, cut and remove lockwire ; remove the three bolts (18) and washers (19).
CAUTION : SUPPORT CONTROL COLUMN FROM BENEATH.
(j)In flight compartment, remove flanged sleeves (20).
(k)Remove control column by pulling it upwards.

C. Installation
(1)Installation of control column.
(a)In flight compartment, hold control column in position and fix to control mechanism mounting beam with the two flanged sleeves (20).
(b)In avionics compartment, secure both flanges sleeves (20) to control mechanism mounting beam with washers (19) and bolts (18). Wirelock.
(c)Connect pitch control bellcrank (23) to control column with bolts (27). Install washers (21) and nuts (17). Tighten nuts and safety with cotter pins (16).
(d)Secure wiring of stick shaker (24).
(e)Connect interconnecting spring rod (29) to roll control bellcrank (30) with bolt (28). Install washer (31) and nut (32). Tighten nut and safety with cotter pin (34).



Control Column
Figure 401

(f)Connect control rod (33) to roll control bellcrank (30) with bolt (22). Install washer (36) and nut (35). Tighten nut and safety with cotter pin (37).
(g)Install floor panels 211EF (212EF) above mounting beam (26).
(h)Install cover (15) and secure with bolts (13) and washers (39).
(j)Attach mounting base halves (14) and (38) to cover (15) with bolts (10), washers (12) and link plates (7).
(k)Under flight compartment floor, between STA794 and STA815(FR2 and FR3).
1 Connect connectors 785VC and 787VC (Captain side) or 784VC and 786VC (First Officer side .
2 Connect bonding lead 75VN3 (Captain side) or 74VN3 (First Officer side).

(2)Installation of control column bellows (9).
(a)Install bellows (9) sliding it down from the top of control column.
(b)Install and secure clamp (11) and retaining plate (40) with bolts (6) and washers (8).
(c)Position control wheel on the four studs of control column head and push home to fully connect control wheel electrical plug in control column receptacle.
(d)Install washers (2) on studs of control column head.
(e)Install and tighten nuts (3).
(f)Safety nuts with cotter pins (4).
(g)Install cover plate (5) on control wheels (1).
(h)Adjust rods (33) and (29) (Ref. 27-11-00, P. Block 501).

D. Test
(1)Perform functional test (Ref. 27-31-00, P. Block 501).

E. Close-Up
(1)Install Captain seat (Ref. 25-11-11, P. Block 401) or First Officer seat (Ref. 25-11-12, P. Block 401).
(2)Remove safety clips and tags and close the following circuit breakers : 306CA1, 306CA2, 30RN, 31RN, 32RN, FAC1, FAC2 line 103 and STICK SHAKER line 109.
(3)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(5)Close access door 121BL.

CABLE TENSION REGULATOR 274510 (274509) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

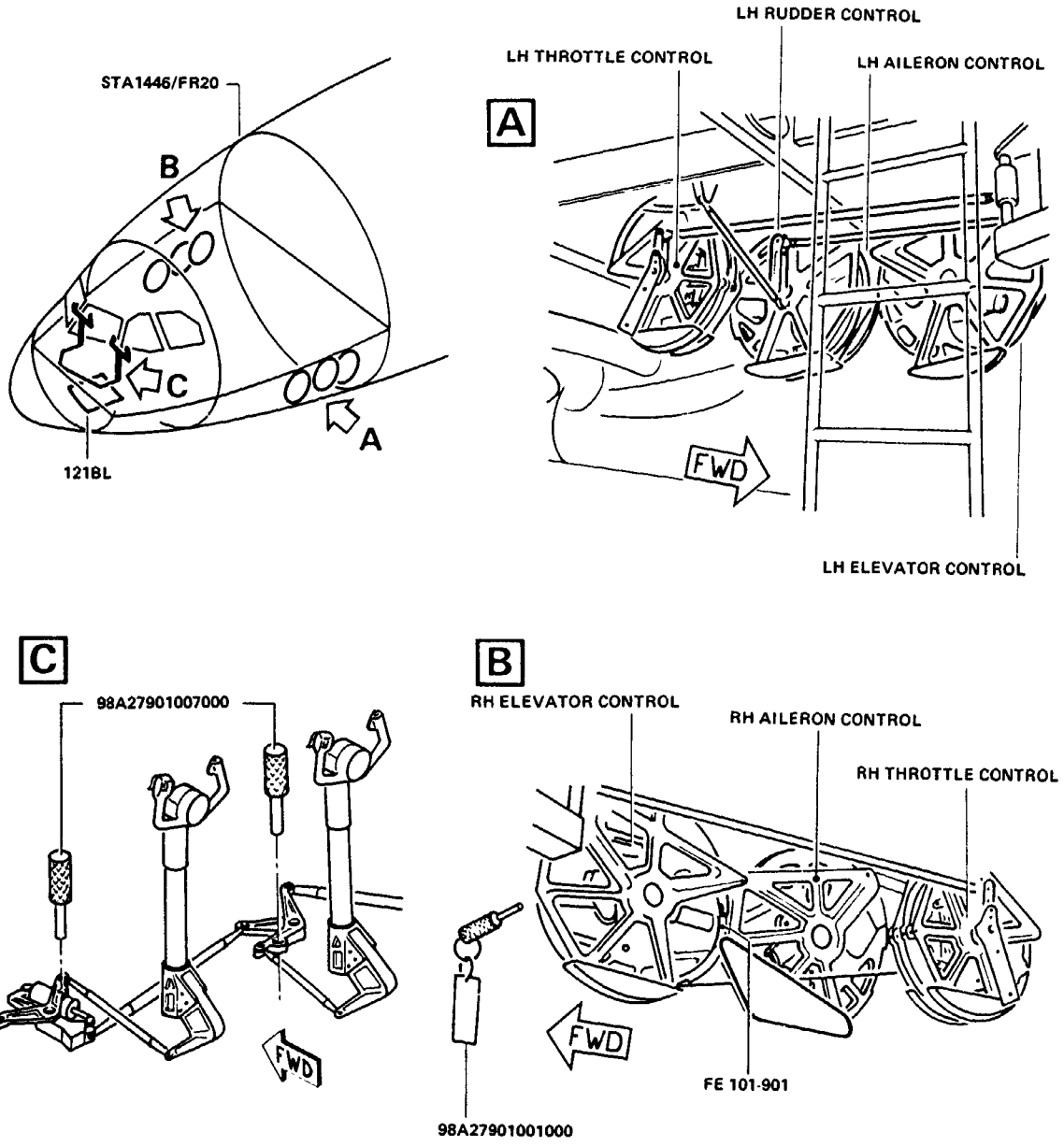
1. Equipment and Materials

	ITEM	DESIGNATION
	A. 98A27901007000	Pin - Rigging, Elevator Control
	B. 98A27901001000	Pin - Rigging, Elevator Control
	C. 98A27307541000	Rigging Pin - Cable Quadrant, Elevator Mechanical Controls
R	D. FE101901	Locking Equipment - Cable Tension Regulator
	E.	Lockwire - Corrosion Resistant Steel, dia. 0.8 mm (0.032 in.)
	F.	Circuit Breaker Safety Clips
	G.	Warning Notices Prohibiting Use of Pitch Control System
	H.	Electrical Ground Power Unit - 3-Phase - 115/200 V, 400 Hz, 90 KVA
	J.	Access Platform, 2.7 to 6 m (9 ft. 8 in. to 19 ft. 8 in.)
	Referenced Procedures	
	- 24-41-00, P. Block 301	AC External Power Control
	- 29-21-00, P. Block 301	Green Auxiliary Power
	- 27-30-00, P. Block 501	Elevator
	- 27-31-26, P. Block 401	Artificial Feel Unit Frame

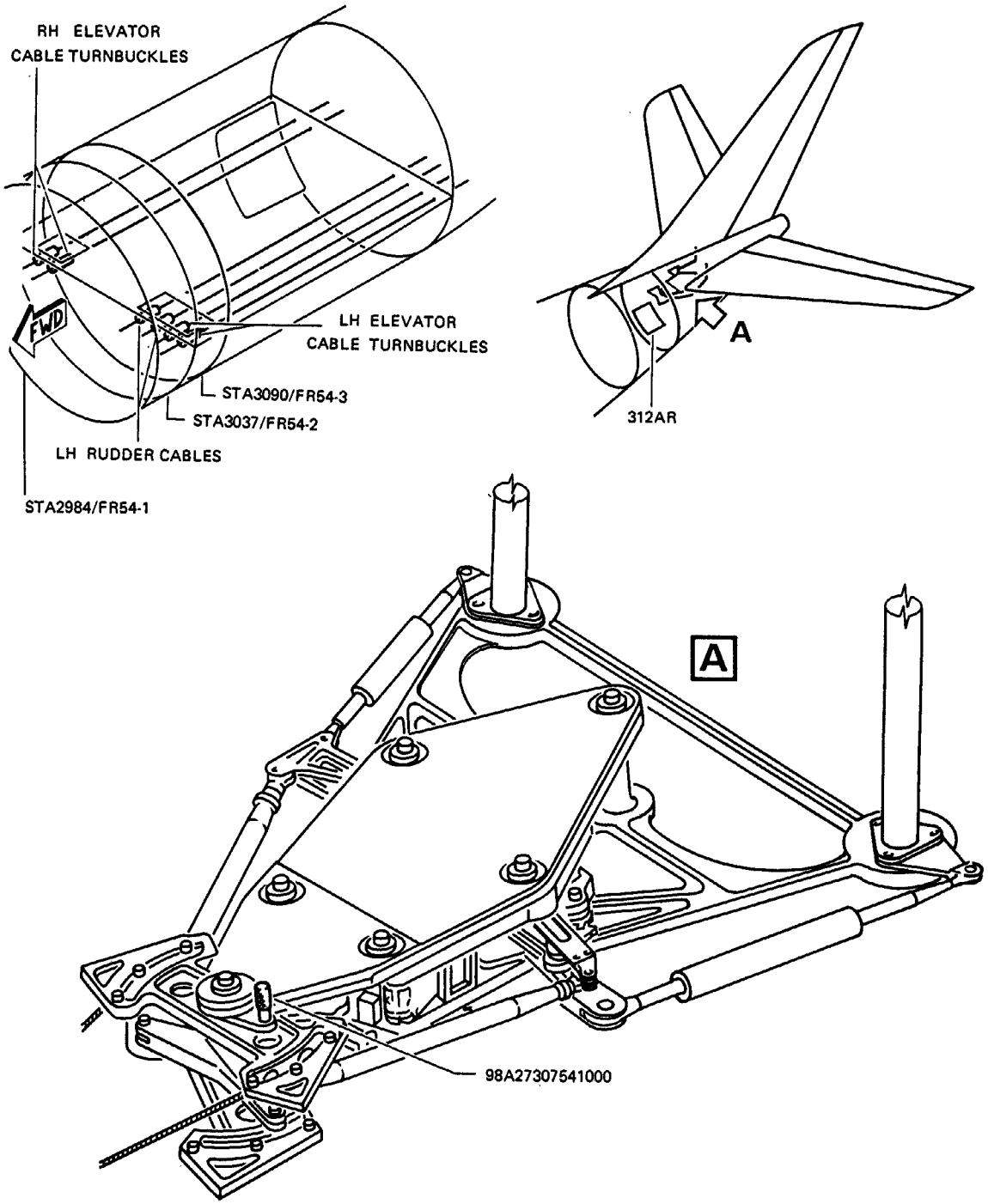
2. Procedure

A. Job Set-Up
(Ref. Fig. 401)
(Ref. Fig. 402)
(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1/115VAC	309CC1	103/G 5
21VU	FAC2/115VAC	309CC2	103/G10



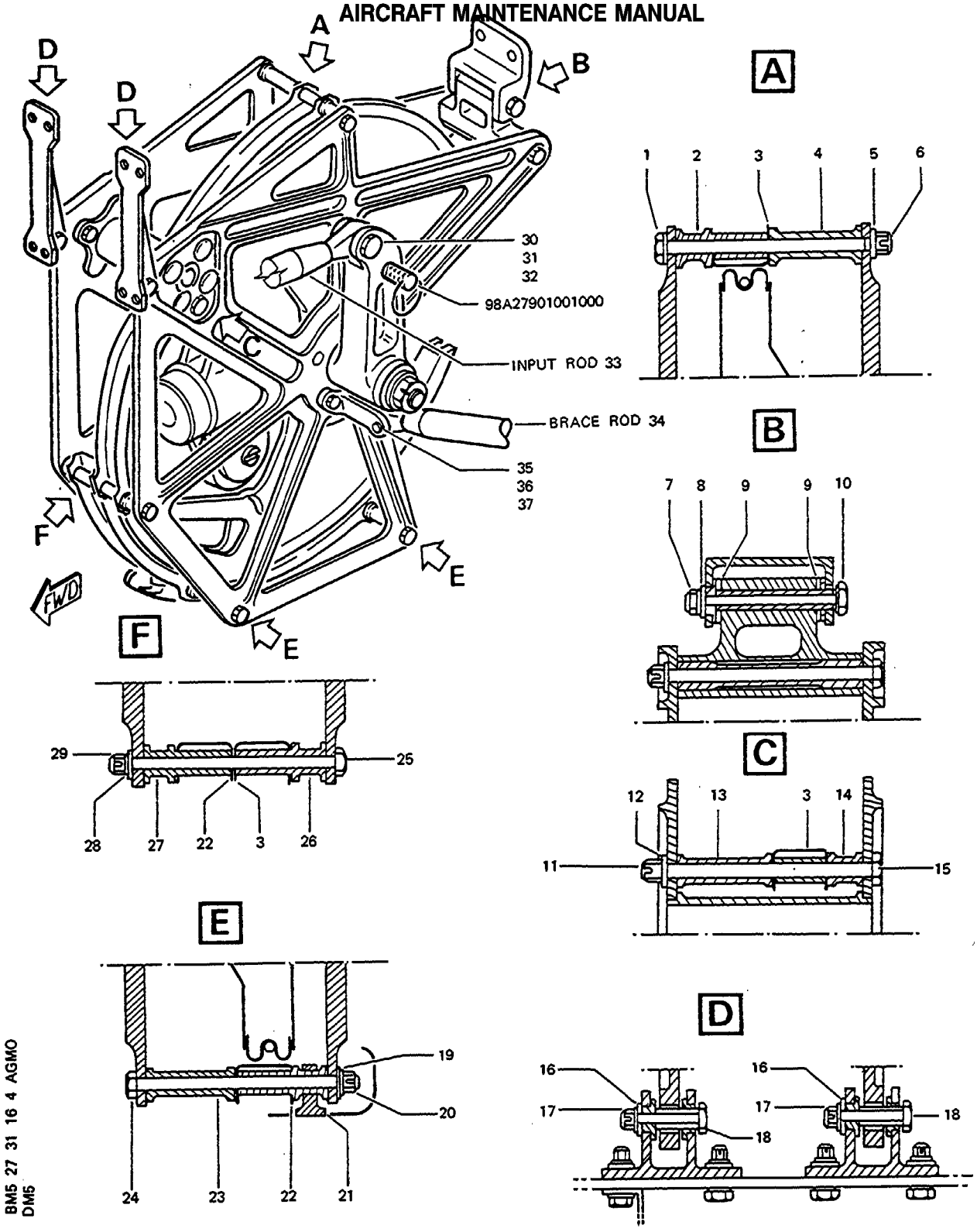
Location of Components and Rigging Points
Figure 401



Cable Location
Figure 402

(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(3)Pressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).
(4)In flight compartment, display a warning notice prohibiting depressurization of Green system.
(5)Make certain that pitch trim control wheels are at zero.
(6)Open access door 121BL to avionics compartment.
(7)Install rigging pin 98A27901007000 in pitch control bellcrank located under control mechanism mounting beam.
(8)With pitch control bellcrank thus locked, open access door 312AR and remove load limiting spring rods (Ref. 27-31-26, P. Block 401).
(9)Depressurize Green hydraulic system (Ref. 29-21-00, P. Block 301) and in flight compartment display notice prohibiting operation of control column.
(10)De-energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(11)Install rigging pin 98A27307541000 in cable quadrants on artificial feel unit.
(12)Install rigging pin 98A27901001000 in cable tension regulator input lever.
(13)Between STA2894/FR 54.1 and STA3090/FR 54.3, remove floor panels for access to cable turnbuckles.
(14)Remove safety clips from turnbuckles and gradually release cable tension
R until locking tool FE101901 can be installed in the two quadrants on the tension regulator.
Install locking tool.
(15)Release cable tension as necessary to enable removal of cable ends from their slots.

B. Removal of Left Cable Tension Regulator
(Ref. Fig. 403)
NOTE : Removal of right tension regulator is symmetrical.
(1)Remove cotter pin from nut (30), remove nut (30), washer (31). Hold input rod (33) and remove bolt (32).
(2)Stow input rod (33) on an adjacent part of the aircraft to prevent it from being damaged.
(3)Remove cotter pin from nut (35), remove nut (35) and washer (36). Hold brace rod (34) and remove bolt (37).
(4)Stow brace rod (34) on an adjacent part of the aircraft to prevent it from being damaged.
(5)Remove cotter pin from nut (6), remove nut (6), washer (5), bolt (1), spacers (2) and (4) and upper cable guard (3). (Ref. Detail A.).
(6)Remove cotter pin from nut (11), remove nut (11), washer (12), bolt (15) and spacers (13) and (14) and upper cable guard (3). (Ref. Detail C.).
(7)Remove cotter pin from nut (29), remove nut (29), washer (28), bolt (25), spacers (26) and (27), upper cable guard (3) and lower cable guard (22). (Ref. Detail F.).
(8)Remove cotter pins from nuts (20), remove nuts (20), washers (19), bolts (24), spacers (23), spacers (21) with protective cover assembly.
(9)Remove lower cable guard (22). (Ref. Detail E.).
(10)Remove cable ends from slots on tension regulator cable quadrants. Hang cables on structure.

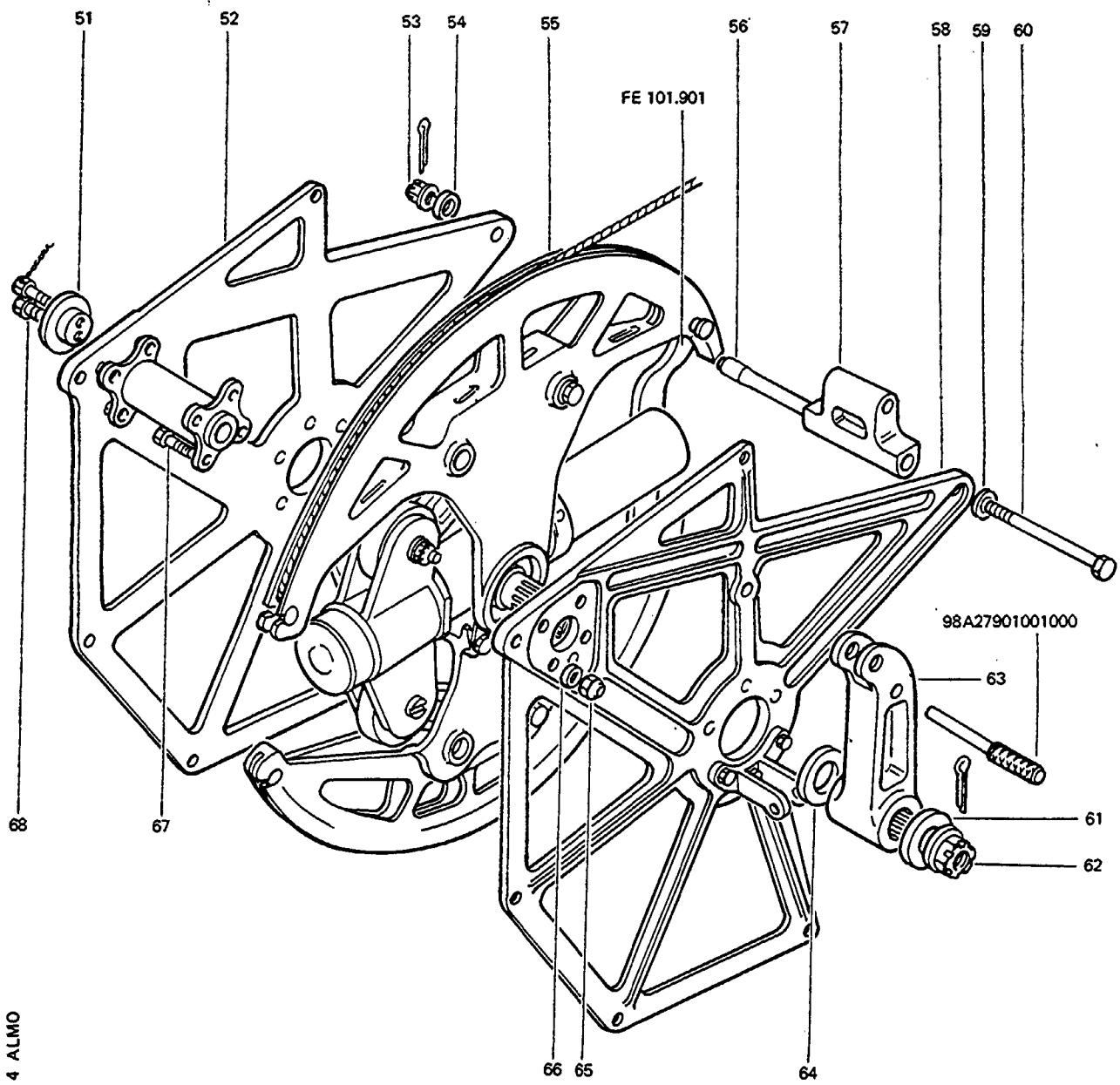


Left Cable Tension Regulator
Figure 403

(11)At forward attachment point of regulator, remove cotter pins from nuts (17), remove nuts (17) and retain washers (16). (Ref. Detail D.).
(12)At aft attachment point of regulator, remove cotter pin from nut (7), remove nut (7) and washer (8). (Ref. Detail B.).
(13)Support regulator. Remove bolt (10), shim washers (9) and bolts (18).
(14)Remove regulator.

C. Preparation of Replacement Component
(Ref. Fig. 404)
(1)Disassembly of regulator
(a)Remove rigging pin 98A27901001000, remove cotter pin from nut (62), remove nut (62), washer (61), input lever (63), shim washer (64).
(b)Cut and remove lockwire, remove the two bolts (68). Remove lock washer (51).
(c)Remove cotter pins from the four nuts (65), and remove nuts (65). Remove the four bolts (67) and retain washers (66).
(d)Remove cotter pin from nut (53) and remove nut (53) and washer (54).
(e)Remove frame (58).
(f)Separate frame (52) from regulator (55).
(g)On frame (58) :
1 Hold suspension block (57)
2 Remove bolt (60) and retain washer (59).
3 Remove suspension block (57) together with spacer (56).
(2)Assembly of regulator
WARNING : REPLACEMENT REGULATOR MUST BE MANDATORILY FITTED WITH ITS CABLE QUADRANT LOCKING EQUIPMENT.
(a)Insert shorter hub of replacement regulator into bearing of frame (52).
(b)Install lock washer (51) and attach with the two bolts (68). Wirelock bolts (68).
(c)Make certain that spacer (56) is correctly inserted into suspension block (57). Install suspension block assembly on frame (58) using bolt (60) and washer (59).
(d)Install frame (58), centering it on regulator hub and on shoulder of spacer attached to frame (52).
(e)Install washer (54) on bolt (60). Install nut (53), tighten and safety with cotter pin.
(f)Install bolts (67) and washers (66). Install nuts (65), tighten and safety with cotter pin.
(g)Install shim washer (64) and input lever (63) on regulator hub.
NOTE : A double spline on regulator hub and a double groove on input lever provide foolproof mating of input lever with respect to regulator.
(h)Place regulator in correct installation attitude and lock input lever (63) to frame (58) using rigging pin 98A27901001000.
(j)Install washer (61). Install nut (62) tighten and safety with cotter pin.

D. Installation (Ref. Fig. 403)
(1)Position tension regulator and secure with bolt (10), shim washers (9) and bolts (18).
(2)At aft attachment point of regulator, install washer (8), and nut (7) on



Tension Regulator
Figure 404

bolt (10). Tighten nut and safety with cotter pin. (Ref. Detail B.).
(3)At forward attachment point of regulator, install washers (16), on bolts (18), install nuts (17), tighten and safety with cotter pins (Ref. Detail D.).
(4)Insert cable end fittings in slots on cable quadrants.
(5)Position upper cable guard (3) and attach using bolt (1), spacers (2) and (4). Install washer (5) on bolt (1), install nut (6), tighten and safety with cotter pin. (Ref. Detail A.).
(6)Attach upper cable guard (3) and spacers (13) and (14) with bolt (15). Install washer (12) on bolt (15). Install nut (11), tighten and safety with cotter pin. (Ref. Detail C.).
(7)Attach upper cable guard (3) and spacer (26), and lower cable guard (22) and spacer (27) with bolt (25) and washer (28). Install nut (29) tighten and safety with cotter pin (Ref. Detail F.).
(8)Attach lower cable guard (22), spacers (23) and spacers (21) fitted with protective cover assembly with bolts (24) and washers (19). Install nuts (20), tighten and safety with cotter pins. (Ref. Detail E.).
(9)Install brace rod (34) on tension regulator using bolt (37). Install washer (36), nut (35) tighten nut and safety with cotter pin.
(10)Install input rod (33) on regulator input lever using bolt (32). Install washer (31) and nut (30). Tighten nut and safety with cotter pin.
(11)Progressively tighten cables to enable removal of locking tool FE 101-901.

E. Adjustment
Adjust cable tension (Ref. 27-30-00, P. Block 501).

F. Test
(1)Remove all rigging pins.
Install load limiting spring rods (Ref. 27-31-26, P. Block 401).
(2)Energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Pressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).
(4)Operate elevator control system several times.
(5)Install rigging pin 98A27901007000 in pitch control bellcrank.
(6)Check that rigging pins 98A27901001000 and 98A27307541000 can be installed in cable tension regulator and cable quadrants respectively.
(7)Make certain that cable tension, as read on tension regulator compensation scale, then has not changed.
(8)Re-adjust cable tension as required (Ref. 27-30-00, P. Block 501).

G. Close-Up
(1)Remove all rigging pins.
(2)Depressurize Green hydraulic system.
(3)De-energize the aircraft electrical network.
(Ref. 24-41-00, P. Block 301).
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(5)Remove warning notices.
(6)Remove safety clips and tags and close the following circuit breakers : 309CC1, 309CC2.
(7)Close access doors.

(8)Remove access platform.

VERTICAL TORQUE TUBE, WITH UNIVERSAL JOINT - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, up to 8 m (26 ft.)
B. 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
C. 98A27307541000	Rigging Pin - Cable Quadrant, Elevator Mechanical Controls
D. 98A27307549000	Pin - Rigging, Elevator Control Bellcranks
E. 0U131281	Pin - Rigging, Landing Gear Emergency Lowering Control
F.	Cotter Pins
G.	Warning Notices
H. Material No. 04-004	Common Greases (Ref. 20-31-00)
J. Material No. 05-005	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 27-31-26, P. Block 401	Artificial Feel Unit Frame
- 27-31-33, P. Block 401	Pitch Uncoupling Unit
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 51-75-10, P. Block 801	Repair of Paint Coatings
- 55-13-13, P. Block 401	Trailing Edge Access Panels

2. Procedure

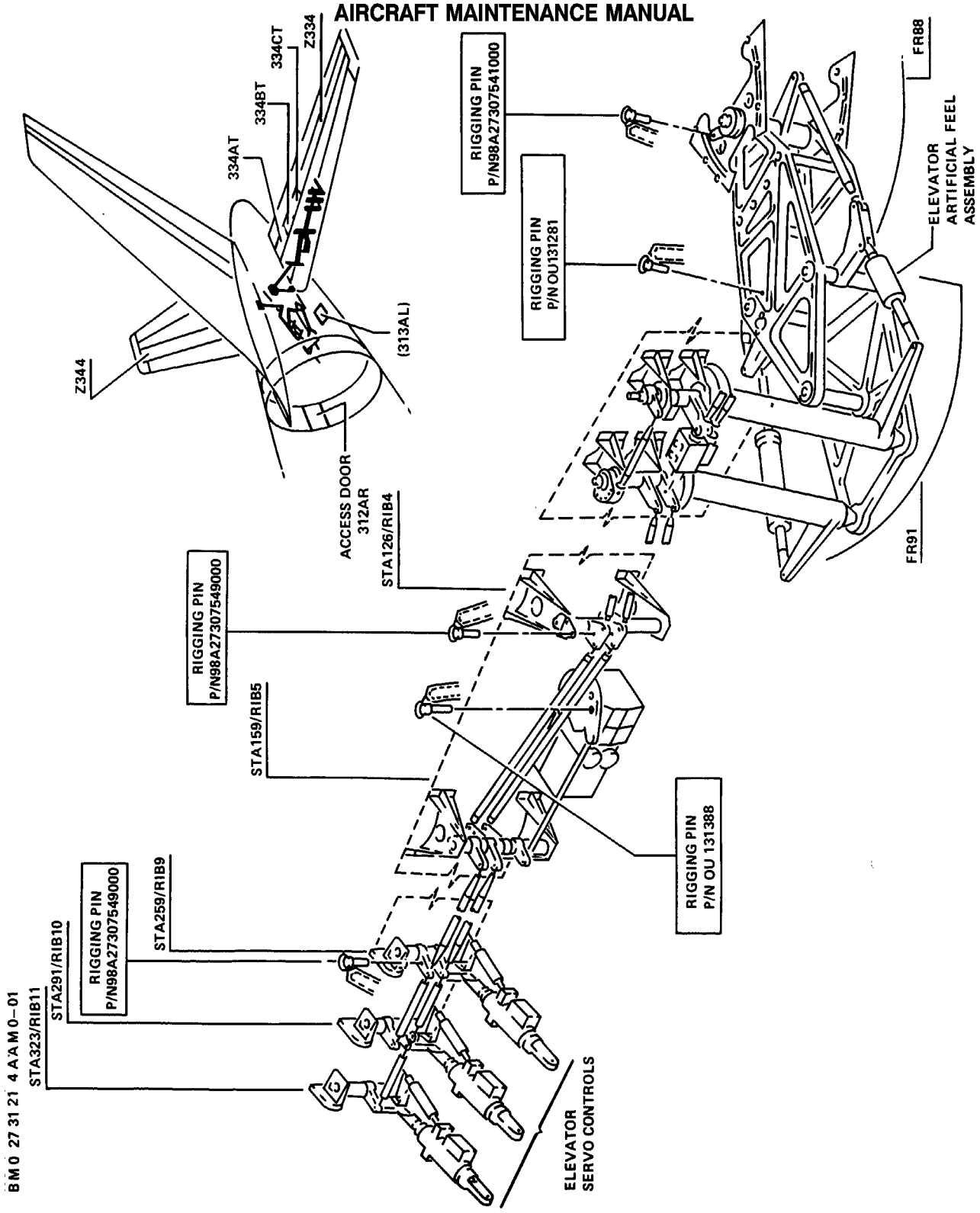
A. Job Set-Up (Ref. Fig. 401)
(1)Position access platform.
(2)Make certain that pitch trim control wheels and elevator control are set at zero and install locking equipment P/N 97A27302009000 at pitch trim control wheel.
(3)Display warning notices in flight compartment prohibiting operation of flight controls.
(4)Remove trailing edge access panels 334/344CT (Ref. 55-13-13, P. Block 401).
(5)Open access doors 312AR and 313AL.
(6)Remove artifical feel unit cover (Ref. 27-31-26, P. Block 401).
(7)Install rigging pin P/N 98A27307541000 in cable quadrant.
(8)Install rigging pin P/N 0U131281 in elevator artificial feel frame assembly.
(9)Install rigging pin P/N 98A27307549000 in bellcrank at RIB9 LH and RH.
(10)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301) and display warning notice in flight compartment prohibiting pressurization.

B. Removal (Ref. Fig. 402)
(1)Remove pitch uncoupling unit (1) (Ref. 27-31-33, P. Block 401).
(2)Remove control rods (4).
(a)Remove cotter pins (7), nuts (6) and washers (5).
(b)Remove bolts (2), bushes (3) and disconnect control rods (4).
(3)Remove brackets (15).
(a)Remove cotter pins (14), nuts (13) and washers (12).
(b)Remove bolts (10), move bracket (15) from structure and remove shims (11).
(4)Carefully withdraw pins (9) of elevator vertical torque tubes from bearing (8) and remove vertical torque tubes with universal joints.

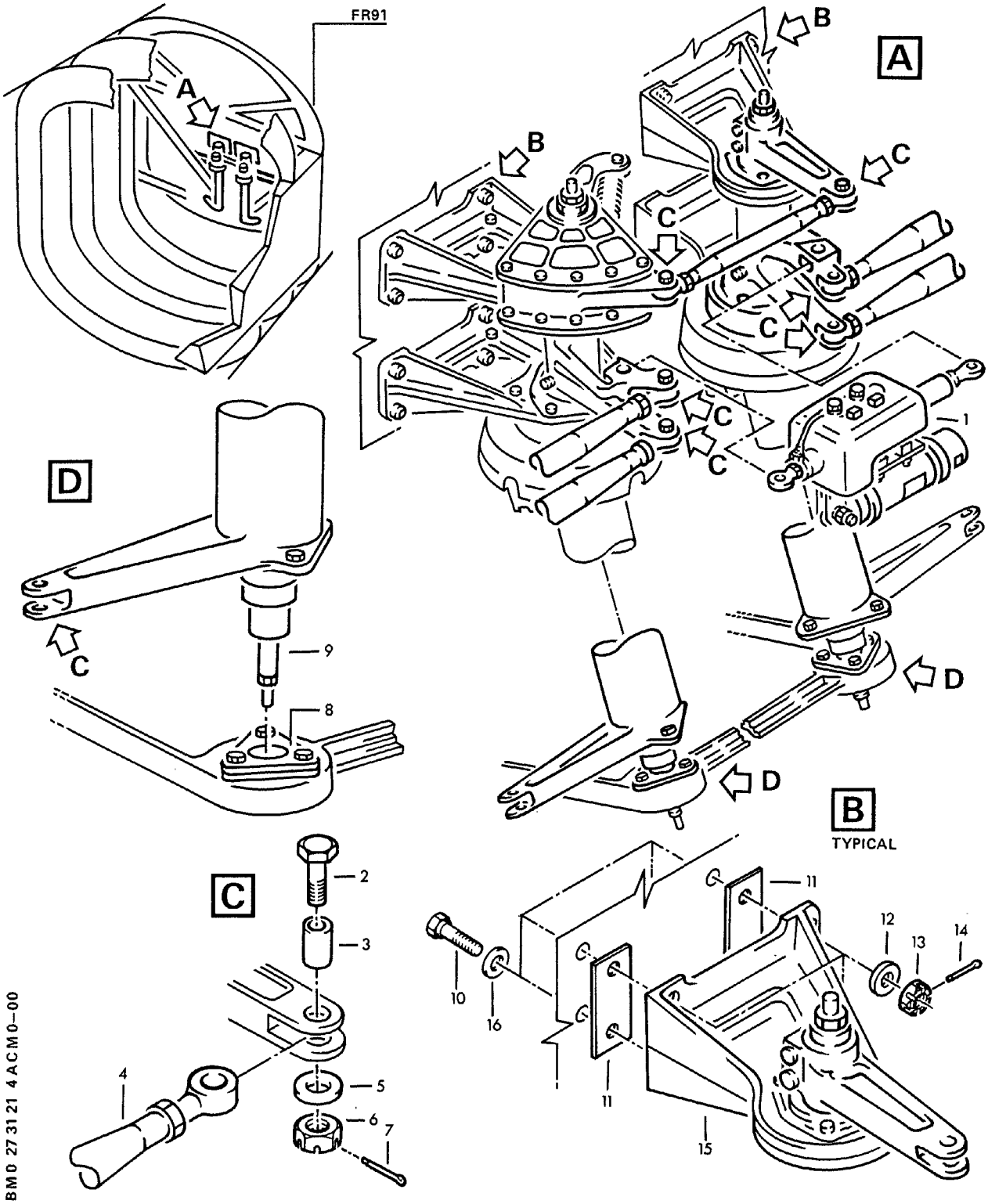
C. Installation (Ref. Fig. 402)
(1)Apply grease (Mat. No. 04-004) to all bolts.
(2)Position vertical torque tubes with universal joints and insert pins (9) into bearing (8).
(3)Install brackets (15).
(a)Position shims (11), brackets (15), install bolts (10), washers (12) and nuts (13).
(b)Safety nuts (13) with cotter pins (14).
(4)Install control rods (4).
(a)Position control rods (4), bushes (3), install bolts (2), washers (5) and nuts (6).
(b)Safety nuts (6) with cotter pins (7).
(5)Install pitch uncoupling unit (1) (Ref. 27-31-33, P. Block 401).
(6)Remove rigging pins P/N 98A27307549000, P/N 98A27307541000, P/N 0U131281 and locking equipment P/N 97A27302009000.

D. Test
(1)Carry out functional test of elevator and pitch control uncoupling and coupling (Ref. 27-31-00, P. Block 501).
(2)Carry out artificial feel functional test (Ref. 27-33-00, P. Block 501).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install artificial feel unit cover (Ref. 27-31-26, P. Block 401).
(3)Apply corrosion-preventive compound (Mat. No. 05-005) to all visible cadmium-plated steel parts (Ref. 51-75-10, P. Block 801).
(4)Close access doors 312AR and 313AL.
(5)Install trailing edge access panels 334/344CT (Ref. 55-13-13, P. Block 401).
(6)Remove access platform.
(7)Remove warning notices.



Rigging Location
Figure 401



Vertical Torque Tube, with Universal Joint
Figure 402

THS BELLCRANKS - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROLSURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

CAUTION : DO NOT OPERATE ELEVATOR SERVO CONTROLS, WHEN MECHANICAL TRAVEL STOPS IN LEVER SUPPORT RIB5 LH AND RH ARE REMOVED.

1. Reason for the Job

A. Replacement of bellcranks.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, up to 8.30 m (27 ft.) O
B. 0U131281	Pin - Rigging, Artificial Feel Unit Elevator O Mechanical Controls O
C. 98A27307541000	Pin - Rigging O Elevator Mechanical Controls O
D. 98A27207543000	Pin - Rigging, Auto-Pilot, Servo-Motor O
E. 98A27307549000	Pin - Rigging, Elevator Control Bellcranks O
F. 97A27302009000	Locking Equipment - Pitch Trim Control Wheel O
G.	Corrosion-Resistant Steel Lockwire, 0.8 mm O (0.032 in.) dia O
H.	Warning Notices O
J.	Circuit Breaker Safety Clips O
K.	Cotter Pins O
L. Material No. 05-002	Special Materials (Ref. 20-31-00) M
M. Material No. 05-005	Special Materials (Ref. 20-31-00) M
N. Material No. 05-019	Special Materials (Ref. 20-31-00) M
P. Material No. 11-004	Cleaning Agents (Ref. 20-31-00) M
Referenced Procedures	
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ D Depressurization D
- 27-31-00, P. Block 301	Mechanical Control and Pitch Uncoupling - D Rigging D
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling D
- 27-31-23, P. Block 401	Servo Control Actuating Spring Rod D
- 55-13-11, P. Block 401	Trailing Edge D
- 55-13-13, P. Block 401	Trailing Edge Access Panels D

3. Procedure

A. Job Set-Up (Ref. Fig. 401)

(1)Position access platform.

(2)Make certain that pitch trim control wheels and control column are set at zero and install locking equipment P/N 97A27302009000 at pitch trim control wheel.

(3)Display warning notices in flight compartment prohibiting operation of flight controls.

(4)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL THS/JAM DET	2CB	332/U64
133VU	FLT CTL/SURF/POS	1CT	334/S61
133VU	FLT CTL/PITCH UNCOUPLING SOLENOID	1CF	331/V64

(5)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).

(6)Remove horizontal stabilizer access panels 334AB/AT, 334CB/CT, 344AB/AT, 344CB/CT and sections 334BB/BT, 344BB/BT (Ref. 55-13-13 and 55-13-11, P. Block 401.

(7)Open access doors 312AR and 313AL.

(8)Install rigging pins P/N 98A27307541000 and P/N OU131281 (Ref. 27-31-00, P. Block 301).

(9)Insert rigging pin P/N 98A27307549000 in bellcrank at RIB9.

(10)Insert rigging pins P/N 98A27307549000 in bellcranks, at aft detent bellcrank RIB4 and RIB5.

(11)Insert rigging pin P/N 98A27207543000 in autopilot servomotor.

B. Removal

CAUTION : IT IS ESSENTIAL TO IDENTIFY BOLTS, BUSHES AND SIMILAR SMALL COMPONENTS AT EACH CONNECTION, TO ENSURE INSTALLATION IN ORIGINAL POSITIONS.

CAUTION : PUSHRODS MAY ONLY BE REPLACED IN PAIRS.

(1)Removal of Pushrods - Typical (Ref. Fig. 402)

NOTE : Removal procedure is similar for each pushrod.

R (a)Record and mark clamp (61) position by measuring distance
R between rod bearing axis and clamp before removal.
R (b)Remove cotter pins (7), nuts (6), washers (5), bolts (1) and spacer (2).
R (c)Remove pushrods (3) and bushes (4).
R (d)Remove cotter pin (64), nut (63), washer (62), bolt (60) and clamp (61).

(2)Removal of Bellcranks RIB4 (Ref. Fig. 403)

(a)Disconnect pushrods (3) refer to Para. 3.B.(1).
(b)Remove rigging pin P/N 98A27307549000 from bellcrank RIB4.
(c)Remove cotter pins (21), nuts (20) and washers (19).
(d)Remove bolts (10), plate (28) and cover (12).
(e)Remove cotter pins (22), nuts (23) and washers (24).
(f)Remove bolts (26) and washers (25).
(g)Remove cotter pins (13), nuts (14), washers (15), bearing assemblies (16) and washers (17).
(h)Remove bellcrank (18).

(3)Removal of Bellcranks RIB5, 9, 10, 11 - Typical (Ref. Fig. 403)

(a)Disconnect pushrods (3) refer to Para. 3.B.(1).
(b)Remove rigging pin P/N 98A27307549000 from respective bellcrank.
(c)Remove servo control actuating spring rod (27) (Ref. 27-31-23, P. Block 401).

NOTE : Step (c) is only applicable for removal of bellcranks RIB9, 10 and 11.

(d)Remove cotter pins (21), nuts (20) and washers (19).
(e)Remove bolts (10), washers (11) and cover (12).
(f)Remove cotter pins (22), nuts (23) and washers (24).
(g)Remove bolts (26) and washers (25).
(h)Remove cotter pins (13), nuts (14), washers (15), bearing assemblies (16) and washers (17).
(j)Remove bellcrank (18).

C. Preparation for Installation

(1)Clean all bolts, sleeves, bushes and working area with cleaning agent (Mat. No. 11-004).
(2)Coat all moving components, bearings, bolts, etc. with grease (Mat. No. 05-019).

D. Installation

(1)Installation of Bellcranks RIB5, 9, 10, 11 - Typical (Ref. Fig. 403)

(a)Position bellcrank (18).

(b)Apply corrosion-preventive paste (Mat. No. 05-002) to mating surface of bearing assemblies (16).

(c)Position washers (17), bearing assemblies (16), washers (15), install nuts (14).

(d)Safety nuts (14) with cotter pins (13).

(e)Position washers (25), install bolts (26), washers (24), nuts (23).

(f)Safety nuts (23) with cotter pins (22).

(g)Position cover (12), washers (11), install bolts (10), washers (19), nuts (20).

(h)Safety nuts (20) with cotter pins (21).

(j)Install servo control actuating spring rod (27) (Ref. 27-31-23, P. Block 401).

NOTE : Step (f) is only applicable for installation of bellcranks RIB9, 10 and 11.

(k)Connect pushrods (3) refer to Para. 3.D.(3).

(2)Installation of Bellcranks RIB4, (Ref. Fig. 403)

(a)Position bellcrank (18).

(b)Apply corrosion-preventive paste (Mat. No. 05-002) to mating surface of bearing assemblies (16).

(c)Position washers (17), bearing assemblies (16), washers (15), install nuts (14).

(d)Safety nuts (14) with cotter pins (13).

(e)Position washers (25), install bolts (26), washers (24), nuts (23).

(f)Safety nuts (23) with cotter pins (22).

(g)Position cover (12), plate (28), install bolts (10), washers (19), nuts (20).

(h)Safety nuts (20) with cotter pins (21).

(j)Connect pushrods (3) refer to Para. 3.D.(3).

(3)Installation of Pushrods - Typical (Ref. Fig. 402).

CAUTION : PUSHRODS MAY ONLY BE REPLACED IN PAIRS.

(a)Install rigging pins P/N 98A27307549000 in bellcranks RIB4, 5, and 9.

R (b)Put clamps (61) in position in the mark made during removal,
R install bolts (60), washers (62), nuts (63).

R (c)Safety nuts (63) with cotter pins (64).

R (d)Position bushes (4) and pushrods (3).

R (e)Install spacers (2), bolts (1), washers (5), nuts (6).

R (f)Safety nuts (6) with cotter pins (7).

R (g)If necessary carry out adjustment of pushrods (3) (Ref. 27-31-00,
R P. Block 501).

R (h)Apply corrosion-preventive compound (Mat. No. 05-005) to all
R threaded ends and nuts.

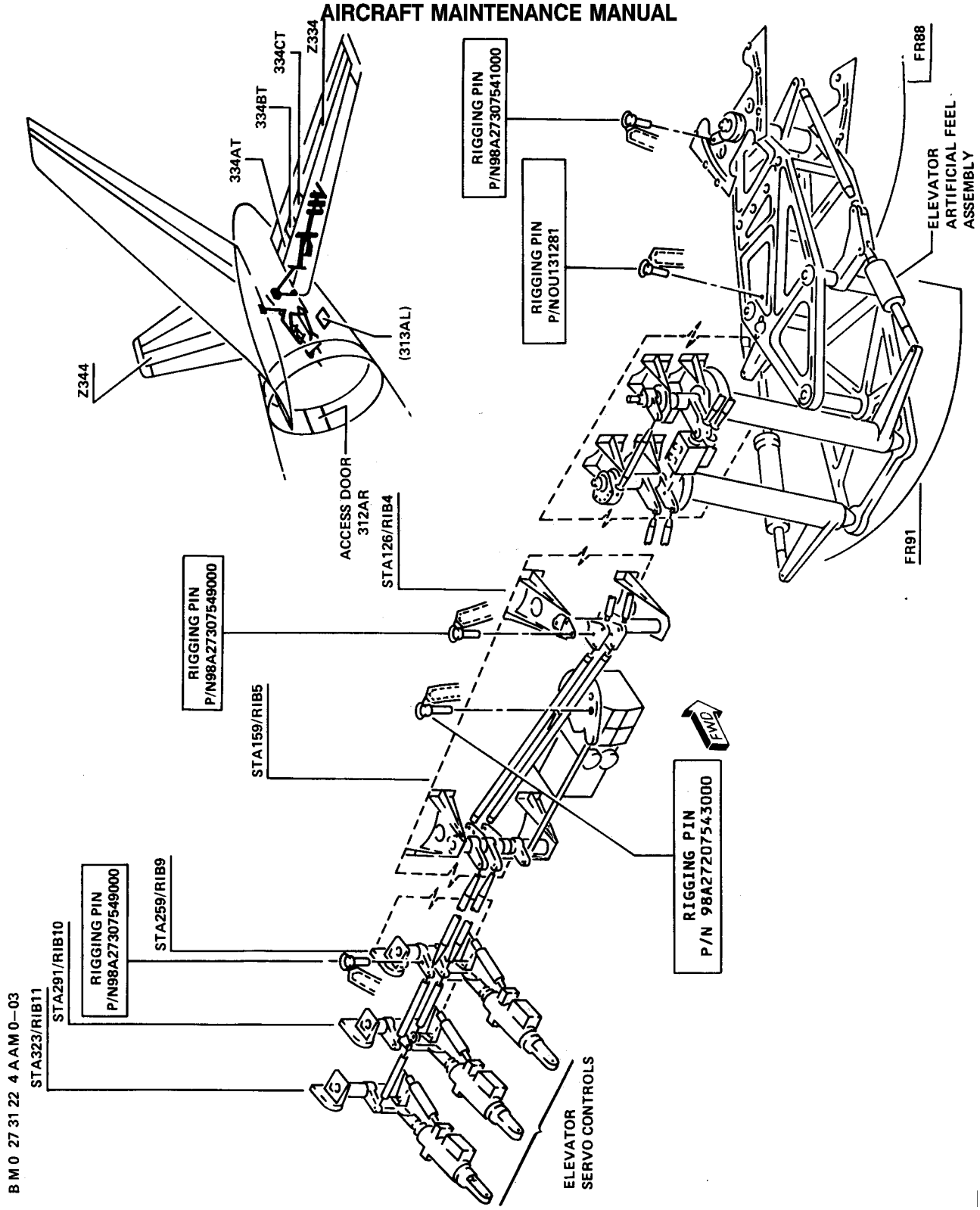
(4)Remove all rigging pins.

(5)Remove safety clips and tags, and close circuit breakers 1CB, 2CB, 1CT and 1CF.

(6)Make certain that travel ranges of elevator, pushrods, bellcranks and levers are clear.

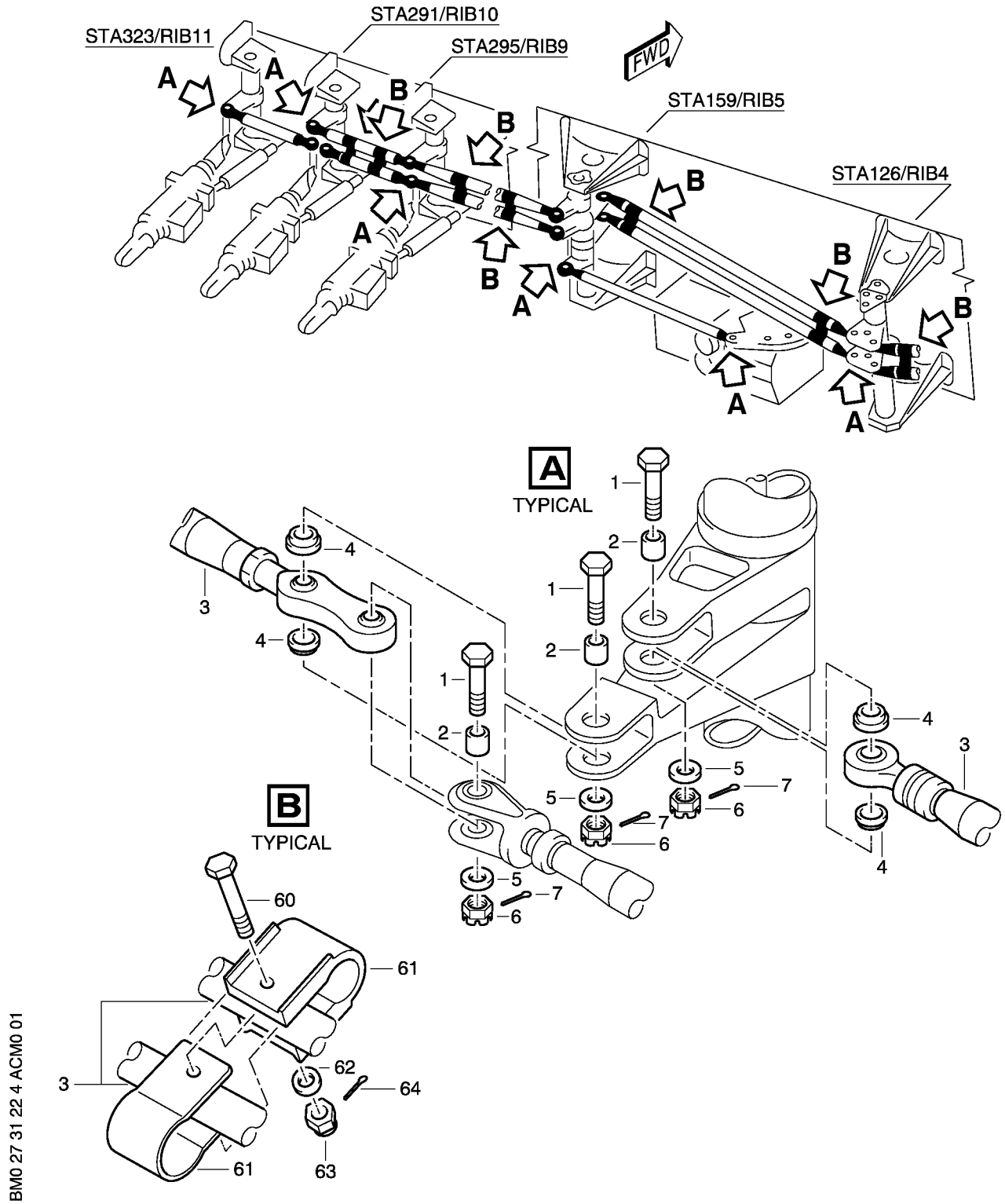
E. Test
(1)Carry out mechanical control functional test (Ref. 27-31-00, P. Block 501).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install covers (Ref. 27-31-26, P. Block 401).
(3)Close access doors 312AR and 313AL.
(4)Install access panels 334AB/AT, 334CB/CT, 344AB/AT, 344CB/CT (Ref. 55-13-13, P. Block 401).
(5)Remove warning notices.
(6)Remove access platform.



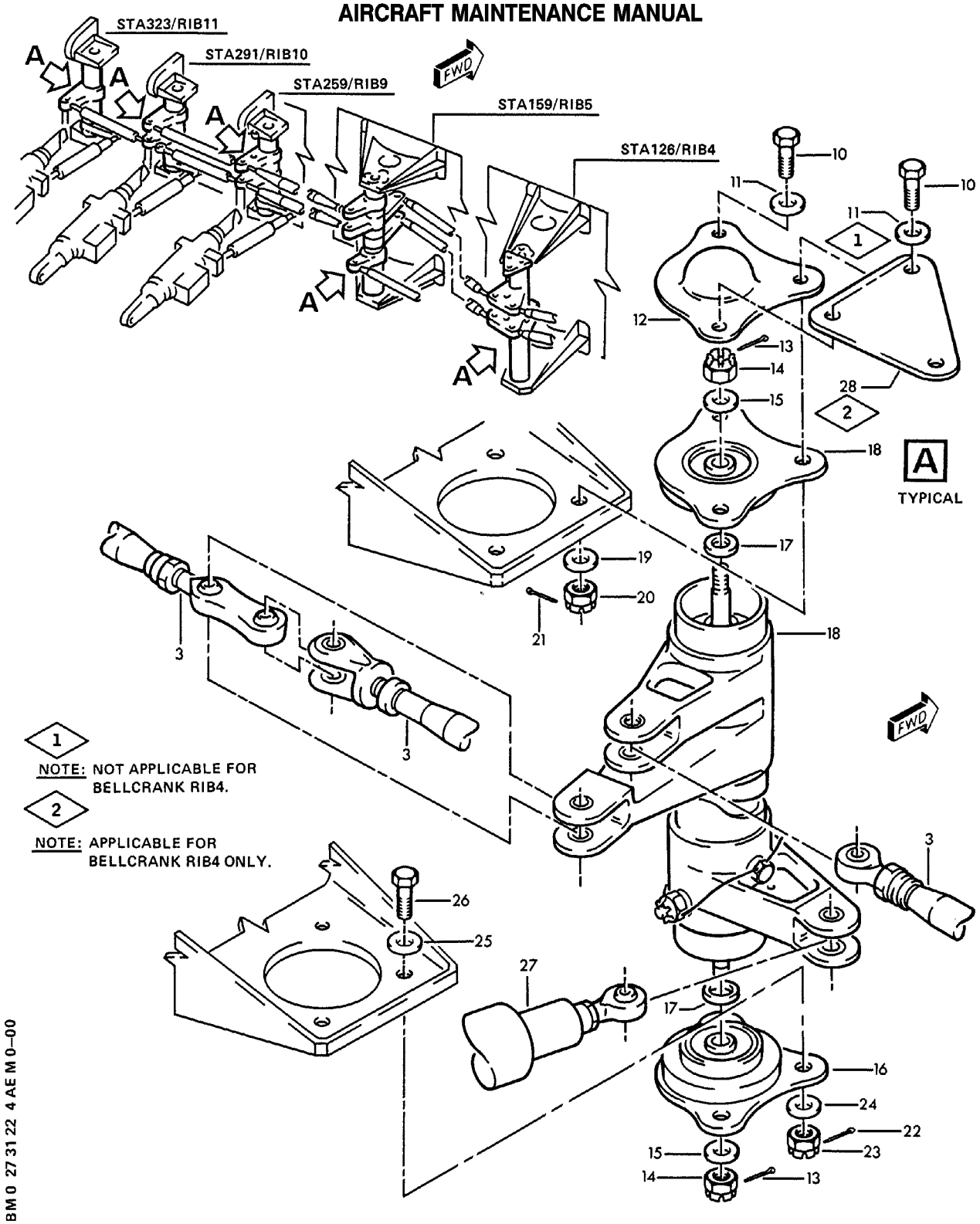
Rigging Location
Figure 401

R



Pushrods
Figure 402

R



Bellcranks
Figure 403

SERVO CONTROL ACTUATING SPRING ROD - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

NOTE : The servo control actuating spring rods are identical in design and function. Only one is described and illustrated.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, up to 8.0 m (26 ft.)
B.	Electrical Ground Power Unit - 3-Phase, 115/200V, 400 Hz
C. EMH1569S	Cart - Hydraulic Ground Power Supply, 150 l/min (36.6 USGPM)
D. 98A27307549000	Pin - Rigging, Elevator Control Bellcranks
E. TR12-18	Rigmaster System
F. TR31	Rigmaster System - Protractor (Qty. 2)
or	
G. 98A27308005000	Protractor - Control Surface Deflection
H.	Circuit Breaker Safety Clips
J.	Cotter Pins
K.	Warning Notices
L. Material No. 05-005	Special Materials (Ref. 20-31-00)
M. Material No. 05-019	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 27-35-00, P. Block 501	Control Surface Position Indicating (Elevator)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 51-75-10, P. Block 801	Repair of Paint Coatings
- 55-13-13, P. Block 401	Trailing Edge Access Panels
- 55-22-13, P. Block 401	Leading Edge Access Panels

A. Job Set-Up

(1)Position access platform.
(2)Make certain that elevator and trimmable horizontal stabilizer controls are set at neutral position.
NOTE : Check and record elevator neutral position (trailing edge aligned with alignment marks, located on tail cone side skin).
(3)Display warning notices in flight compartment prohibiting operation of flight controls.
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	U64
133VU	FLT CTL/SURF POS	1CT	S61

(5)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301) and display warning notices, prohibiting pressurization.
(6)Open access panels associated with servo control to be removed:
LH panels 334CT, 334CB (Ref. 55-13-13, P. Block 401) and 335BT, 335BB (Ref. 55-22-13, P. Block 401).
RH panels 344CT, 344CB (Ref. 55-13-13, P. Block 401) and 345BT, 345BB (Ref. 55-22-13, P. Block 401).
(7)Install rigging pin P/N 98A27307549000 in bellcrank at RIB9.

B. Removal (Ref. Fig. 401)

(1)Remove cotter pins (5), nuts (4) and washers (3).
(2)Remove bolts (1) and spacers (2).
(3)Remove spring rod (6) and remove bushes (8).

C. Preparation for Installation (Ref. Fig. 401)

(1)Check that lockwire (7) is in position and in good condition.
(2)Measure and record distance between eye-end centers of removed spring rod (6).

NOTE : Distance between eye-end centers should be approx. 260 mm (10.24 in.).

(3)Adjust replacement spring rod (6), as previously recorded, but do not tighten nut (9).
(4)Check that rod thread is visible through inspection hole.

D. Installation (Ref. Fig. 401)

(1)Position bushes (8).
(2)Apply grease (Mat. No. 05-019) to bolts (1) and spacers (2).
(3)Make certain that elevators are in neutral position.
(4)Position spring rod (6), spacers (2), install bolts (1), washers (3) and nuts (4).
(5)TORQUE nuts (4) to between 0.8 and 0.95 m daN (70.8 and 84.0 lbf. in.) and safety with cotter pins (5).

E. Adjustment/Test (Ref. Fig. 401)

NOTE : If three spring rods have been replaced on either side, carry out adjustment of elevator to neutral position (Ref. 27-31-00, P. Block 501).

(1)Remove all safety clips and tags and close circuit breakers 1CB, 2CB and 1CT.
(2)Remove rigging pin P/N 98A27307549000.
(3)Connect electrical ground power unit and energize the electrical network (Ref. 24-41-00, P. Block 301).
(4)Make certain that electronics racks ventilation is correct.
(5)Connect hydraulic ground power cart and pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(6)Make certain that travel ranges of elevator and servo controls are clear of tools and miscellaneous items of equipment.
(7)Make certain that B/G/Y pushbutton switches on SERVO CTL section of panel 428VU are pressed in (legends OFF).
(8)Install rigging pin P/N 98A27307549000 in bellcrank at RIB9.
(9)Install rigmaster system P/N TR12-18 and rigmaster system protractor P/N TR31 or alternatively protractor P/N 98A27308005000 and set to zero.

NOTE : Make certain that head piece of protractor is at right angles to stabilizer trailing edge.

(10)Test of spring rod

NOTE : Outboard servo control - B pushbutton switch
Center servo control - G pushbutton switch
Inboard servo control - Y pushbutton switch

NOTE : Only Green hydraulic system replacement spring rod test is described. The Yellow and Blue hydraulic system spring rod tests are similar.

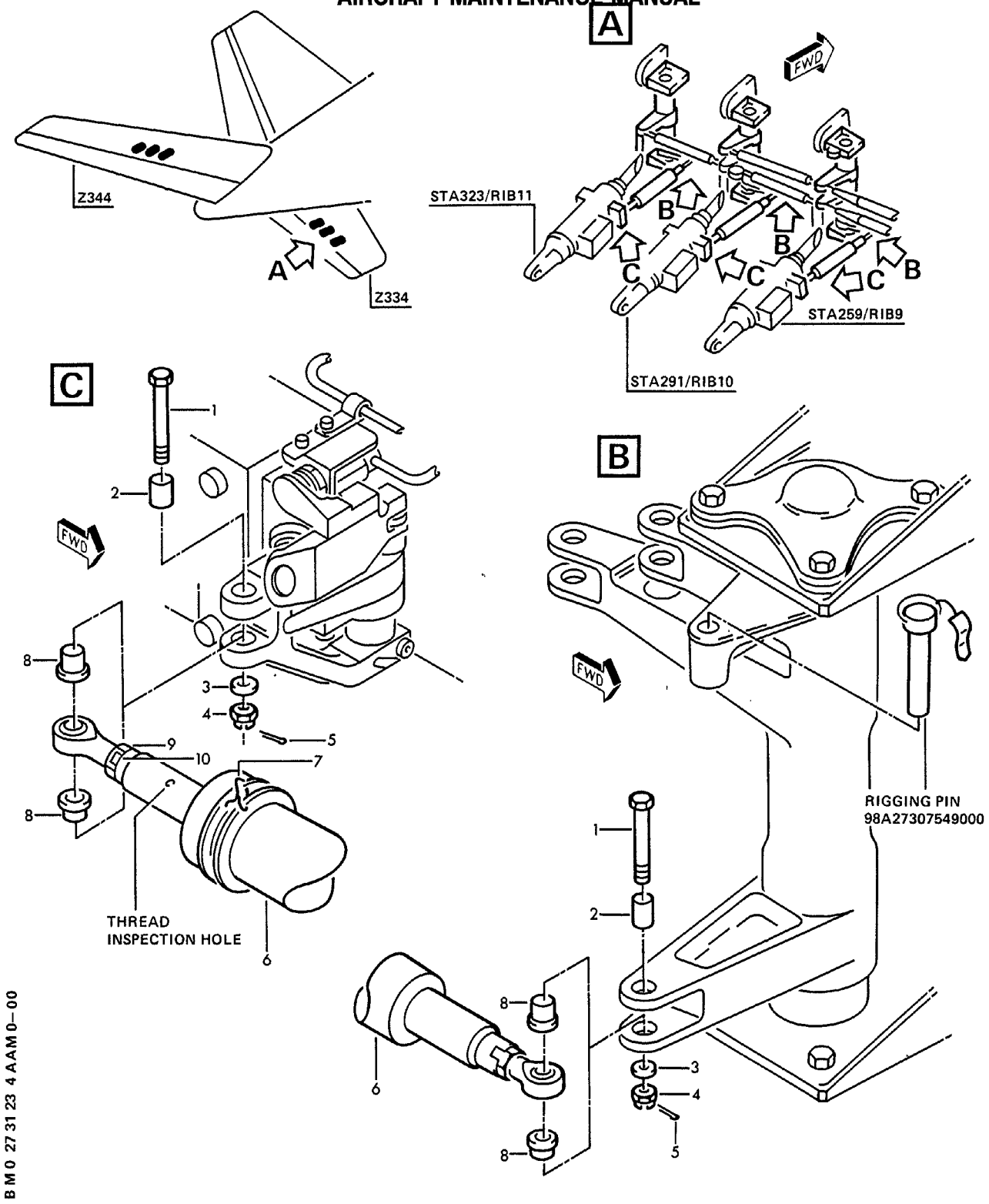
ACTION	RESULT
1. Check that elevator is in neutral position as previously recorded.	
2. On SERVO CTL section of panel 428VU: - press pushbutton switch G. - release pushbutton switches B and Y. If elevator has moved adjust actuating spring rod (6) (Ref. Para. E.(12)).	Check that elevator has not moved from neutral.
3. On SERVO CTL section of panel 428VU: - release pushbutton switch G.	

ACTION	RESULT
- press pushbutton switch B. If elevator has moved adjust actuating spring rod (6) (Ref. Para. E.(12)).	Check that elevator has not moved from neutral.
4. On SERVO CTL section of panel 428VU: - release pushbutton switch B. - press pushbutton switch Y. If elevator has moved adjust actuating spring rod (6) (Ref. Para. E.(12)).	Check that elevator has not moved from neutral.
5. Remove rigging pin P/N 98A27307549000.	
6. On SERVO CTL section of panel 428VU: - release pushbutton switch Y. - press pushbutton switch G.	
7. Move elevator to nose up stop. Should limit be exceeded adjust actuating spring rod (6) (Ref. Para. E.(12)).	Check that angle between elevator full deflection and neutral is 30- ± 1-.
8. Move elevator to nose down stop. Should limit be exceeded adjust actuating spring rod (6) (Ref. Para. E.(12)).	Check that angle between elevator full deflection and neutral is 15- ± 1-.
9. Move elevator to neutral.	

(11)Check that elevators are in neutral position.
(12)Adjust replacement actuating spring rod (6) as follows:
    (a)Loosen nut (9) and serrated locking device (10).
    (b)Adjust length by rotating spring rod body, until elevator is in neutral position.
    (c)Engage serrated locking device (10) and tighten nut (9).
    (d)Make certain rod end threads are visible through inspection holes.
    (e)Safety nut (9) with lockwire to serrated locking device (10).
(13)Make certain that hydraulic flexible hoses of elevator servo controls do not chafe on rear spar of horizontal stabilizer spar box.
(14)Remove rigmaster system P/N TR12-18, TR31, or protractor P/N 98A27308005000.
(15)Carry out functional test of position indicating system (Ref. 27-35-00, P. Block 501).

F.Close-Up

(1)Shut down and remove hydraulic ground power unit.
(2)De-energize aircraft electrical network and disconnect electrical ground power unit.
(3)Coat all visible cadmium-plated steel parts with corrosion-preventive paste (Mat. No. 05-005) (Ref. 51-75-10, P. Block 801).
(4)Check that drain holes are clear.
(5)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(6)Install access panels 334/344CT, 334/344CB (Ref. 55-13-13, P. Block 401) and 335/345BT, 335/345BB (Ref. 55-22-13, P. Block 401).
(7)Remove warning notices.
(8)Remove access platform.



Servo Control Actuating Spring Rod
Figure 401

WARNING: CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

CAUTION: DURING REMOVAL/INSTALLATION OF ELEVATOR AVOID DAMAGE TO SURFACE PROTECTION ON ELEVATOR HINGE ARMS.

NOTE: SHUR-LOK and STA-LOK locking systems are interchangeable.

1. Reasons for the Job

A. Removal for replacement

B. Replacement of horizontal stabilizer spar box

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, up to 8.0 m (26 ft.)
B. 98A27303002000	Centering Bullets and Pins - Elevator Hinge Pins
C. 98A27307549000	Pin, Rigging, Elevator Control Bellcranks
D. 98A27408018000	Socket Wrench Set - Elevator Bearings
E. 98A27907509000	Tool Set - Extraction/Insertion, SHUR-LOK (for SHUR-LOK Locking System)
F. 98A55208012000	Sling - Removal and Installation, Elevator
G. SL90.315-.3750	Wrenches-Notched, Tightening of Nuts NSA5454-6
H. SL90.314-.3750	Tool-Extraction, Tab Washers STA-LOK NSA5454-6 (for STA-LOK Locking System)
J. SL90.313-.3750	Tool - Installation, Tab Washers STA-LOK NSA5454-6 (for STA-LOK Locking System)
K. SL90.315-.5625	Wrenches-Notched, Thigtening of Nuts NSA 5454-9
L. SL90.314-.5625	Tool-Extraction, Tab Washers STA-LOK NSA5454-9 (for STA-LOK Locking System)
M. SL90.313-.5625	Tool - Installation, Tab Washers STA-LOK NSA5454-9 (for STA-LOK Locking System)
N. SL90.315-.7500	Wrenches-Notched, Tightening of Nuts NSA5454-12
P. SL90.314-.7500	Tool-Extraction, Tab Washers STA-LOK NSA5454-12

ITEM	DESIGNATION
	(for STA-LOK Locking System)
Q. SL90.313-.7500	Tool - Installation, Tab Washers STA-LOK NSA5454-12 (for STA-LOK Locking System)
R.	Crane, Minimum Height 17 m (56 ft.)
S.	Torque Wrench, 0.28 to 3.0 m.daN (2 to 22 lbf.ft.)
T.	Circuit Breaker Safety Clips
U.	Cotter Pins
V.	Lockwashers
W.	Warning Notices
X. Material No. 04-004	Common Greases (Ref. 20-31-00)
Y. Material No. 05-002	Special Materials (Ref. 20-31-00)
Z. Material No. 05-005	Special Materials (Ref. 20-31-00)
AA.Material No. 05-052	Special Materials (Ref. 20-31-00)
AB.Material No. 09-013	Sealants (Ref. 20-31-00)
AC.Material No. 09-016	Sealants (Ref. 20-31-00)
AD.Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 11-20-00, P. Block 1	Exterior Placards and Markings
- 20-28-11, P. Block 1	Electrical Bonding
- 23-61-11, P. Block 401	Static Discharger
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 27-35-00, P. Block 501	Control Surface Position Indicating (Elevator)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 51-75-10, P. Block 801	Repair of Paint Coatings
- 55-13-13, P. Block 401	Trailing Edge Access Panels
- 55-22-13, P. Block 401	Leading Edge Access Panels
- 55-16-48, P. Block 401	Elevator Support Struts Functional Check

3. Procedure

A. Job Set-Up (Ref. Fig. 401)

(1)Position access platform.
(2)Remove trailing edge access panels (Ref. 55-13-13, P. Block 401).
(3)Remove upper and lower leading edge access panels (Ref. 55-22-13, P. Block 401).
(4)Make certain that pitch trim control wheels and control column are in neutral position.
(5)Display warning notices in flight compartment, prohibiting operation of flight controls.
(6)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO-CTL/& THS/HYD/SEL	1CB	332/U63
133VU	FLT CTL/SERVO-CTL/& THS/JAM/DET	2CB	332/U64
133VU	FLT CTL/TRIM/AIL	3CG	331/V63
133VU	CTL/SURF/POS	1CT	334/S61

(7)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301) and display warning notices prohibiting pressurization.
(8)Install rigging pins P/N 98A27307549000 in elevator control bellcrank at RIB9.
(9)Make certain that each servo control is supported.
(10)Remove self-adhesive discs covering elevator hoisting points.
(11)Remove hoisting lugs and install in reverse position.
(12)Position crane and install elevator sling P/N 98A55208012000.

** ON ELEVATOR WITH SHUR-LOK LOCKING SYSTEM

B. Removal (Ref. Fig. 402, 403, 404)
(Ref. Fig. 405, 406)

CAUTION: ALL BOLTS, BUSHES, NUTS ETC. MUST BE RETAINED WITH THE RESPECTIVE HINGE. USE A SEPARATE BAG FOR EACH HINGE TO CONTAIN ALL REMOVED BOLTS, BUSHES, NUTS, ETC.

NOTE: Use SHUR-LOK tool set P/N 98A27907509000 to remove lockwashers.

NOTE: Use groove nut wrenches from tool set P/N 98A27408018000 to remove slotted ring nuts.

(1)Remove bonding straps as follows:
(a)At hinges no. 1 and 7
1 Remove bolts (32), washers (33) and disconnect bonding straps (34).
(b)At hinges no. 2, 3, 5, and 6
1 Remove nuts (43), washers (42), bolts (40) and disconnect bonding straps (41).
(c)At hinge no. 4
1 Remove nut (43), washer (42), bolt (40), stop (85) and disconnect bonding straps (41).
(2)At hinges no. 1 and 7
(a)Remove cotter pins (28), lockwashers (20), slotted ring nuts (21), washers (22) and bolts (31).
(b)Straighten tabs of lockwashers (25), remove slotted ring nuts (24) and lockwashers (25).
(3)At hinges no. 5 and 6
(a)Remove lockwashers (60), slotted ring nuts (59) and washers (58).
(b)Remove bolts (55), washers (56) and bushes (57).
(4)At hinge no. 5 RH (Ref. Fig. 402)
NOTE: Step (4) is applicable only when RH elevator is removed.

(a)Remove cotter pin (5), nut (4), washers (2, 3), bolt (1) and disconnect control rod (6).

(5)At hinges no. 2 thru 4

(a)Remove servo controls.

1 Remove cotter pins (82), lockwashers (76), slotted ring nuts (77) and cupwashers (78).

2 Remove bolts (84) and disconnect servo controls (80) from fittings and lower onto supports.

3 Remove bushes (83) and washers (79, 81).

(6)At hinges no. 2 and 4

(a)Remove cotter pins (75), lockwashers (70), slotted ring nuts (71) and cupwashers (72).

(b)Remove bolts (74) and bushes (73).

(7)At hinge no. 3

(a)Remove cotter pin (96), lockwasher (90), slotted ring nut (91) and cupwasher (92).

(b)Remove bolts (95) and disconnect elevator support strut (97).

(8)Tension elevator sling P/N 98A55208012000, to remove load from hinges.

(9)At hinge no. 3

(a)Remove sleeve (93) and bushes (94).

(10)At hinges no. 1 and 7

(a)Remove sleeves (30) and washers (29) and bushes (26).

(11)Carefully remove elevator from hinges and lower onto a suitable support.

(12)Remove bushes (27, 58, 98).

** ON ELEVATOR WITH STA-LOK LOCKING SYSTEM

B. Removal (Ref. Fig. 402, 403, 404)
(Ref. Fig. 405, 406)

CAUTION: ALL BOLTS, BUSHES, NUTS ETC. MUST BE RETAINED WITH THE RESPECTIVE HINGE. USE A SEPARATE BAG FOR EACH HINGE TO CONTAIN ALL REMOVED BOLTS, BUSHES, NUTS, ETC.

NOTE: For removal/installation use following STA-LOK tools:
At hinge no. 1 and 7

- Extractor P/N SL90.314-.3750 to remove retaining rings.
- Notched wrench P/N SL90.315-.3750 to remove, install and torque ring nuts
- Installation tool P/N SL90.313-.3750 to install retaining rings.

At hinge no. 5, 6 and at 3 upper position

- Extractor P/N SL90.314-.5625 to remove retaining rings.
- Notched wrench P/N SL90.315-.5625 to remove, install and torque ring nuts.
- Installation tool P/N SL90.313-.5625 to install retaining rings.

At hinge no. 2, 4 and at 3 lower position

- Extractor P/N SL90.314-.7500 to remove retaining rings.
- Notched wrench P/N SL90.315-.7500 to remove, install and

torque ring nuts.
- Installation tool P/N SL90.313-.7500 to install retaining rings.

(1)Remove bonding straps as follows:
(a)At hinges no. 1 and 7
1 Remove bolts (32), washers (33) and disconnect bonding straps (34).
(b)At hinges no. 2, 3, 5, and 6
1 Remove nuts (43), washers (42), bolts (40) and disconnect bonding straps (41).
(c)At hinge no. 4
1 Remove nut (43), washer (42), bolt (40), stop (85) and disconnect bonding straps (41).
(2)At hinges no. 1 and 7
(a)Remove cotter pins (28), retaining ring (120), ring nuts (121), washers (22) and bolts (31).
(b)Straighten tabs of lockwashers (25), remove slotted ring nuts (24) and lockwashers (25).
(3)At hinges no. 5 and 6
(a)Remove retaining ring (160), ring nuts (159) and washers (58).
(b)Remove bolts (55), washers (56) and bushes (57).
(4)At hinge no. 5 RH (Ref. Fig. 402)
NOTE: Step (4) is applicable only when RH elevator is removed.
(a)Remove cotter pin (5), nut (4), washers (2, 3), bolt (1), and disconnect control rod (6).
(5)At hinges no. 2 and 4
(a)Remove servo controls.
1 Remove cotter pins (82), retaining ring (176), ring nuts (177) and cupwashers (78).
2 Remove bolts (84) and disconnect servo controls (80) from fittings and lower onto supports.
3 Remove bushes (83) and washers (79, 81).
(b)Remove cotter pins (75), retaining ring (170), ring nuts (171) and cupwashers (72).
(c)Remove bolts (74) and bushes (73).
(6)At hinge no. 3 at upper position.
(a)Remove cotter pin (96), retainig ring (190 alternatively 90), ring nut (191 alternatively 91) and cupwasher (92).
(b)Remove bolts (95) and disconnect elevator support strut (97).
(7)At hinge no. 3 at lower position.
(a)Remove pins (82), retaining ring (176, alternatively 76), ring nuts (177, alternatively 77) and cupwasher (78).
(b)Remove bolt (84) and disconnect servo controls (80) from fittings and lower onto supports.
(c)Remove bushes (83) and washers (79, 81).
(8)Tension elevator sling P/N 98A55208012000, to remove load from hinges.
(9)At hinge no. 3
(a)Remove sleeve (93) and bushes (94).
(10)At hinges no. 1 and 7
(a)Remove sleeves (30) and washers (29) and bushes (26).

(11)Carefully remove elevator from hinges and lower onto a suitable support.
(12)Remove bushes (27, 58, 98).

** ON ALL ELEVATOR

C. Preparation for Installation (Ref. Fig. 403)
(Ref. Fig. 404, 405, 406)

(1)On replacement elevator
(a)Remove hoisting lugs and install in reverse position.
(b)Position crane and install sling P/N 98A55208012000.
(c)Remove leading edge access panels (Ref. 55-22-13, P. Block 401).
(2)Transfer static dischargers from elevator to replacement elevator (Ref. 23-61-11, P. Block 401).
(3)Clean hinges, bolts, sleeves, washers and bushes with cleaning agent (Mat. No. 11-004) and allow to dry.
(4)Around work area, carry out visual inspection to make certain that structure, paintwork, elevator control surface, hinge arms, sealant, etc. are free from damage.
(5)Check condition of bolts, sleeves and bushes.
(6)Apply grease (Mat. No. 04-004) to hinge bearings, bolts, sleeves and nuts.
(7)Check bonding straps for good condition and renew if necessary.
(8)At hinge no. 5 RH

NOTE : Step (8) is applicable only, when removed RH elevator is not to be re-installed.

(a)Remove cotter pins (11), nuts (10), washers (9), bolts (7) and bracket (8).
(b)Drill two attachment holes 6.350 mm 0+0.015 mm (0.25 in. 0+0.0006 in.) dia in associated mounting fitting for bracket (8). (Ref. Fig. 402)

NOTE : Step (b) is applicable only, when RH elevator has been removed and a new elevator is to be installed.

(c)Position bracket (8), washers (9), install bolts (7) and nuts (10).
(d)Secure nuts (10) with cotter pins (11).
(9)Install bushes as follows:
(a)Apply corrosion-preventive paste (Mat. No. 05-002) to all bushes.
(b)Install bushes as previously recorded.
1 At hinge fittings no. 1 and 7, install bushes (26, 27).
2 At hinge fittings no. 2 thru 4, install bushes (73, 83, 94, 98) and washer (79).
3 At hinge fittings no. 5 and 6, install bushes (57, 58).
(c)Apply sealant bead (Mat. No. 09-016) to flange of bushes and hinge fittings.
(10)Install washers (81) with sealant (Mat. No. 09-013).

** ON ELEVATOR WITH SHUR-LOK LOCKING SYSTEM

D. Installation (Ref. Fig. 402, 403)
(Ref. Fig. 404, 405, 406)

NOTE : Use centering bullets and pins P/N 98A27303002000 to install elevator hinge bolts.

NOTE : Use socket wrench set P/N 98A27408018000 to tighten slotted ring nuts.

NOTE : Use SHUR-LOK tool set P/N 98A27907509000 to install lockwashers.

(1)Using crane, hoist and position elevator.

CAUTION : A MECHANIC SHOULD BE AT EACH HINGE, TO ALIGN HINGE ARMS AND SERVO CONTROLS WITH HINGE FITTINGS ON ELEVATOR.

(2)Align holes in hinge arms and servo controls with holes in hinge fittings on elevator.

CAUTION : PAY SPECIAL ATTENTION TO DIFFERENT HINGE COMPONENTS.

(3)At hinges no. 1 and 7
(a)Check that circlips (23) are installed in sleeves (30).
(b)Position washers (29), install sleeves (30) and bolts (31).
(c)Install lockwashers (25) and slotted ring nuts (24).
(d)Install washers (22) and slotted ring nuts (21).
(4)At hinge no. 3
(a)Install sleeve (93), bolt (95) and connect elevator support strut (97).
(b)Install cupwasher (92) and slotted ring nut (91).

NOTE : Make certain that concave side of cupwasher (92) faces bearing.

(5)At hinges no. 5 and 6
(a)Position washers (56) and install bolts (55).
(b)Install washers (58), and slotted ring nuts (59).
(6)At hinges no. 2 and 4
(a)Install bolts (74), cupwashers (72) and slotted ring nuts (71).

NOTE : Make certain that concave side of cupwashers (72) faces bearings.

(7)At hinges no. 2 thru 4
(a)Connect servo controls (80) and install bolts (84), cupwashers (78) and slotted ring nuts (77).

NOTE : Make certain that concave side of cupwashers (78) faces bearings.

(8)TORQUE and safety slotted ring nuts as follows:
(a)At hinges no. 1 and 7

1 TORQUE slotted ring nuts (24) to between 0.44 and 0.54 m.daN (3.25 and 4.0 lbf.ft.) and safety with lockwashers (25).
2 TORQUE slotted ring nuts (21) to between 0.44 and 0.54 m.daN (3.25 and 4.0 lbf.ft.) and install lockwashers (20) and cotter pins (28).

(b)At hinges no. 5 and 6
1 TORQUE slotted ring nuts (59) to between 1.32 and 1.62 m.daN (9.75 and 12.0 lbf.ft.) and install lockwashers (60).

(c)At hinges no. 2 and 4
1 TORQUE slotted ring nuts (71, 77) to between 2.21 and 2.7 m.daN (16.30 and 19.90 lbf.ft.) and install lockwashers (70, 76) and cotter pins (75, 82).

(d)At hinge no. 3
1 TORQUE slotted ring nut (91) to between 1.32 and 1.62 m.daN (9.75 and 12.0 lbf.ft.) and install lockwasher (90) and cotter pin (96).
2 TORQUE slotted ring nut (77) to between 2.21 and 2.7 m.daN (16.30 and 19.90 lbf.ft.) and install lockwasher (76) and cotter pin (82).

(9)At hinge no. 5 RH (Ref. Fig. 402)

NOTE : Step (9) is applicable only when RH elevator has been removed.

(a)Position control rod (6), washer (2) and install bolt (1), washer (3) and nut (4).
(b)TORQUE nut (4) to 0.28 m.daN (24.8 lbf.in.) and safety nut (4) with cotter pin (5).

(10)Apply corrosion-preventive compound (Mat. No. 05-005) to all visible cadmium-plated steel parts (Ref. 51-75-10, P. Block 801).

(11)Install bonding straps as follows:
- For electrical bonding refer to 20-28-11. P. Block 1.

(a)At hinges no. 1 and 7
1 Position bonding straps (34), washers (33) and install bolts (32).

(b)At hinges no. 2, 3, 5 and 6
1 Position bonding straps (41) and install bolts (40), washers (42) and nuts (43).

(c)At hinge no. 4
1 Position bonding straps (41), stop (85), install bolt (40), washer (42) and nut (43).

(12)Remove sling P/N 98A55208012000 from elevator.

(13)Remove and degrease all hoisting lugs with cleaning agent (Mat. No. 11-004).

(14)Apply corrosion-preventive paste (Mat. No. 05-002) to all hoisting lugs and install with lugs turned inwards and flush with elevator skin.

(15)Install self-adhesive discs (Mat. No. 05-052) over hoisting points (Ref. 11-20-00, P. Block 1).

(16)Adjust elevator support strut, if necessary (Ref. 55-16-48, P. Block 401).

(17)Make certain that travel ranges of elevator and actuators are clear of tools and miscellaneous items of equipment.

(18)Remove rigging pins P/N 98A27307549000.
(19)Remove safety clips and tags and close circuit breakers 1CB, 2CB, 3CG and 1CT.

** ON ELEVATOR WITH STA-LOK LOCKING SYSTEM

E. Installation (Ref. Fig. 402, 403)
(Ref. Fig. 404, 405, 406)

NOTE : Use centering bullets and pins P/N 98A27303002000 to install elevator hinge bolts.

(1)Using crane, hoist and position elevator.

CAUTION : A MECHANIC SHOULD BE AT EACH HINGE, TO ALIGN HINGE ARMS AND SERVO CONTROLS WITH HINGE FITTINGS ON ELEVATOR.

(2)Align holes in hinge arms and servo controls with holes in hinge fittings on elevator.

CAUTION : PAY SPECIAL ATTENTION TO DIFFERENT HINGE COMPONENTS.

(3)At hinges no. 1 and 7
(a)Check that circlips (23) are installed in sleeves (30).
(b)Position washers (29), install sleeves (30) and bolts (31).
(c)Install lockwashers (25) and slotted ring nuts (24).
(d)Install washers (22) and ring nuts (121).
(4)At hinge no. 3 upper position
(a)Install sleeve (93), bush (94), bolt (95) and connect elevator support strut (97).
(b)Install cupwasher (92), ring nut (191, alternatively 91) and a new cotter pin (96).

NOTE : Make certain that concave side of cupwasher (92) faces bearing.

(5)At hinge no. 3 lower position .
(a)Connect servo control (80).
(b)Install bush (83), bolt (84), cupwasher (78), ring nut (177, alternatively 77) and new cotter pin (82).
(6)At hinges no. 5 and 6
(a)Position washers (56) and install bolts (55).
(b)Install washers (58), and ring nuts (159).
(7)At hinges no. 2 and 4
(a)Install bushes (73), bolts (74), cupwashers (72) and ring nuts (171) and new cotter pin (75).

NOTE : Make certain that concave side of cupwashers (72) faces bearings.

(b)Connect servo controls (80) and install bushes (83),bolts (84),

cup washer (78) and ring nuts (177), and new cotter pin (82).

NOTE : Make certain that concave side of cupwashers (78) faces bearings.

(8)TORQUE and safety slotted ring nuts as follows:
(a)At hinges no. 1 and 7
1 TORQUE slotted ring nuts (24) to between 0.44 and 0.54 m.daN (3.25 and 4.0 lbf.ft.) and safety with lockwashers (25).
2 TORQUE ring nuts (121) to between 0.44 and 0.54 m.daN (3.25 and 4.0 lbf.ft.) and install retaining ring (120) and cotter pins (28).
(b)At hinges no. 5 and 6
1 TORQUE ring nuts (159) to between 1.32 and 1.62 m.daN (9.75 and 12.0 lbf.ft.) and install retaining ring (160).
(c)At hinges no. 2 and 4
1 TORQUE ring nuts (171, 177) to between 2.21 and 2.7 m.daN (16.30 and 19.90 lbf.ft.) and install retaining rings (170, 176) and cotter pins (75, 82).
(d)At hinge no. 3
1 TORQUE ring nut (191) to between 1.32 and 1.62 m.daN (9.75 and 12.0 lbf.ft.) and install retaining ring (190) and cotter pin (96).
2 TORQUE ring nut (177) to between 2.21 and 2.7 m.daN (16.30 and 19.90 lbf.ft.) and install retaining ring (176) and cotter pin (82).
(9)At hinge no. 5 RH (Ref. Fig. 402)

NOTE : Step (9) is applicable only when RH elevator has been removed.

(a)Position control rod (6), washer (2) and install bolt (1), washer (3) and nut (4).
(b)TORQUE nut (4) to 0.28 m.daN (24.8 lbf.in.) and safety nut (4) with cotter pin (5).
(10)Apply corrosion-preventive compound (Mat. No. 05-005) to all visible cadmium-plated steel parts (Ref. 51-75-10, P. Block 801).
(11)Install bonding straps as follows:
- For electrical bonding refer to 20-28-11. P. Block 1.
(a)At hinges no. 1 and 7
1 Position bonding straps (34), washers (33) and install bolts (32).
(b)At hinges no. 2, 3, 5 and 6
1 Position bonding straps (41) and install bolts (40), washers (42) and nuts (43).
(c)At hinge no. 4
1 Position bonding straps (41), stop (85), install bolt (40), washer (42) and nut (43).
(12)Remove sling P/N 98A55208012000 from elevator.
(13)Remove and degrease all hoisting lugs with cleaning agent (Mat. No. 11-004).

(14)Apply corrosion-preventive paste (Mat. No. 05-002) to all hoisting lugs and install with lugs turned inwards and flush with elevator skin.
(15)Install self-adhesive discs (Mat. No. 05-052) over hoisting points (Ref. 11-20-00, P. Block 1).
(16)Adjust elevator support strut, if necessary (Ref. 55-16-48, P. Block 401).
(17)Make certain that travel ranges of elevator and actuators are clear of tools and miscellaneous items of equipment.
(18)Remove rigging pins P/N 98A27307549000.
(19)Remove safety clips and tags and close circuit breakers 1CB, 2CB, 3CG and 1CT.

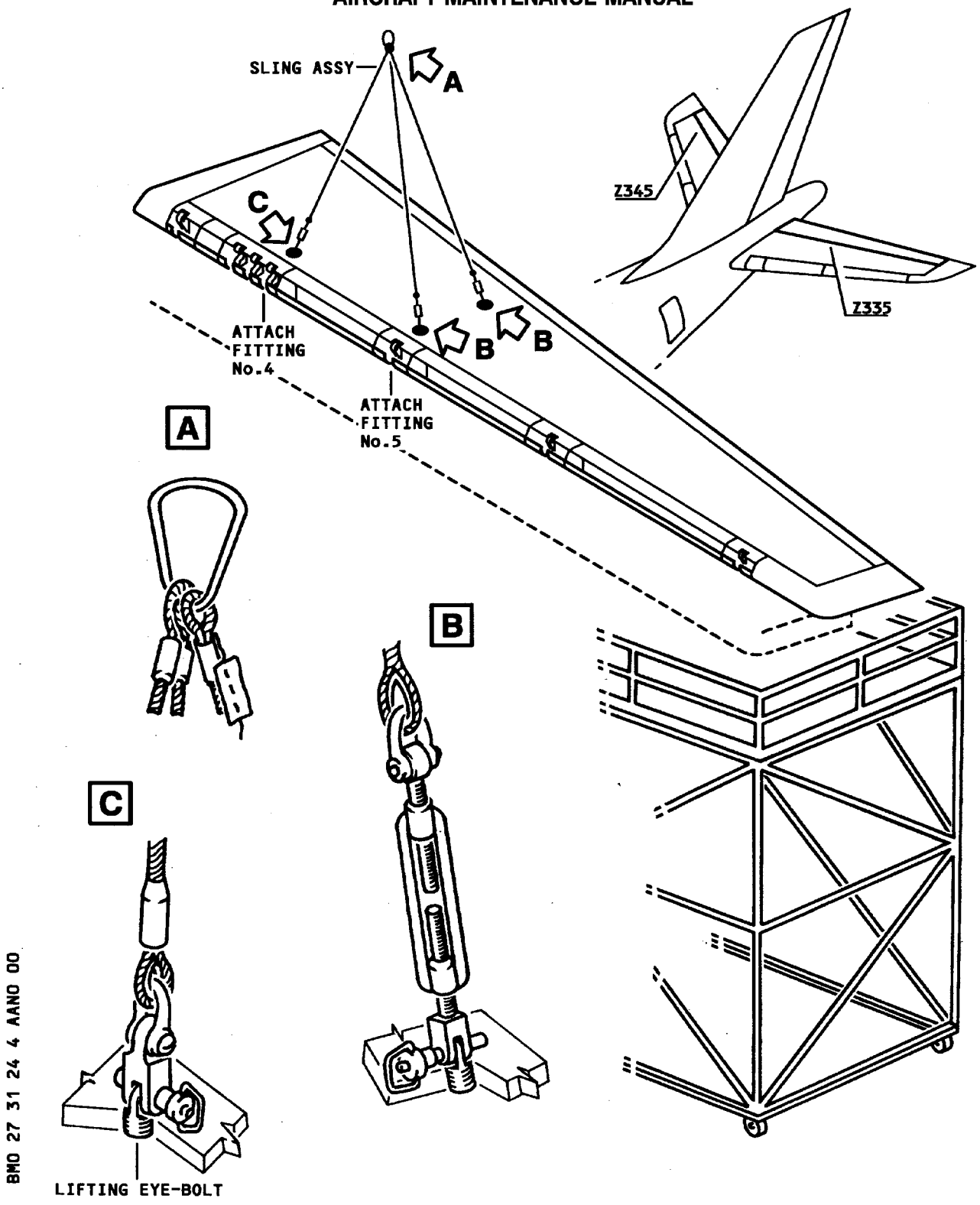
** ON ALL ELEVATOR

F. Test

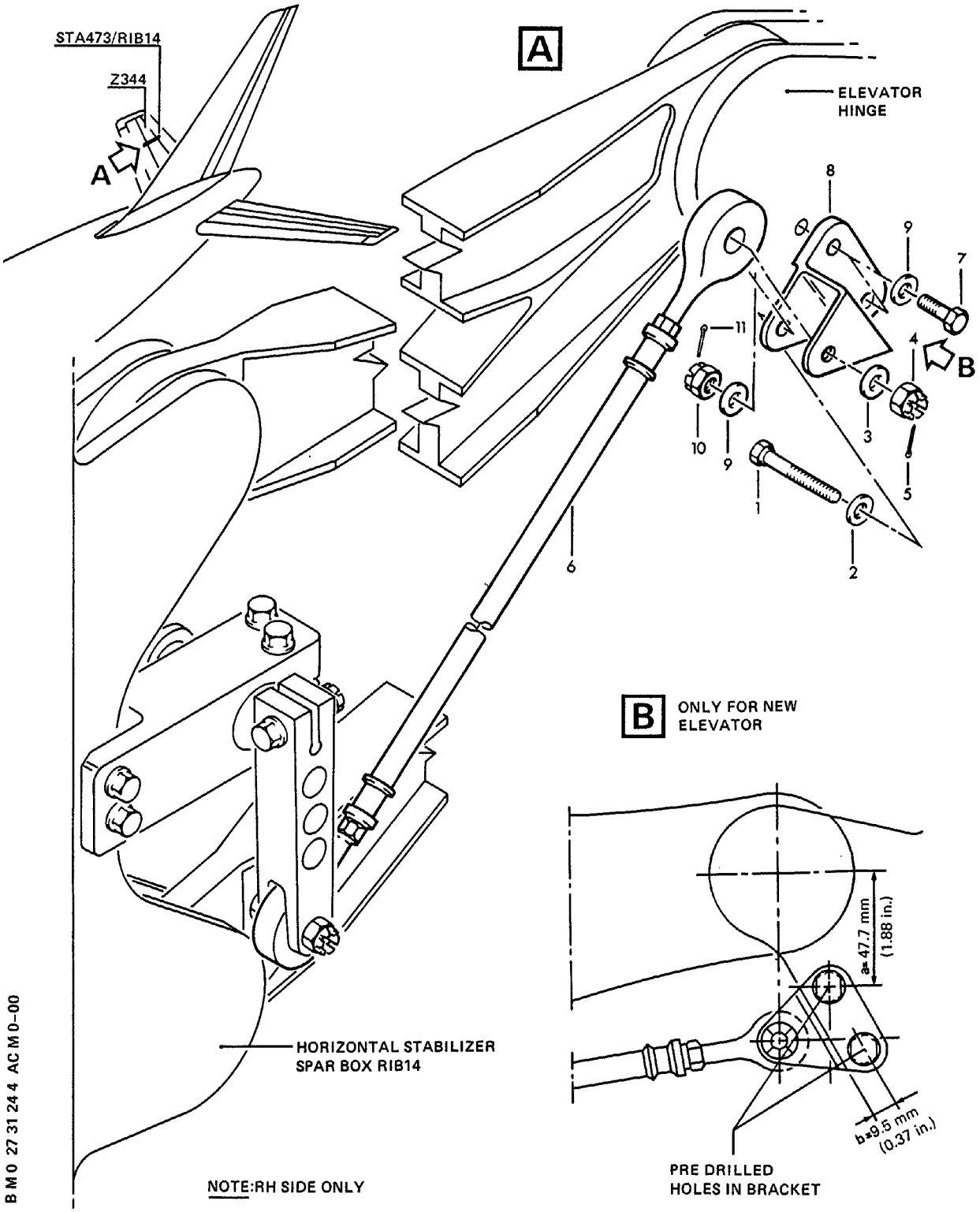
(1)Do the adjustment of elevator mechanical control and pitch uncoupling. (Ref. 27-31-00, P.Block 501).
(2)Do the functional test of elevator mechanical control and pitch uncoupling. (Ref. 27-31-00 P. Block 501).
(3)Do the adjustment of elevator position indicating system. (Ref. 27-35-00, P. Block 501).
(4)Do the functional test of elevator position indicating system. (Ref. 27-35-00, P. Block 501).

G. Close-Up

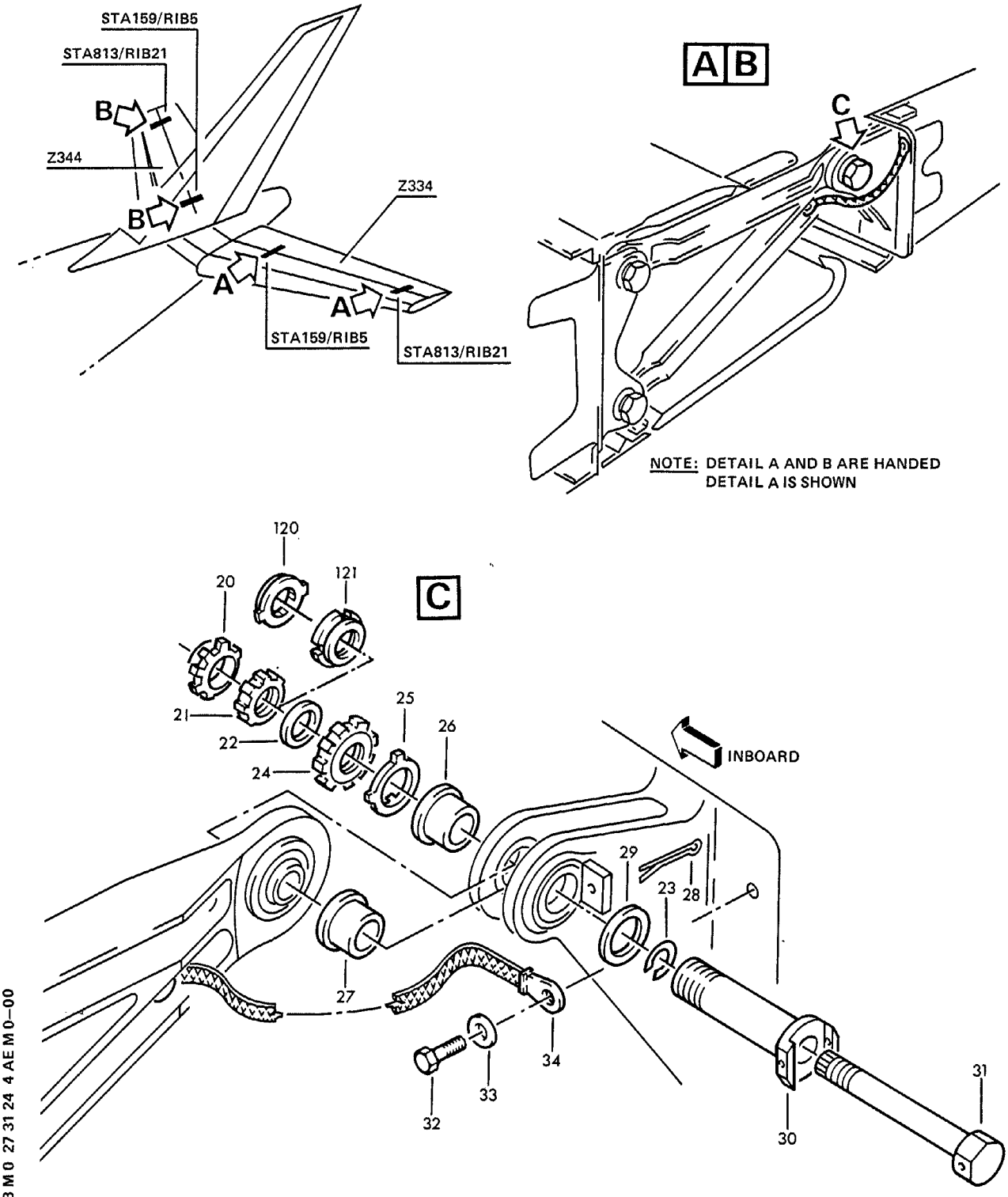
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install upper and lower leading edge access panels (Ref. 55-22-13, P. Block 401).
(3)Install trailing edge access panels (Ref. 55-13-13, P. Block 401).
(4)Remove warning notices.
(5)remove access platform.



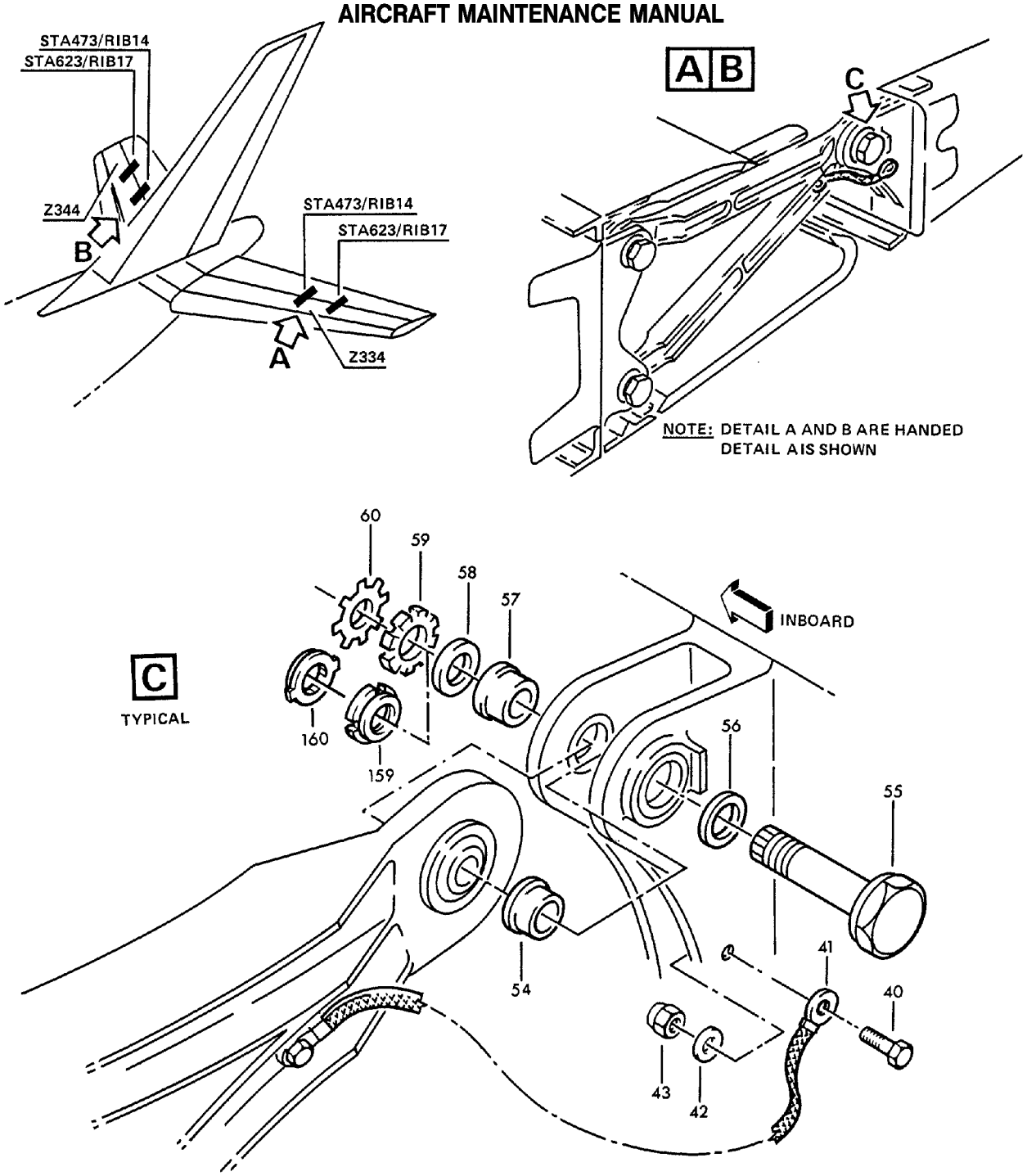
Sling Attachment
Figure 401



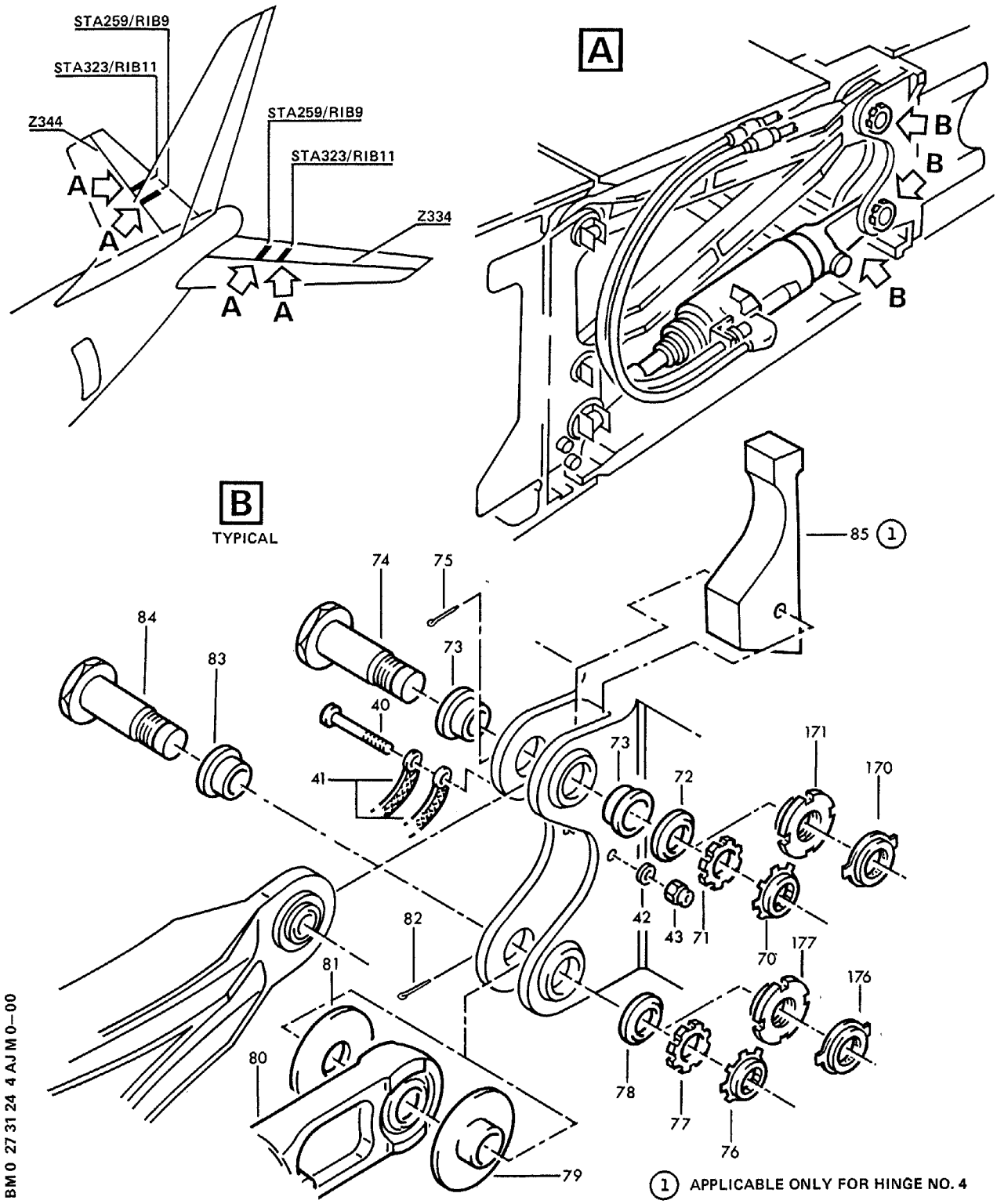
Position Transmitter
Figure 402



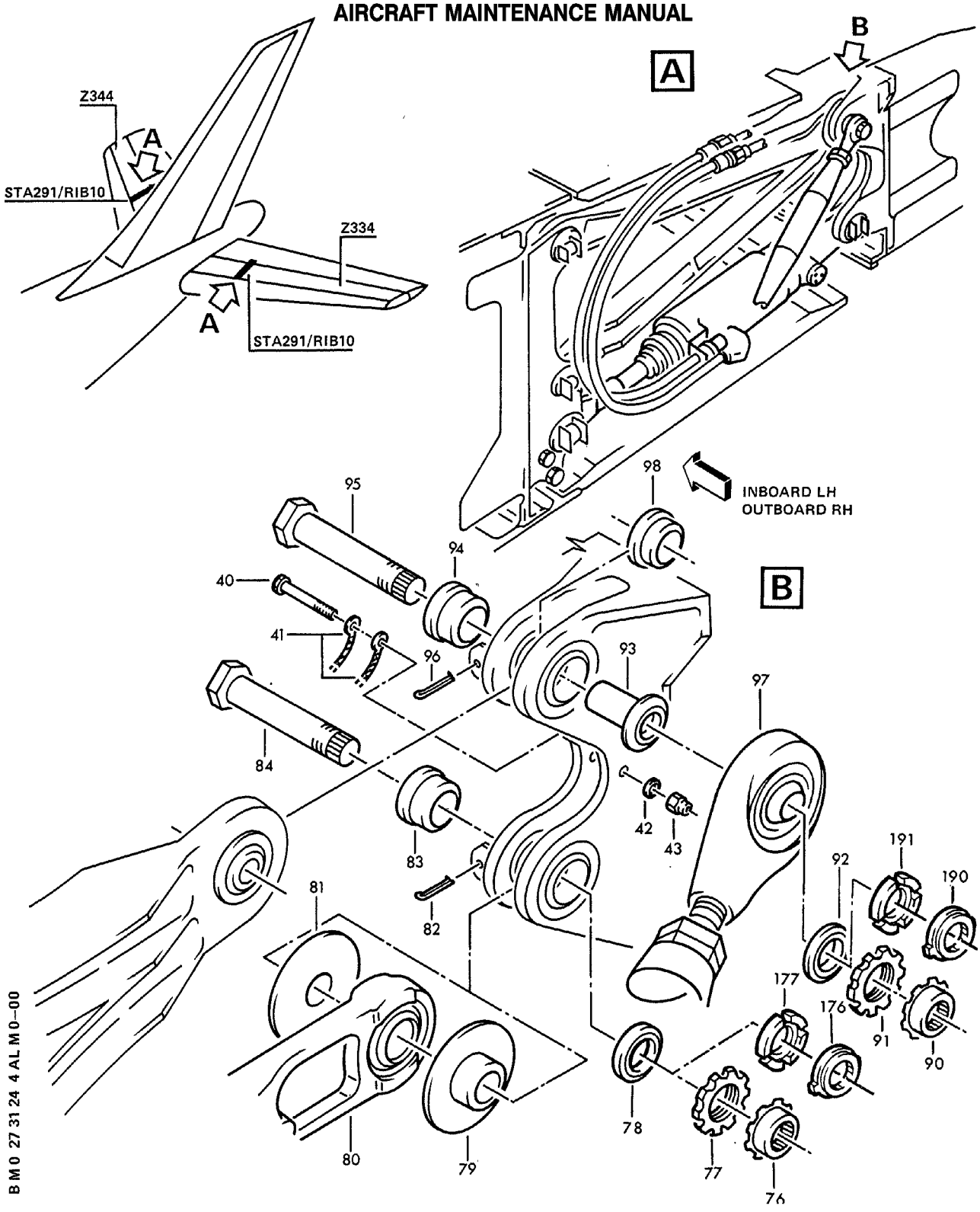
Hinge Fittings No. 1 and 7
Figure 403



Hinge Fittings No. 5 and 6
Figure 404



Hinge Fittings No. 2 and 4
Figure 405



Hinge Fitting No. 3
Figure 406

DYNAMOMETRIC ROD 69CA (70CA) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A27901001000	Pin-Rigging, Elevator Control
B. 98A27901007000	Pin-Rigging, Elevator Control
C. 72-5-644	Retaining Fork - Dynamometric Rod
D.	Access Platform, Adjustable from 2,5 m to 3 m (8.20 to 9.80 ft.)
E.	Warning Notices Prohibiting Depressurization of Hydraulic System
F.	Circuit Breaker Safety Clips
G.	Blanking Cap - Electrical Connector
H. 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
Referenced Procedures	
- 22-10-00, P. Block 501	Autopilot
- 24-41-00, P. Block 301	AC External Power Control
R - 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

2. Procedure

NOTE : Before removal of dynamometric rods, check that control cables are correctly rigged and that tension is within limits.

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	AFS/AP1-FD1/FCC1/26VAC	305CA1	102/H 2
21VU	AFS/AP2-FD2/FCC2/26VAC	305CA2	102/H 7

(2)Connect hydraulic ground power cart and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(3)Display a warning notice on ground connectors prohibiting depressurization of hydraulic system.
(4)Check that pitch trim control wheels are in zero position and immobilize with equipment 97A27302009000.
(5)Place control columns in neutral position and install rigging pins 98A27901007000 in forward detent bellcrank, under control columns of the corresponding side.
(6)Display a warning notice prohibiting operation of pitch control system.
(7)Install rigging pin 98A27901001000 in corresponding tension regulator input lever.
(8)Install Tool 72-5-644 on dynamometric rod to be removed.
(9)Check rigging pins free insertion. If not, perform the pitch channel
R cable and front part rigging (Ref. 27-31-00, P. Block 501).

B. Removal
(Ref. Fig. 401)
(1)Disconnect connectors 1094VC-A (4) and 1099VC-A (5) from left rod 69CA (6) (connectors 1096VC-A and 1101VC-A from right rod 70CA).
(2)Cap connectors.
(3)Remove cotter pins and remove nuts (3) and (7).
(4)Remove washers (2) and (8).
(5)Remove bolts (1) and (9).
(6)Remove dynamometric rod (6).

C. Preparation of Replacement Component
Make certain that replacement dynamometric rod is fitted with the retaining fork.

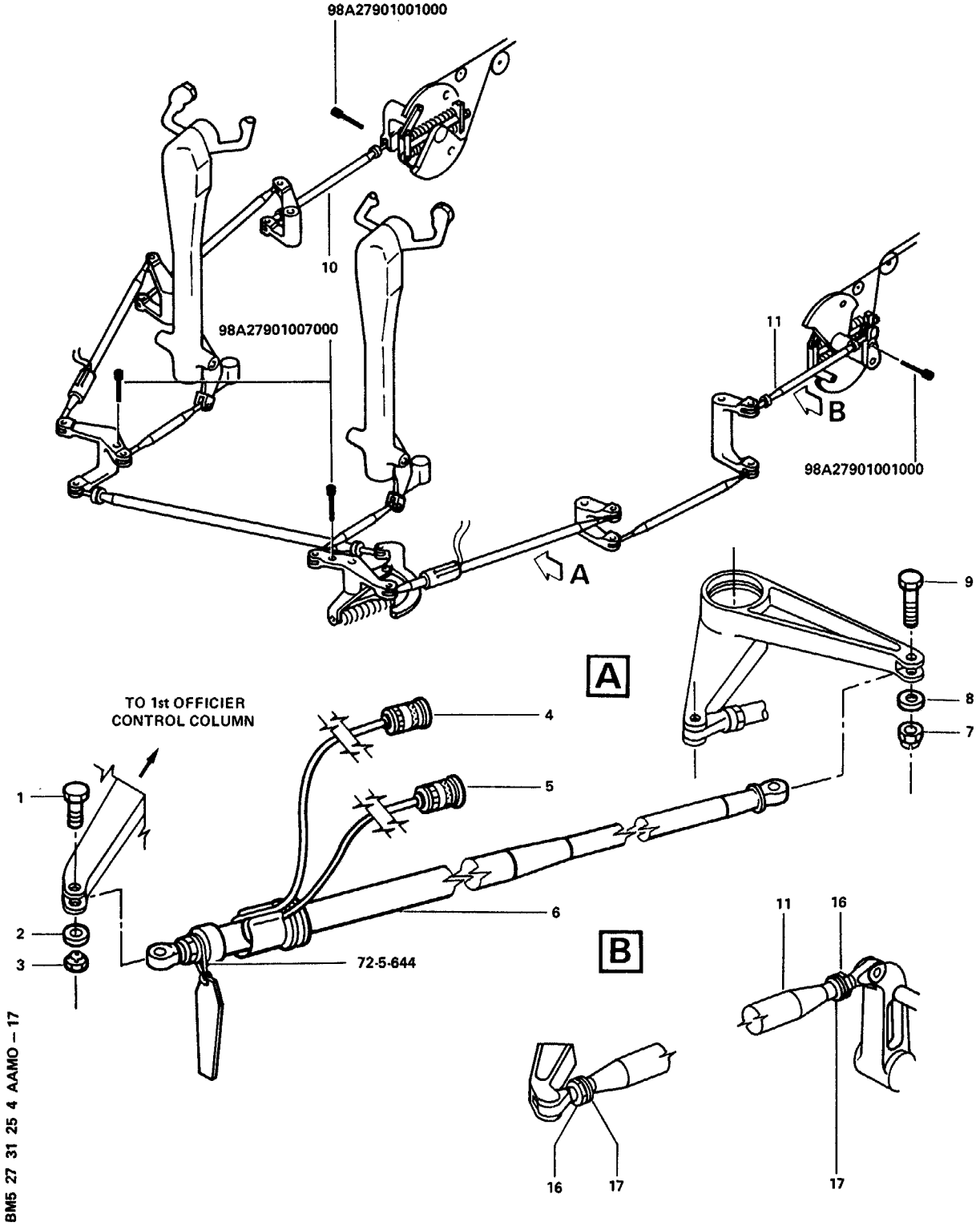
D. Installation
(1)Position dynamometric rod (6) and secure to bellcrank with bolts (1) and (9).
(2)Check rigging pins free insertion.
(3)If required, adjust length of rod (11) for left dynamometric rod, or (10) for right dynamometric rod as follows :
- Cut and remove lockwire, loosen nuts (16) and free lockwashers (17). Act on adjustable rod (11) to allow rigging pins free insertion
- Engage lockwasher (17), tighten nuts (16) and wirelock.
(4)Install washers (2) and (8) on bolts (1) and (9).
(5)Install and tighten nuts (3) and (7). Safety with cotter pins. Check that tightening has not modified the rigging.
(6)Remove blanking caps from connectors (4) and (5).
(7)Connect connectors 1094VC-A (4) and 1099VC-A (5) to dynamometric rod 69CA (1096VC-A and 1101VC-A to dynamometric rod 70CA).
(8)Remove rigging pins and tools.

E. Test

ACTION	RESULT
1. Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electro-	

ACTION	RESULT
nics racks ventilation is correct.	
2. Remove safety clips and tags and close circuit breakers 305CA1 and 305CA2.	
3. Place flight controls in neutral position and check that flaps and slats are fully retracted.	
4. On glareshield - engage AP1 in CWS mode (Ref. 22-10-00, P. Block 501).	Lever remains engaged
5. Move control column in nose down then nose up direction	- Check that elevators deflect accordingly - AP1 lever remains engaged
6. Press AP disconnect pushbutton switch on Captain's control wheel (First Officer's)	- AP1 lever returns to OFF position - AP OFF warning lights come on
7. Press AP disconnect pushbutton switch a second time	- Warning lights go off
8. Repeat steps 4 to 7 with AP2	

F. Close-Up
(1)Depressurize hydraulic system and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Remove warning notices.
(5)Close access door.
(6)Remove access platform.



Dynamometric Rod
Figure 401

ARTIFICIAL FEEL UNIT FRAME - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : AFTER ANY DISCONNECTION WITHIN THE PITCH FEEL SYSTEM A FUNCTIONAL TEST OF SYSTEM (REF. 27-33-00, P. BLOCK 501) MUST BE FORMED.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 5.5 m (18 ft.)
	B. 0U131281	Pin - Artificial Feel Unit Elevator Mechanical Controls
	C. 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
	D. 98A27307549000	Pin - Rigging, Elevator Control Bellcranks
	E. 98A27307541000	Rigging Pin - Cable Quadrant, Elevator Mechanical Controls
	F. 98D32303000201	Wrench
	G. 98A27901007000	Pin - Rigging, Elevator Control (Qty. 2)
	H. 98A53207606000	Panels - Floor, Fuselage Tail Section
	J.	Torque Wrench, up to 1.5 m.daN (133 lbf.in.)
	K.	Blanking Caps - Electrical Connector
	L.	Blanking Plugs - Hydraulic Line
	M.	Container - Hydraulic Fluid Spillage
	N.	Warning Notices
	P.	Circuit Breaker Safety Clips
	Q.	Cotter Pins
	R.	Corrosion-Resistant Steel Lockwire, 0.5 mm (0.02 in.) Dia.
	S. Material No. 05-002	Special Materials (Ref. 20-31-00)
	T. Material No. 05-027	Special Materials (Ref. 20-31-00)
R	U. Material No. 11-003	Special Materials (Ref. 20-31-00)
R	V. Material No. 16-003	Structure Paints (Ref. 20-31-00)

Referenced Procedures

- 20-28-11, P. Block 1	Electrical Bonding
- 27-30-00, P. Block 401	Elevator
- 27-30-00, P. Block 501	Elevator
- 27-31-00, P. Block 301	Mechanical Control and Pitch Uncoupling
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling

R - 27-31-21, P. Block 401 Vertical Torque Tube, with Universal Joint -
R Removal/Installation
- 27-33-00, P. Block 501 Artificial Feel (Elevator)
R - 51-74-10, P. Block 801 Removal of Corrosion
- 51-75-10, P. Block 801 Repair of Paint Coatings

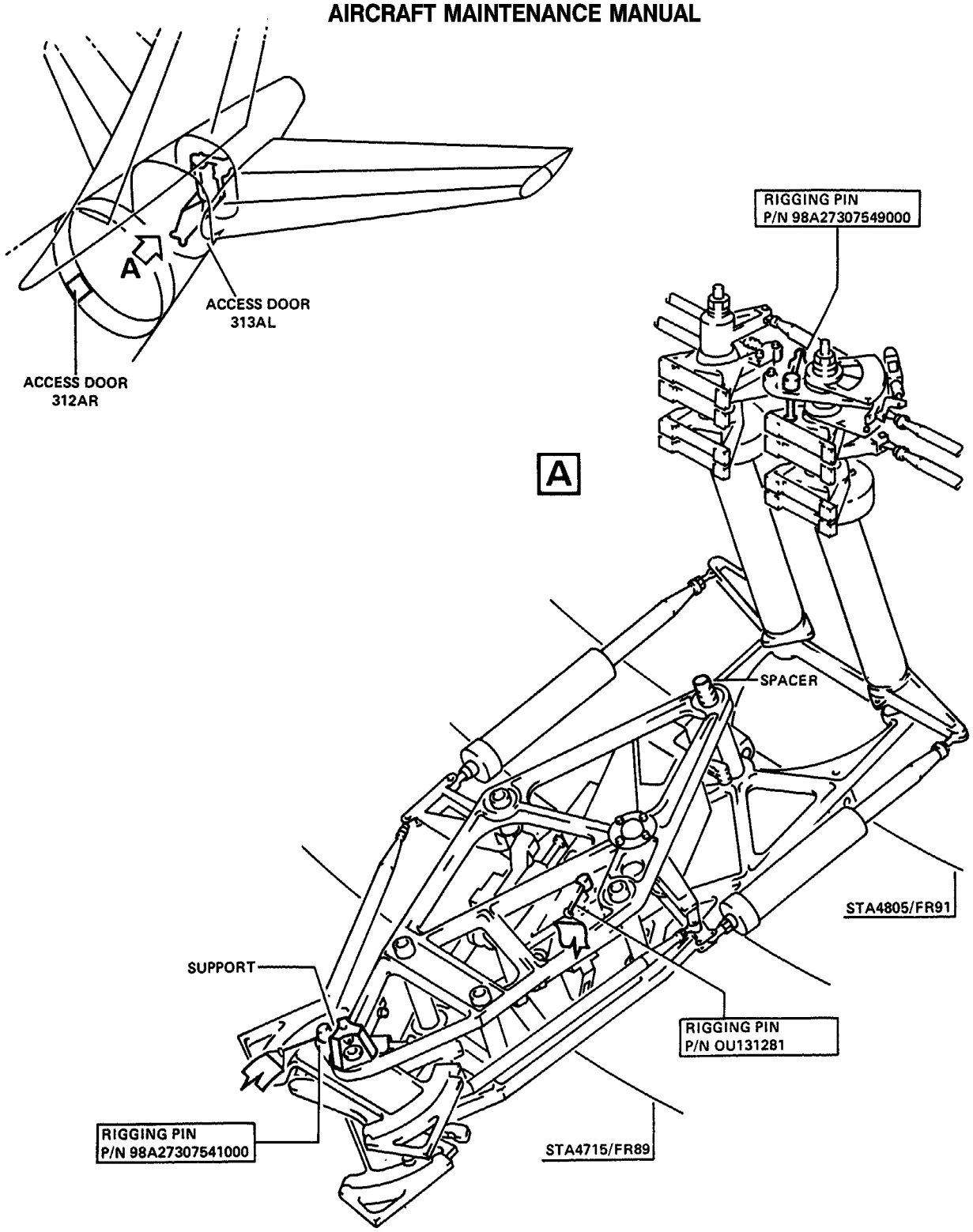
2. Procedure

A. Job Set-Up (Ref. Fig. 401)
(1)Position access platform.
(2)Make certain that horizontal stabilizer pitch trim control is set at zero, and install locking equipment P/N 97A27302009000 on pitch trim control wheel in flight compartment.
(3)Make certain that elevator controls are set at neutral, and install rigging pins P/N 98A27901007000 (Qty. 2) in elevator control bellcranks on control mechanism mounting beam in avionics compartment.
(4)Display warning notice in flight compartment prohibiting operation of flight controls.
(5)Open, safety and tag the following circuit breakers:

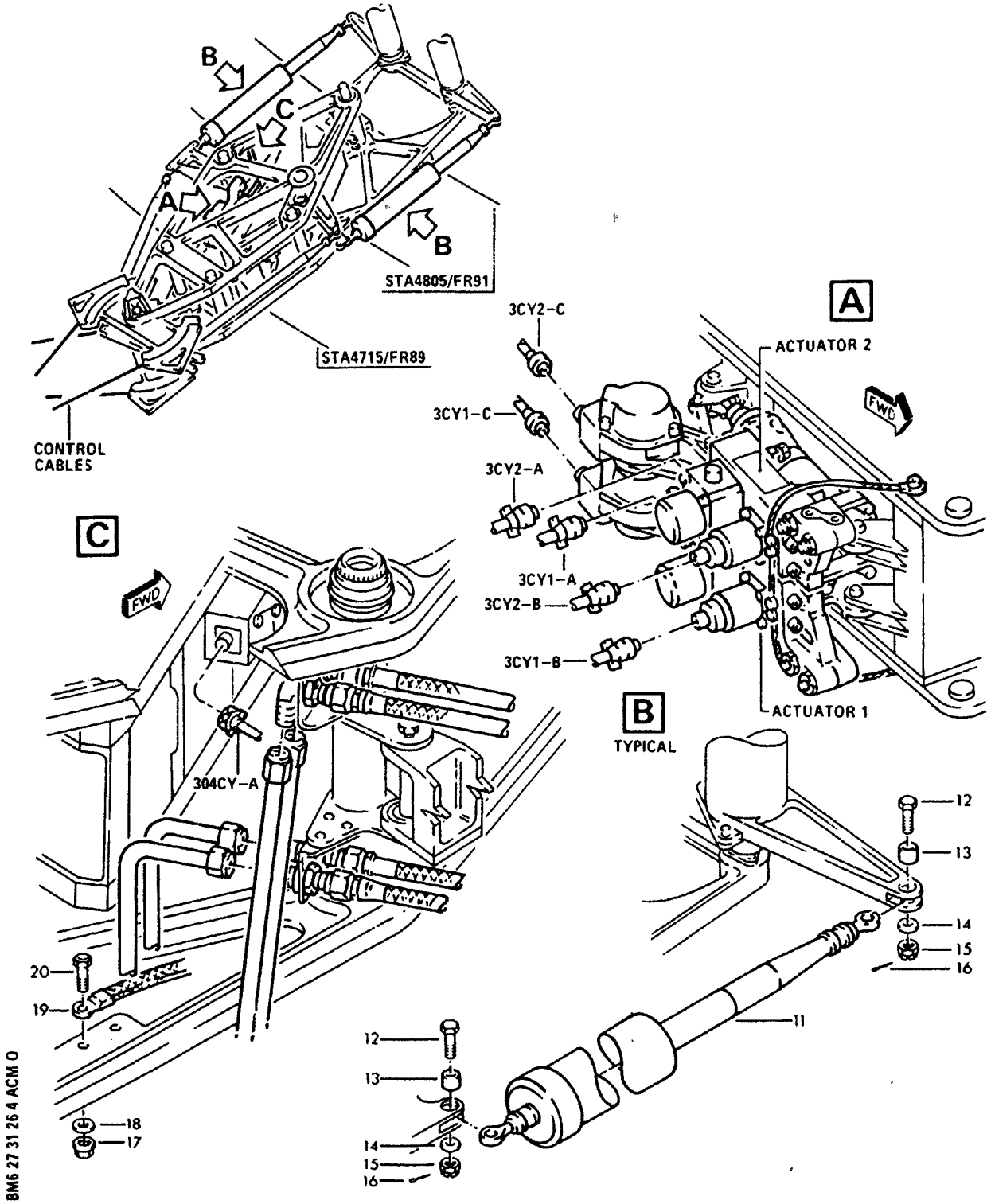
PANEL	SERVICE	IDENT.	LOCATION
21VU	ARTF FEEL/FLC 1/28VDC	5CY1	101/J 1
21VU	ARTF FEEL/FLC 1/26VAC/ESS	305CY1	101/J 2
21VU	ARTF FEEL/FLC 1/26VAC/EMER	306CY1	101/J 3
21VU	ARTF FEEL/FLC 2/26VAC	305CY2	101/J 4
21VU	ARTF FEEL/FLC 2/28VDC	5CY2	101/J 5

(6)Display warning notice, prohibiting repressurization of hydraulic systems.
(7)Open access door 313AL.
(8)Install rigging pin P/N 98A27307549000 in aft detent bellcrank at torque tubes assembly.
(9)Open access door 312AR.
(10)Install floor panels P/N 98A53207606000 in fuselage tail section.
(11)Gain access to artificial feel unit (Ref. 27-31-00, P. Block 301).
(12)Install rigging pin P/N 98A27307541000 in cable quadrant.
(13)Install rigging pin P/N 0U131281 in artificial feel unit.
(14)With rigging pins and locking tools installed and cable tension slackened (Ref. 27-30-00, P. Block 401), disconnect cable ends of elevator control cables from retaining notches of elevator cable quadrants.

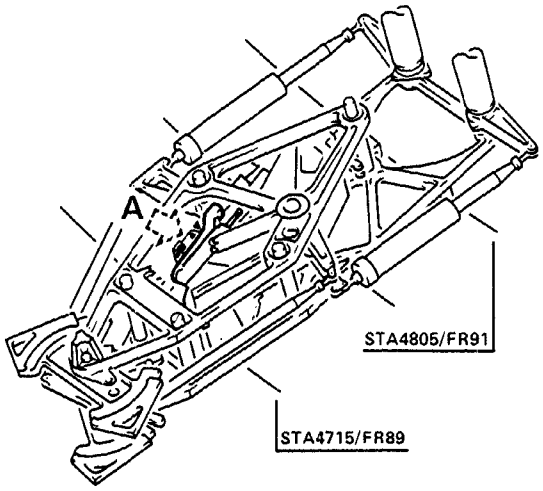
B. Removal (Ref. Fig. 402, 403)
(1)Disconnect the following electrical connectors and install blanking caps (Ref. Fig. 402):
(a)3CY2-A, 3CY2-B and 3CY2-C.
(b)3CY1-A, 3CY1-B and 3CY1-C.
(c)304CY-A.
(2)Removal of Brackets (45) (Ref. Fig. 403)
CAUTION : DO NOT DISTURB POSITION OF CABLE CLAMP (43) ON CABLE LOOM (44).
(a)Remove screw (41), washer (42) and cable clamp (43), securing cable loom (44).
(b)Mark position of brackets (45) on frame base plate (50).
(c)Loosen upper screws (49) but do not remove.
(d)Remove lower screws (49), nuts (46), washers (47) and clips (48).
(e)Remove brackets (45) and cable looms from artificial feel unit frame and temporarily secure to structure.

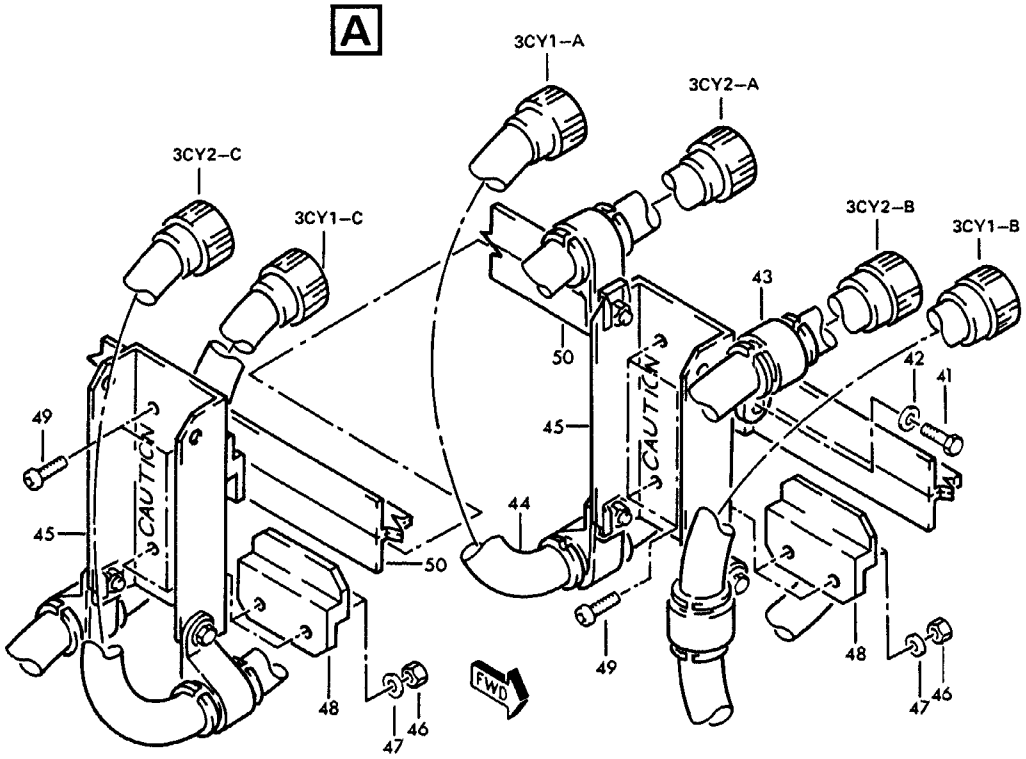


Rigging Location
Figure 401



Artificial Feel Unit - Connections
Figure 402





BM6 27 31 26 4 AE M 0-13

Cable Loom - Attachment
Figure 403

(3)Remove cotter pins (16), nuts (15), washers (14), bolts (12), bushes (13) and spring rods (11) (Ref. Fig. 402).
(4)Position container for hydraulic fluid spillage.
(5)Disconnect hydraulic lines from upper and lower fittings, and install blanking plugs.
(6)Remove nut (17), washer (18), bolt (20) and disconnect bonding strap (19).
(7)Removal of Artificial Feel Unit Frame (37) (Ref. Fig. 404)
CAUTION : ARTIFICIAL FEEL FRAME WEIGHS APPROX. 50 kg (110 lb.).
(a)Support artificial feel unit frame at FR89 and at FR91.
(b)Remove cotter pins (23, 60), nuts (24, 61), washers (25, 62) and bolts (30).
(c)Remove nuts (26) with wrench P/N 98D32303000201.
(d)Remove lockwashers (27), bolts (29) and bushes (28).
(e)Swing links (36, 21) clear of brackets.
(f)Carefully withdraw pins (31) of elevator vertical torque tubes from bearings (32), lowering and moving artificial feel unit frame forward as required.
(g)Remove artificial feel unit frame (37).

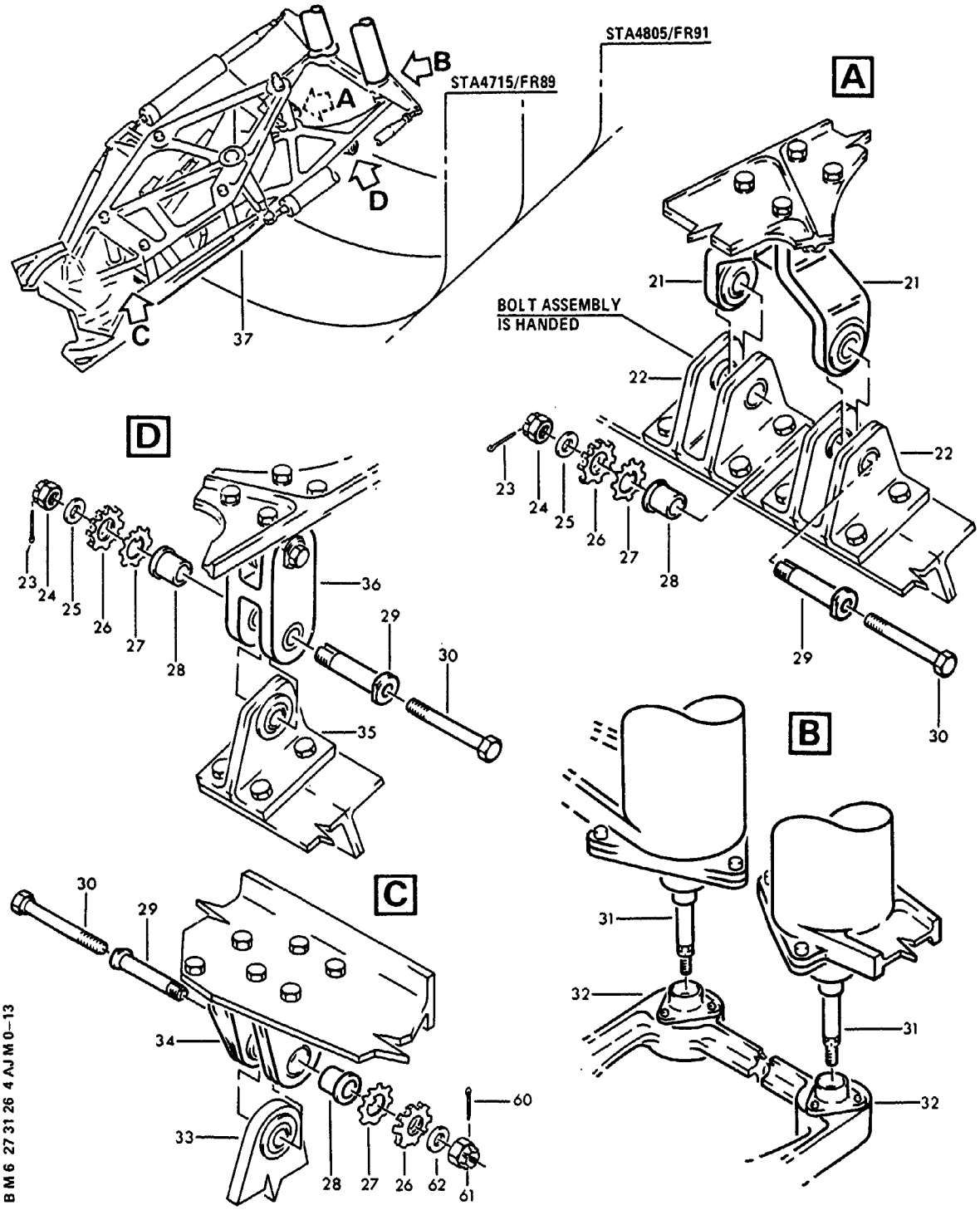
R

R C. Inspection of artificial feel unit frame
R (1)Make sure that artificial feel unit frame (37) and drive shaft bearing
R pins (31) are clean. If necessary clean with CLEANING AGENTS (Material
R No. 11-003) and a lint-free cloth.
R (2)Do an inspection of artificial feel unit frame (37).
R (a)Look for cracks, dents, corrosion, marks and damage to the surface
R protection.
R (b)Cracks and dents are not permitted. If you find cracks or dents, you
R must replace the frame (37).
R (c)If you find marks or corrosion, you must remove the damaged material
R (Ref. 51-74-10, P. Block 801).

R NOTE : The removal of 5% of nominal material thickness over a
R maximum area of 400 mm (0.62 sq.in.) is permitted.

R (d)If you find damaged surface protection, you must repair the paint
R finish (Ref. 51-75-10, P. Block 801).
R (3)Do an inspection of pivot bearings (32) of artificial feel unit
R frame (37).
R (a)Look for corrosion.
R (b)Check the bearings for correct operation and freedom of movement.
R (c)If you find a defective bearing (32), you must replace it.
R (d)Protect bearings (32) from contamination.
R (4)Do an inspection of drive shaft bearing pins (31).
R (a)Look for corrosion and other damage.
R (b)If you find a defective drive shaft bearing pin (31), you must replace
R it (Ref. 27-31-21, P. Block 401).

R D. Installation (Ref. Fig. 402, 403)
(1)Installation of Artificial Feel Unit Frame (37) (Ref. Fig. 404)



Artificial Feel Unit Frame
Figure 404

(a)Position artificial feel unit frame (37).
(b)Carefully align pins (31) of elevator vertical torque tubes with bearings (32), by lifting and moving artificial feel unit frame. Make certain that pins (31) easily engage in bearings (32).
(c)Support artificial feel unit frame at FR91 and at FR89.
(d)Align holes of brackets (35, 33, 22, 34) and links (36, 21) and install bushes (28), bolts (29) and lockwashers (27).
(e)Install nuts (26) with wrench P/N 98D32303000201.
(f)TORQUE nuts (26) to between 0.95 and 1.05 m.daN (84.1 and 92.9 lbf.in.).
(g)Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (30).
(h)Install bolts (30), washers (25, 62) and nuts (24, 61).
(j)TORQUE nuts (24) to between 0.67 and 0.74 m.daN (59.30 and 65.50 lbf.in.) and safety with cotter pins (23).
(k)TORQUE nut (61) to between 1.24 and 1.36 m.daN (9.15 and 10.0 lbf.ft.) and safety with cotter pin (60).

(2)Install bonding strap (19) with bolt (20), washer (18) and nut (17) (Ref. Fig. 402). For electrical bonding refer to 20-28-11, P. Block 1.
(3)Remove blanking plugs from hydraulic line ends and connect lines to upper and lower fittings.
(4)Remove hydraulic fluid container and make certain that all excess fluid is cleaned off all components.
(5)Installation of Brackets (45) (Ref. Fig. 403)
(a)Position brackets (45) on frame base plate (50).
(b)Install brackets (45) at marked positions with clips (48), screws (49), washers (47) and nuts (46).
(c)Tighten nuts (46) sequentially.
(d)Install cable loom (44) with cable clamp (43), washer (42) and screw (41). Length of cable loom (44) from cable clamp (43) to electrical connector 3CY2B must be 130 mm (5 in.).
(e)Apply sealing lacquer (Mat. No. 16-003) to screw (41).

WARNING : DO NOT CROSS CONNECT ELECTRICAL CONNECTORS.

(6)Remove blanking caps and connect the following electrical connectors (Ref. Fig. 402):
(a)Green painted connectors 3CY2-A, 3CY2-B and 3CY2-C to green painted fixed connectors on actuator 2, (upper).
(b)Yellow painted connectors 3CY1-A, 3CY1-B and 3CY1-C to yellow painted fixed connectors on actuator 1, (lower).
(c)3O4CY-A.

(7)Make certain that rigging pin P/N 98A27307541000 in cable quadrant is installed.
(8)Connect elevator control cables to cable quadrants, tension cables, check correct routing of cables and remove locking tools and rigging pins installed at Para. A.(14) (Ref. 27-30-00, P. Block 401).
(9)Make certain that rigging pin P/N 0U131281 is installed in artificial feel unit.
(10)Installation of Spring Rods (11) (Ref. Fig. 402)
(a)Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (12).
(b)Position spring rods (11) and install bushes (13) and bolts (12).
(c)If bolts (12) cannot be easily inserted adjust length of spring rods (11).

(d)Install washers (14) and nuts (15).
(e)TORQUE nuts (15) to between 0.21 and 0.23 m.daN (18.58 and 20.35 lbf.in.) and safety with cotter pins (16).
(11)Remove rigging pins P/N 98A27307541000, P/N 0U131281, P/N 98A27307549000 and P/N 98A27901007000 (Qty. 2).
(12)Remove locking equipment P/N 97A27302009000.
(13)Remove safety clips and tags and close circuit breakers 5CY1, 305CY1, 306CY1, 305CY2 and 5CY2.

R E. Adjustment/Test
(1)Adjust cable tension (Ref. 27-30-00, P. Block 501).
(2)Carry out mechanical controls functional test (Ref. 27-31-00, P. Block 501).
(3)Check that hydraulic connections are free from leaks.
(4)Carry out artificial feel functional test (Ref. 27-33-00, P. Block 501).
(5)Carry out test of disagree warning, which is part of artificial feel operational test (Ref. 27-33-00, P. Block 501).

R F. Close-Up
CAUTION : ELEVATOR CONTROL CABLES INCLUDING GROOVES IN CABLE QUADRANTS, PITCH ARTIFICIAL FEEL ACTUATOR PISTON-RODS, AND NEEDLE BEARINGS (32) MUST NOT BE TREATED WITH MOISTURE-REMOVING OIL.
(1)On the following areas check coating of moisture-removing oil (Mat. No. 05-027) for good condition and renew as necessary (Ref. 51-75-10, P. Block 801):
(a)Elevator artificial feel unit frame including links, brackets, cable quadrants, push rods, spring rods, artificial feel unit and pitch artificial feel actuators.
(2)Install covering (Ref. 27-31-00, P. Block 301).
(3)Remove floor panels P/N 98A53207606000.
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(5)Close access doors 312AR and 313AL.
(6)Remove warning notices.
(7)Remove access platform.

SPRING ROD - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

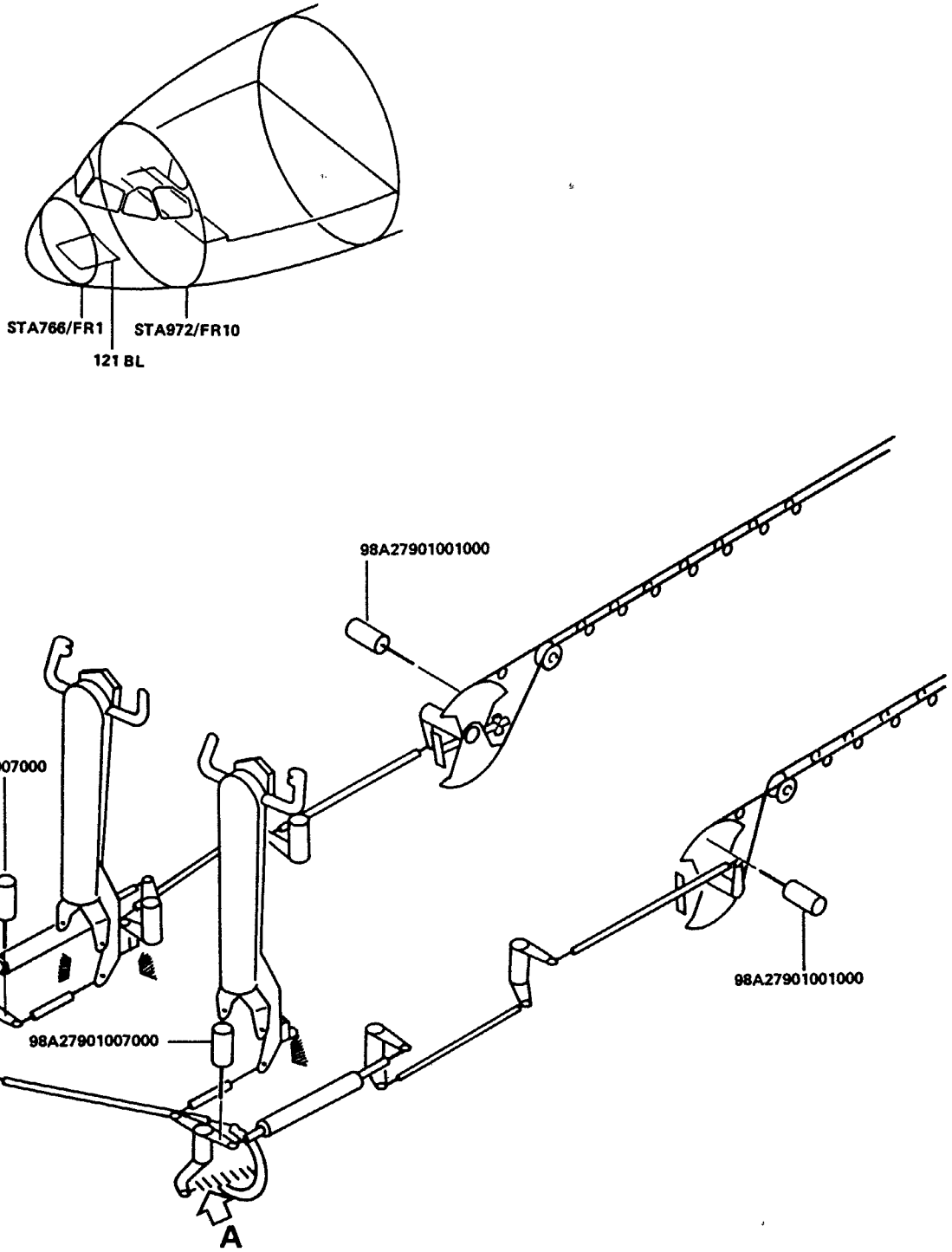
1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Warning Notices Prohibiting Pressurization of Hydraulic System
C.	Warning Notices Prohibiting Operation of Flight Controls
D. Material No. 04-004	Common Greases (Ref. 20-31-00)
E. 98A27901007000	Pin - Rigging, Elevator Control
F. 98A27901001000	Pin - Rigging, Elevator Control
G.	Lockwire - Corrosion Resistant Steel (Dia. 0.8 mm) (0.032 in.)
H.	Access Platform (2.5 m to 3 m) (8.20 to 9.80 ft.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

2. Procedure

A. Job Set-Up
(Ref. Fig. 401)
(1)Position access platform and open access door 121BL.
(2)Display a warning notice on overhead panel in flight compartment, prohibiting pressurization of hydraulic system and operation of flight controls.
(3)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1		Line 103
21VU	FAC2		Line 103



Location of Components and Rigging Points
Figure 401

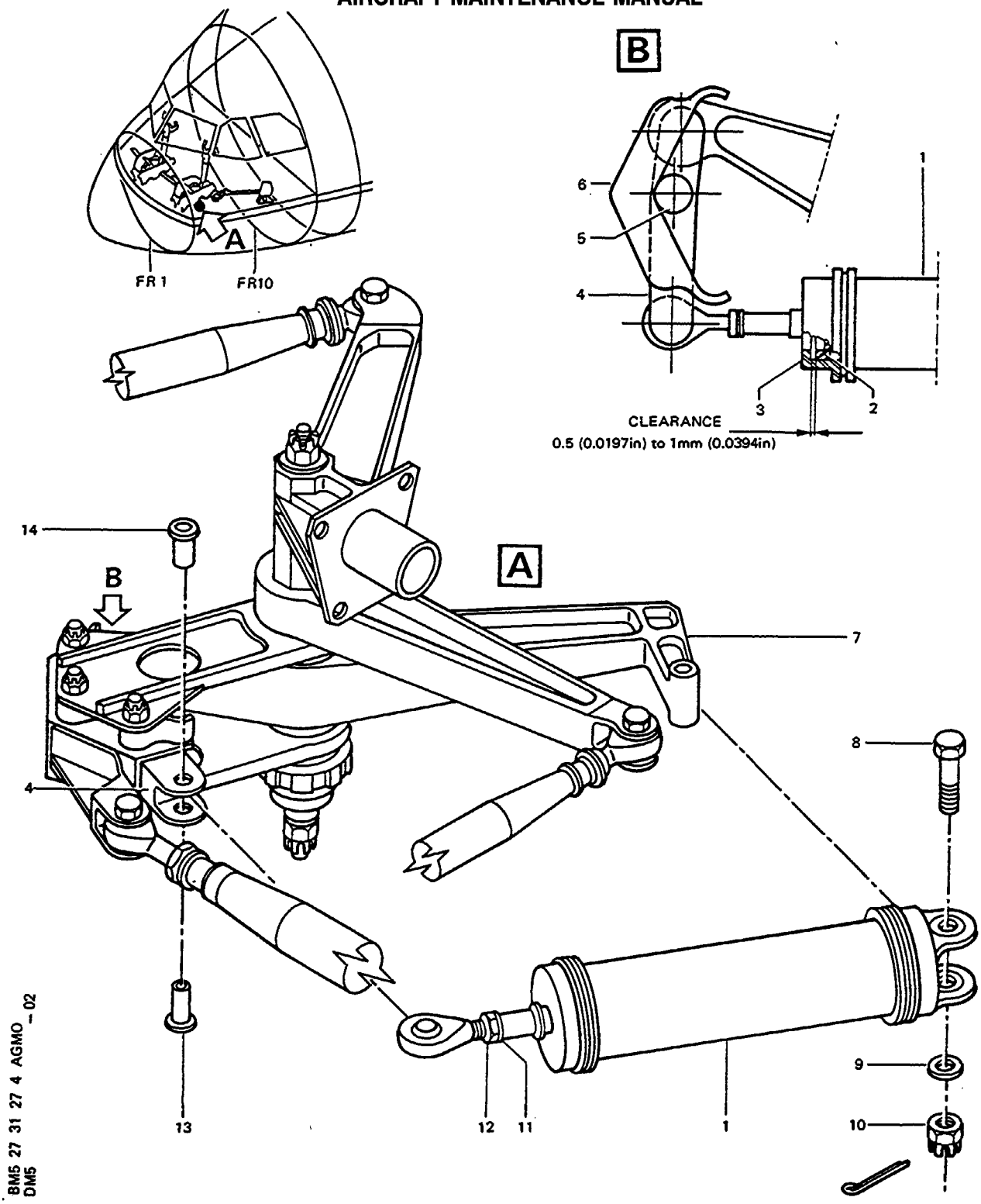
B. Removal
(Ref. Fig. 402)
(1)Uncrimp and remove rivet (13). Remove flanged bush (14), discard rivet (13) and flanged bush (14).
(2)Hold spring rod (1), remove cotter pin, nut (10), washer (9) and bolt (8).
(3)Remove spring rod (1).

C. Installation
(1)Install spring rod (1) on bellcrank (7).
(2)Install bolt (8), washer (9) and nut (10). Tighten nut and safety with cotter pin.
(3)Position the other end of spring rod (1) on control lever (4).
(4)Insert flanged bush (14), then rivet (13). Swage rivet.
R NOTE : Rivet (13) shall be swaged with a punch sharpened to 80°
R for the first operation and with another sharpened to 120° for the finish operation.
(5)Cut and remove lockwire. Loosen nut (12) and disengage lockwasher (11). Adjust length of spring rod (1) to bring the two rollers (5) into contact with cam (6) while maintaining between seat of spring (2) and nut (3) a clearance of 0.5 mm to 1 mm (0.0197 to 0.0394 in.)
(6)Engage lockwasher (11). Tighten and wirelock nut (12).

D. Adjustment (Ref. Fig. 401)
(1)Remove warning notices
(2) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(3)Connect hydraulic ground power cart and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Set pitch control to zero and lock input levers of right and left tension regulators with rigging pins 98A27901001000.
(5)Lock pitch control bellcranks to control mechanism mounting beams with rigging pins 98A27901007000.
(6)Check that rollers (5) are still into contact with cam (6) and that working clearance in within the given tolerance.
(7)Remove rigging pins.
(8)Remove safety clips and tags and close the FAC 1 and FAC 2 circuit breakers, line 103.

E. Test
Perform functional test as described in 27-31-00, P. Block 501.

F. Close-Up
(1)Depressurize Green hydraulic system and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Close access door.
(5)Remove access platform.



Spring Rod
Figure 402

FORWARD DETENT BELLCRANK - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

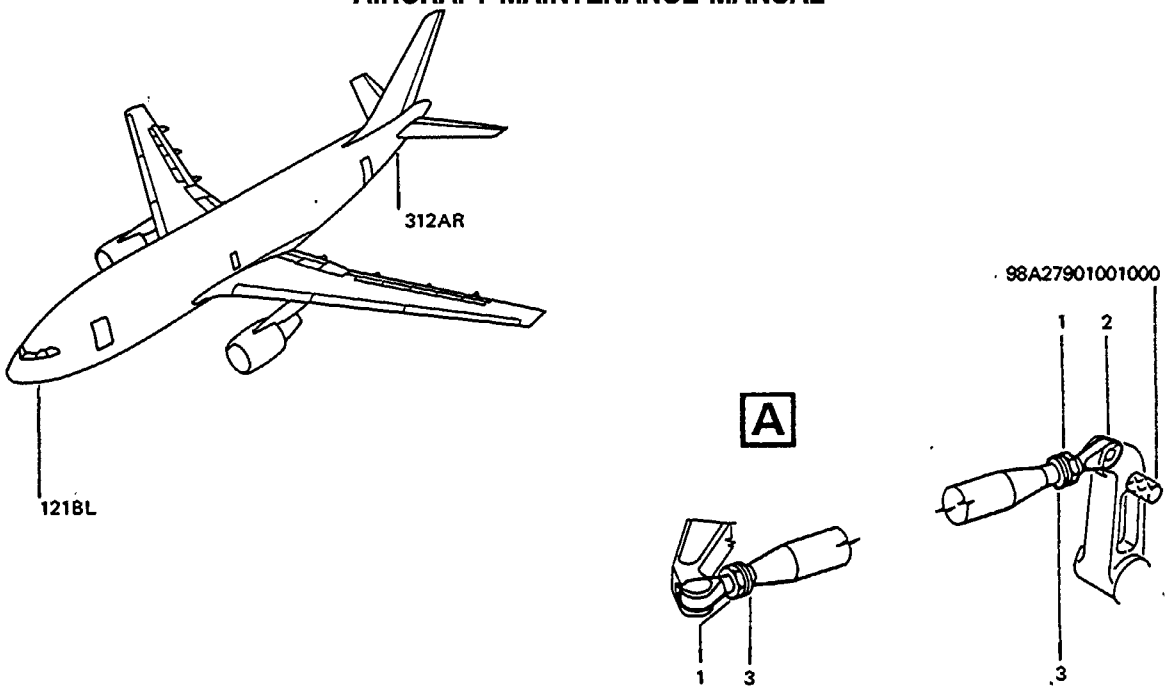
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

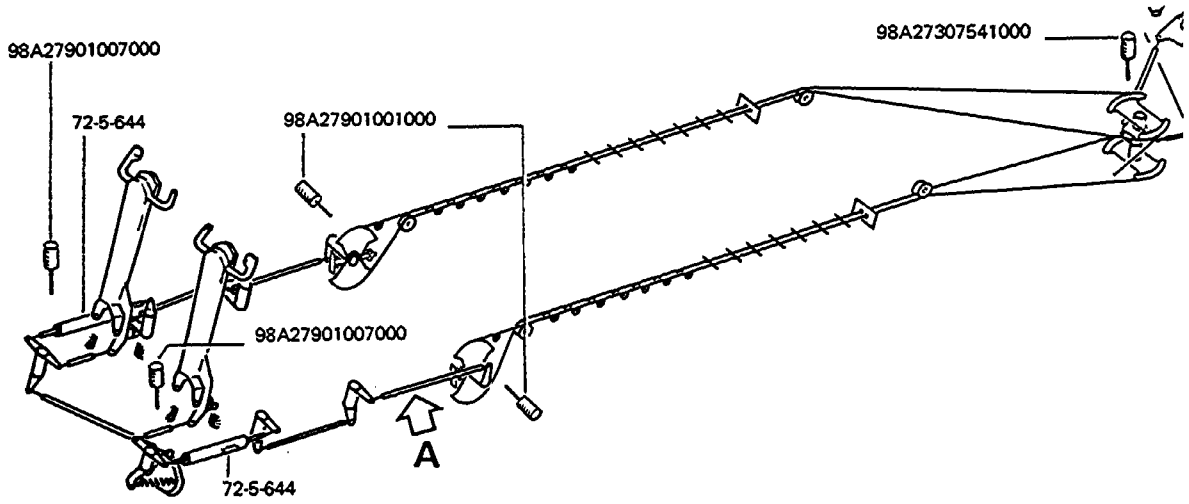
1. Equipment and Materials

ITEM	DESIGNATION
A. 98A27901001000	Pin - Rigging, Elevator Control
B. 98A27901007000	Pin - Rigging, Elevator Control
C. 98A27307541000	Rigging Pin - Cable Quadrant, Elevator Mechanical Controls
D. 72-5-644	Retaining Fork - Dynamometric Rod
E.	Lockwire - Corrosion Resistant Steel (Dia 0.8 mm) (0.032 in.)
F.	Access Platform (2.5 m to 3 m) (8.20 to 9.80 ft.)
G.	Warning Notice Prohibiting Pressurization of Hydraulic System and Operation of Flight Controls
H. Material No. 04-004	Common Greases (Ref. 20-31-00)
J.	Circuit Breaker Safety Clips
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling

2. Procedure

A. Job Set-Up
(Ref. Fig. 401)
(1)Position access platform and open access door 121BL.
(2)Make certain that pitch trim controls are in neutral.
(3)Open, safety and tag the following circuit breakers :





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Location of Components and Rigging Points
Figure 401

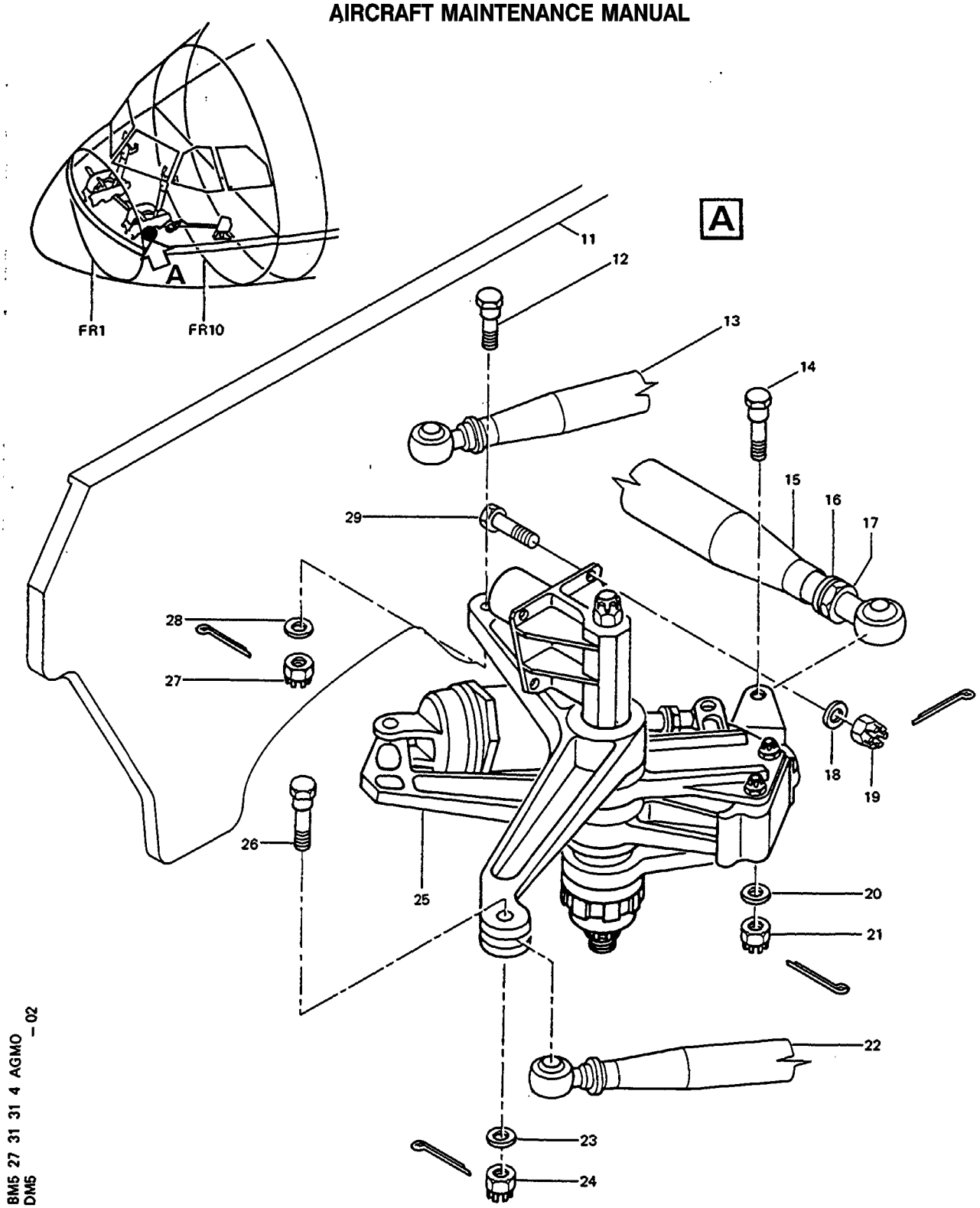
PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1		Line 103
21VU	FAC2		Line 103

(4)Display a warning notice in flight compartment, prohibiting pressurization of hydraulic system and operation of flight controls.
(5)Install tools 72-5-644.

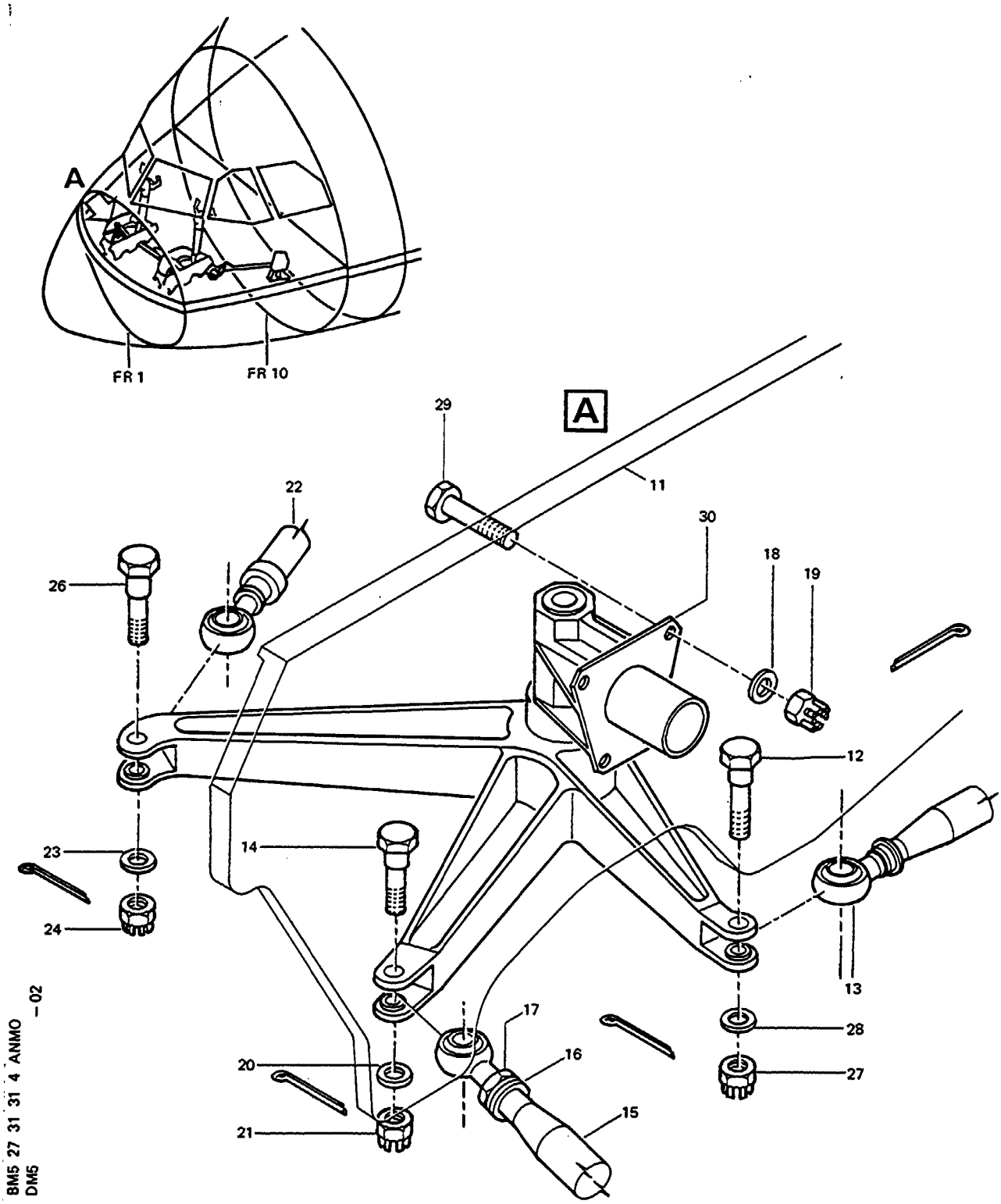
B. Removal
(Ref. Fig. 402)
(Ref. Fig. 403)
(1)Remove cotter pin, remove nut (24) and washer (23).
(2)Hold dynamometric rod (22).
(3)Remove bolt (26).
(4)Handle dynamometric rod (22) with care and stow it on structure.
(5)Remove cotter pin, remove nut (21) and washer (20).
(6)Hold interconnecting rod (15).
(7)Remove bolt (14).
(8)Stow interconnecting rod (15) on structure.
(9)Remove cotter pin, remove nut (27) and washer (28).
(10)Hold pitch control rod (13).
(11)Remove bolt (12).
(12)Stow pitch control rod (13) on structure.
(13)Remove cotter pin, remove nut (19), washer (18) and bolt (29).
(14)At Captain's side, remove detent bellcrank (25). At First Officer's side, remove pitch control bellcrank (30).

C. Preparation of Replacement Component
(1)At Captain's side, check that replacement detent bellcrank (25) is equipped with bushes.
(2)At First Officer's side, check that replacement pitch control bellcrank (30) is equipped with bushes.

D. Installation
NOTE : Lubricate mating surfaces and threads of bolts and nuts with grease, Material No. 04-004.
(1)At Captain's side, position detent bellcrank assembly (25) or, at First Officer's side, position pitch control bellcrank (30).
(2)Secure bellcrank to control mechanism mounting beam (11) with bolts (29), washers (18) and nuts (19). Tighten nuts and safety with cotter pins.
(3)Connect pitch control rod (13) to bellcrank (25) (30) with bolt (12).
(4)Install washer (28) and nut (27) on bolt (12). Tighten nut and safety with cotter pin.
(5)Connect interconnecting rod (15) to bellcrank (25) (30) with bolt (14).
(6)Install washer (20) and nut (21) on bolt (14). Tighten nut and safety with cotter pin.
(7)Connect dynamometric rod (22) to bellcrank (25) (30) with bolt (26).
(8)Install washer (23) and nut (24) on bolt (26). Tighten nut and safety with cotter pin.



Forward Detent Bellcrank, Captain - Removal/Installation
Figure 402



Pitch Control Bellcrank, First Officer - Removal/Installation
Figure 403

E. Adjustment (Ref. Fig. 401, 402, 403)

(1)Remove warning notices

(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(3)Connect hydraulic ground power cart and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(4)Check that elevator control system is in neutral.

(5)Open access door 312AR.

(6)Install rigging pins 98A27307541000 in cable quadrant.

(7)At First Officer's side, lock pitch control bellcrank (30) to control mechanism mounting beam (11) with rigging pin 98A27901007000.

(8)At Captain's side, check that rigging pin 98A27901007000 can be freely installed and removed.

(9)If necessary, adjust as follows .

- cut and remove lockwire, loosen nuts (17) and free lockwashers (16). Act on interconnecting rod (15) body until free insertion and removal of rigging pin 98A27901007000 (Captain's side) is obtained. Engage lockwashers (16), tighten nuts (17) and wirelock. Install rigging pin.

(10)At First Officer's side, install rigging pin 98A27901001000 in tension regulator input lever.

(11)At Captain's side, check that rigging pin 98A27901001000 can be freely installed in tension regulator input lever.

(12)If necessary, adjust as follows :

- cut and remove lockwire, loosen nuts (1) and free lockwashers (3). Act on adjustable rod (2) body until free insertion and removal of rigging pin 98A27301001000 is obtained. Engage lockwashers (3), tighten nuts (1) and wirelock. Install rigging pin.

(13)Remove tools 72-5-644 and remove all rigging pins.

(14)On panel 21VU, remove safety clips and tags and close the following circuit breakers FAC1 and FAC2, Line 103.

F. Test

Perform functional test as described in 27-31-00, P. Block 501.

G. Close-Up

(1)Depressurize hydraulic system and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).

(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(4)Close access doors 121BL and 312AR.

(5)Remove access platform.

AFT DETENT BELLCRANK - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, up to 8 m (26 ft.)
B. OU131281	Pin - Rigging, Artificial Feel Unit Elevator Mechanical Controls
C. 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
D. 98A27307541000	Rigging Pin - Cable Quadrant, Elevator Mechanical Controls
E. 98A27307549000	Pin - Rigging, Elevator Control Bellcranks (Qty. 2)
F. 98A27308032009	Spacer - Aft Detent Bellcrank
G. SL90.313	Tool - Installation, Tab Washers STA-LOK NSA5454
H. SL90.314	Tool - Extraction, Tab Washers STA-LOK NSA5454
J. SL90.374	Wrenches - Notched, Tightening of Nuts NSA5454
K.	Torque Wrench, up to 0.2 m.daN (17 lbf.in.)
L.	Corrosion-Resistant Steel Lockwire, 0.8 mm (0.031 in.) dia.
M.	Cotter Pins
N.	Warning Notices
P. Material No. 05-005	Special Materials (Ref. 20-31-00)
Q. Material No. 05-027	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 27-31-00, P. Block 301	Mechanical Control and Pitch Uncoupling - Rigging
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 51-75-10, P. Block 801	Repair of Paint Coatings
- 55-13-13, P. Block 401	Trailing Edge Access Panels

3. Procedure

A. Job Set-Up (Ref. Fig. 401)

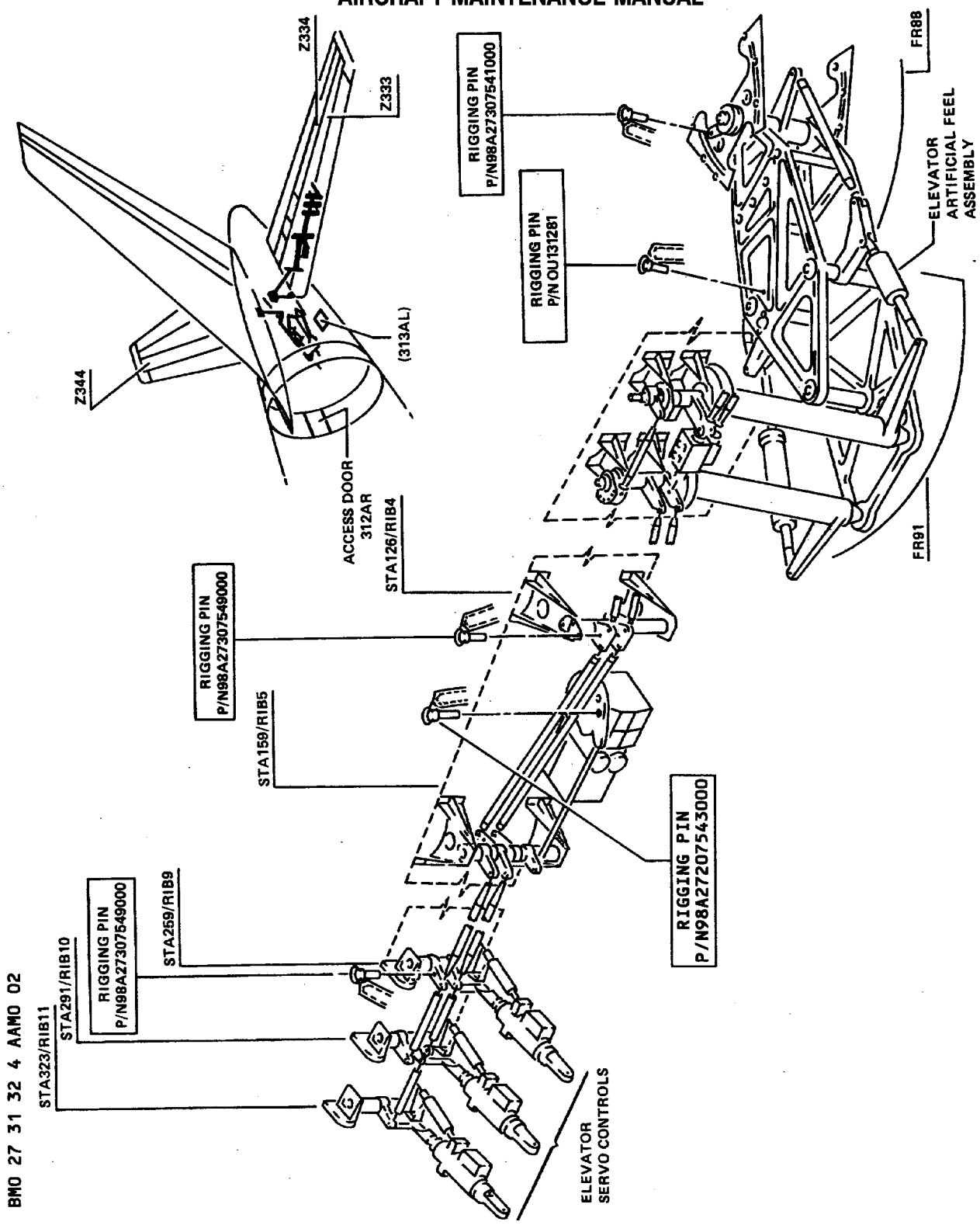
(1)Position access platform.
(2)Make certain that pitch trim control wheels and elevator control are set at zero and install locking equipment P/N 97A27302009000 at pitch trim control wheel.
(3)Display warning notices in flight compartment prohibiting operation of flight controls.
(4)Remove trailing edge access panels 334/344CT (Ref. 55-13-13, P. Block 401).
(5)Open access doors 312AR and 313AL.
(6)Install pins P/N 98A27307541000 and P/N OU131281 (Ref. 27-31-00, P. Block 301).
(7)Insert rigging pin P/N 98A27307549000 in bellcrank at RIB9 LH and RH.
(8)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301) and display warning notice in flight compartment prohibiting pressurization.

B. Removal (Ref. Fig. 402)
(1)Remove cotter pin (10), nut (11) and washer (9).
(2)Remove bolts (6), bushes (7), disconnect pushrod (8) and secure to structure.
(3)Cut and remove lockwire, remove cap nut (1) and washer (2).
(4)Remove retaining ring (3) using extractor P/N SL90.314, and ring nut (4) using notched wrench P/N SL90.374, and washer (5).
(5)Remove cotter pins (14), nuts (15), washers (16) and bolts (17).
(6)Remove detent bellcrank (12) from splined shaft (13).

C. Installation (Ref. Fig. 402)
(1)Position spacer P/N98A27308032009 in slot of aft detent bellcrank.
(2)Position detent bellcrank (12) on splined shaft (13).
(3)Position pushrod (8).
(4)Make certain that bolt hole of detent bellcrank (12) and pushrod (8)are aligned. If holes do not align, remove bellcrank (12) re-position to get minimum misalignment and adjust pushrod (8) as required.
NOTE : Make certain that angle between centerline of universal joints and interconnecting rod attachment axis is 97°.
(5)Install washer (5), ring nut (4) using notched wrench P/N SL90.374 and retaining ring (3) using installation tool P/N SL90.313.
(6)Remove spacer P/N 98A27308032009.
(7)Install bolts (17), washers (16) and nuts (15).
(8)TORQUE nuts (15) to between 0.14 and 0.16 m.daN (12.4 and 14.2 lbf.in.) and safety with cotter pins (14).
(9)Install washer (2), cap nut (1) and safety with lockwire.
(10)Position pushrod (8), bush (7) install bolt (6),washer (9) and nut (11).
(11)TORQUE nut (11) to between 0.08 and 0.095 m.daN (7 and 8 lbf.in.) and safety with cotter pin (10).
(12)Remove rigging pins P/N 98A27307541000, P/N 0U131281 (Ref. 27-31-00, P. Block 301), P/N 98A27307549000 and locking equipment P/N 97A27302009000.
(13)Coat all visible cadmium-plated steel parts with corrosion-preventive compound (Mat. No. 05-005) (Ref. 51-75-10, P. Block 801).
(14)Check coating of moisture removing oil (Mat. No. 05-027) for good condition and renew if necessary (Ref. 51-75-10, P. Block 801).

D. Test
(1)Carry out functional test of pitch control uncoupling (Ref. 27-31-00, P. Block 501).

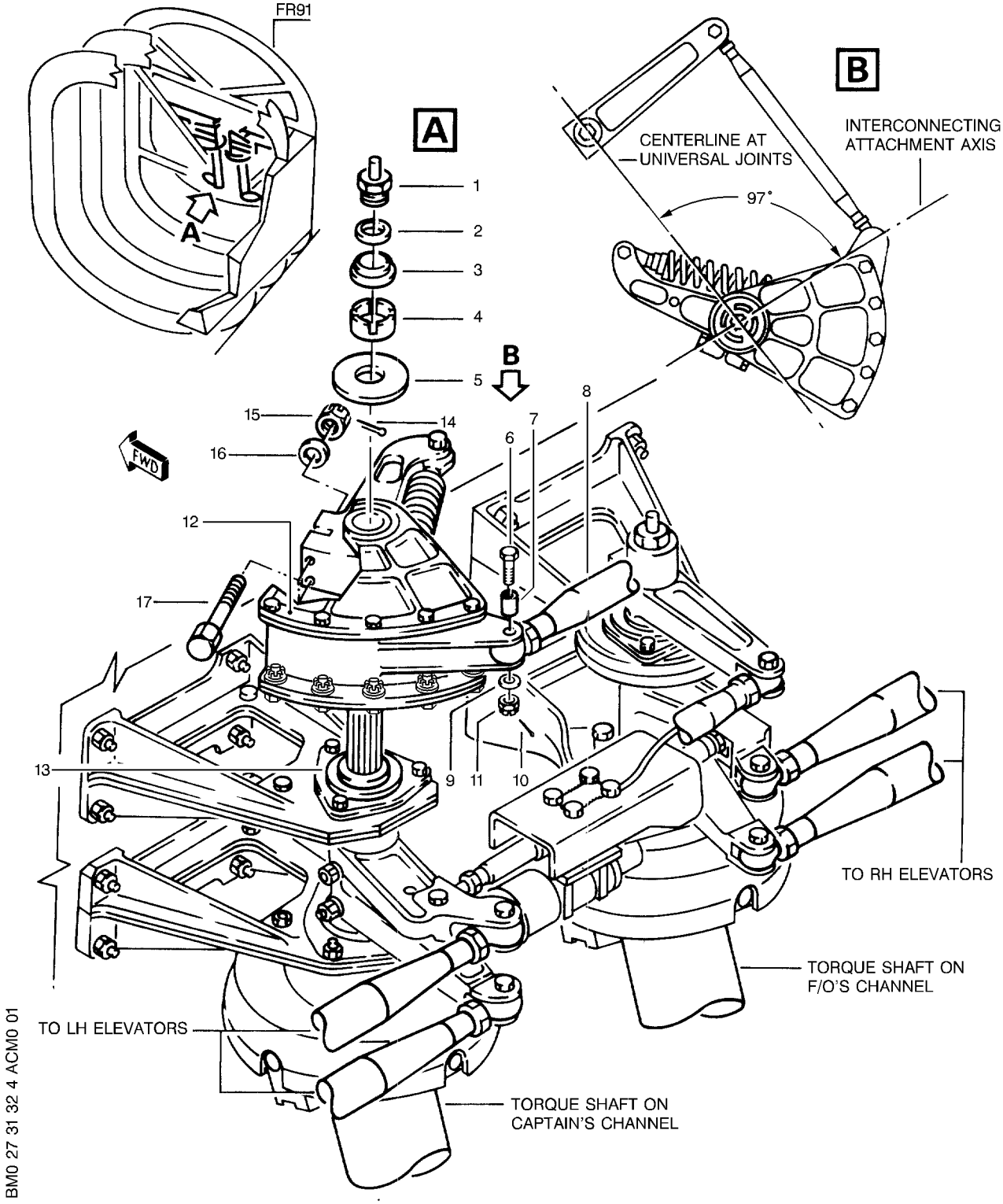
E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install access panels 334/344CT, (Ref. 55-13-13, P. Block 401).
(3)Close access doors 312AR and 313AL.
(4)Remove warning notices.
(5)Remove access platform.



BMO 27 31 32 4 AAMO 02

Rigging Location
Figure 401

R



Aft Detent Bellcrank
Figure 402

R

AFT DETENT BELLCRANK - INSPECTION/CHECK

WARNING: MAKE SURE THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE SURE THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reasons for the Job

A. Do a check of the Fits and the Clearances.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, up to 8 m (26 ft.)
B. OU131281	Pin - Rigging, Artificial Feel Unit Elevator Mechanical Controls
C. 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
D. 98A27307541000	Pin - Rigging, Cable Quadrant Elevator Mechanical Controls
E. 98A27307549000	Pin - Rigging, Elevator Control Bellcranks (Qty. 2)
F. 98A27207543000	Pin - Rigging, Autopilot Pitch Actuator
G.	Warning Notices

Referenced Procedures

- 22-13-23, P. Block 401	Autopilot Pitch Actuator
- 27-31-00, P. Block 301	Mechanical Control and Pitch Uncoupling - Rigging
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 55-13-13, P. Block 401	Trailing Edge Access Panels

3. Procedure

A. Job Set-Up (Ref. Fig. 601)

(1)Put the access platform.
(2)Make certain that the pitch trim control wheels and elevator control are set at zero and install locking equipment P/N 97A27302009000 at pitch

trim control wheel.
(3)Put warning notices in flight compartment to prevent operation of flight controls.
(4)Remove trailing edge panels 334/344CT (Ref. 55-13-13, P. Block 401).
(5)Open access doors 312AR and 313AL.
(6)Install rigging - pin P/N 98A27307541000 in cable quadrant (Ref. 27-31-00, P. Block 301).
(7)Install rigging - pin P/N 0U131281 in artificial feel unit (Ref. 27-31-00, P. Block 301).
(8)Install rigging - pin P/N 98A27207543000 in autopilot pitch actuator (Ref. 22-13-23, P. Block 401).
(9)Install rigging - pin P/N 98A27307549000 in bellcrank at RIB9 LH and RH and at RIB 4.
(10)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301) and put warning notices in flight compartment to prevent pressurization.

B. Check of the Fits and the Clearances (Ref. Fig. 602)

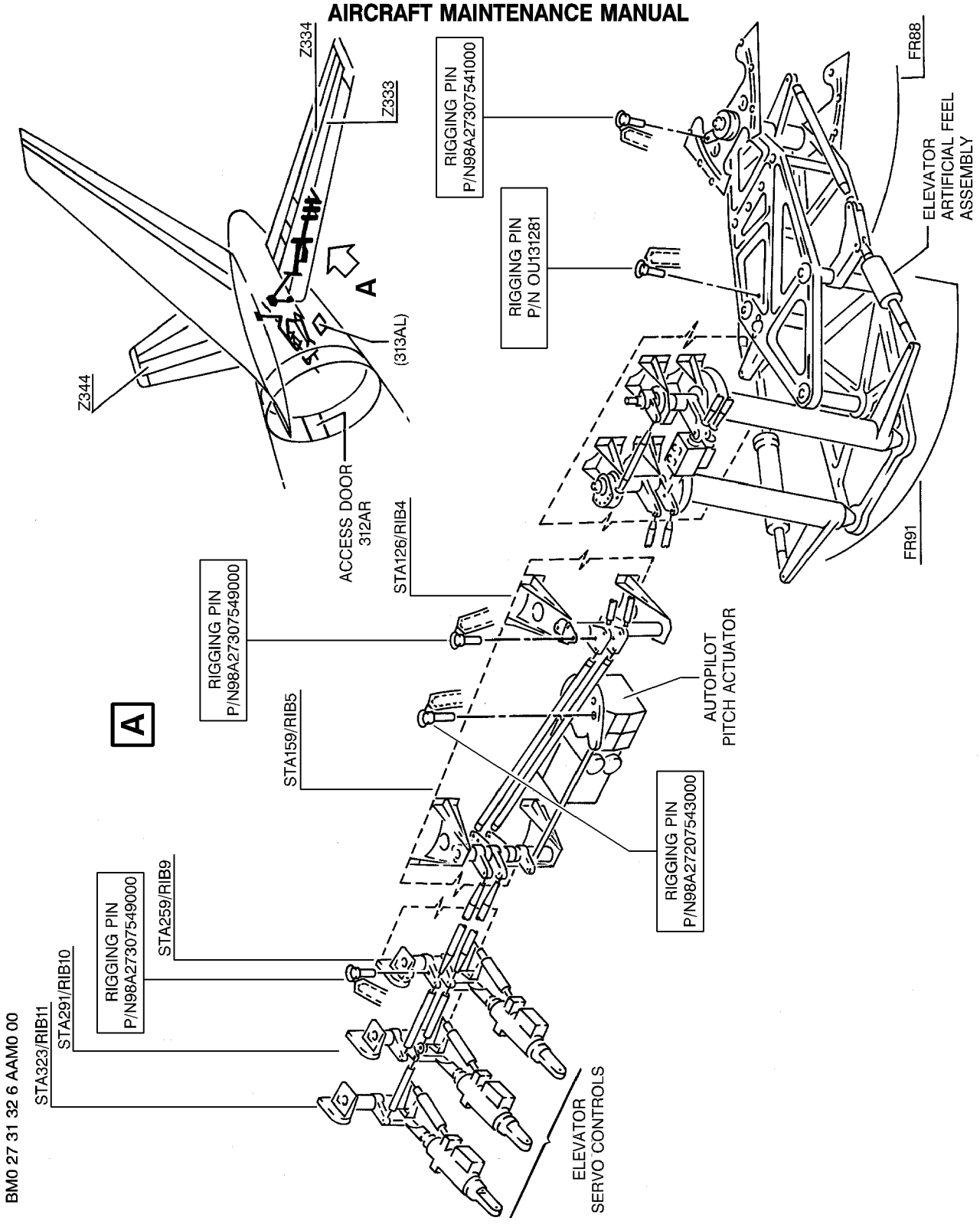
(1)Measure the fits and the clearances of components as listed in the following table (Ref. Fig. 602):

Detail and Item No.	Original Mfg Limits				In-Service Wear Limits		
	Dimension/assy mm (in.)		Clearance mm (in.)		Dimension Limits mm (in.)		Max. Allow. clear mm (in.)
	Min.	Max.	Min.	Max.	Min.	Max.	
A-A							
OD1	6.324 (0.2489)	6.334 (0.2494)			6.288 (0.2475)		
			0.056 (0.0022)	0.041 (0.0017)			0.128 (0.0050)
ID2	6.350 (0.2499)	6.380 (0.2512)				6.416 (0.2526)	
OD1	6.324 (0.2489)	6.334 (0.2494)			6.324 (0.2484)		
			0.016 (0.0005)	0.041 (0.0017)			0.041 (0.0017)
ID4	6.350 (0.2499)	6.365 (0.2506)				6.365 (0.2506)	
OD2	7.986 (0.3144)	7.995 (0.3148)			7.969 (0.3137)		
			0.005 (0.0002)	0.029 (0.0012)			0.063 (0.0024)
ID3	8.000 (0.3150)	8.015 (0.3156)				8.032 (0.3162)	

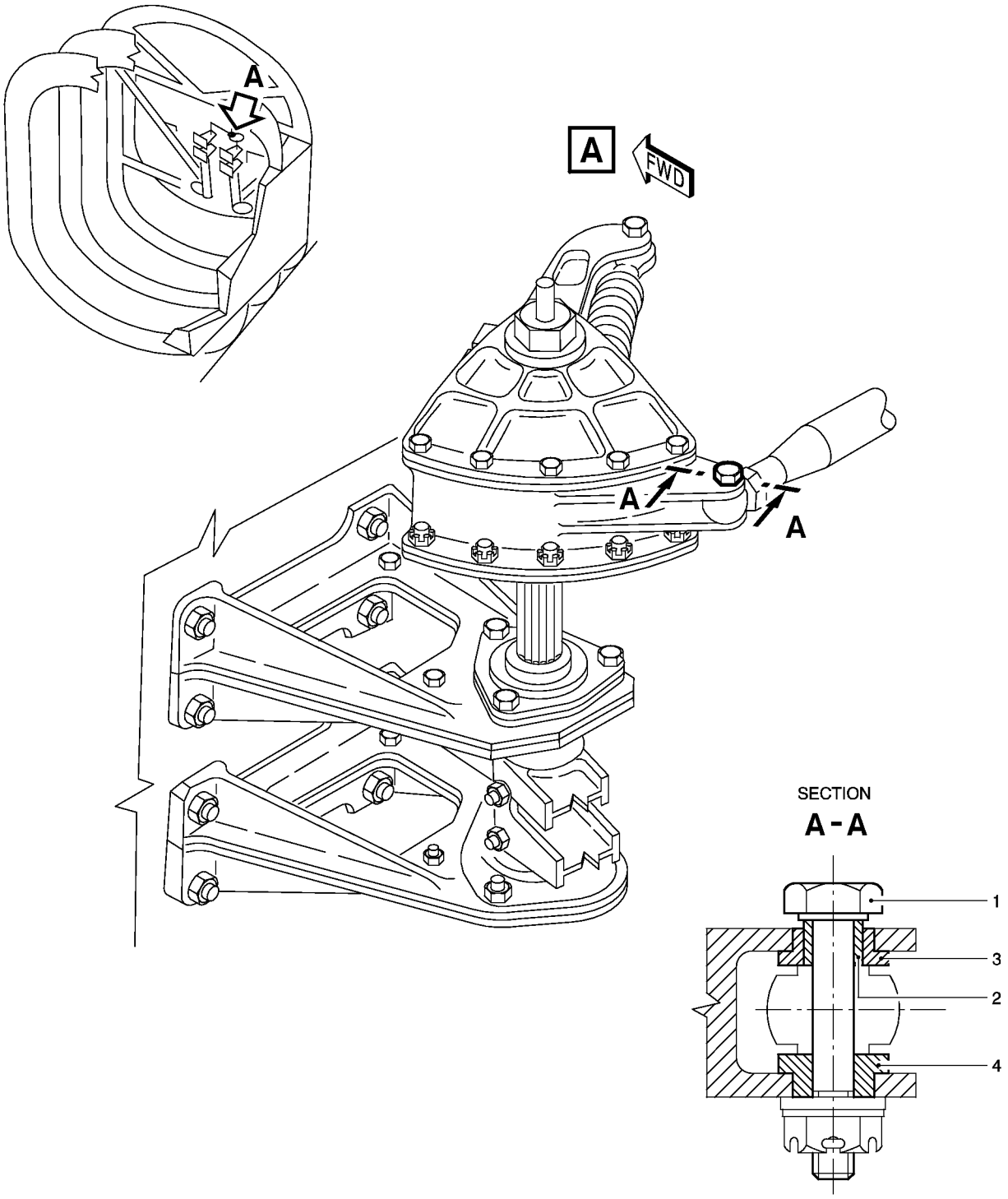
(2)Replace the components if the dimensions of the fits and the clearances are larger than the given limits.

C. Close-Up

(1)Make sure that the work area is clean and clear of tools and other items.
(2)Remove all the rigging pins.
(3)Install trailing edge access panels 334/344CT.
(Ref. 55-13-13, P. Block 301).
(4)Close access doors 312AR and 313AL.
(5)Remove the warning notices.
(6)Remove access platforms.



Rigging - Pins Location
Figure 601



BM0 27 31 32 6 ACM0 00

AFT Detent Bellcrank
Figure 602

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR, MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF THE CONTROLS.

1. Equipment and Materials:

ITEM	DESIGNATION
A.	Access Platform, up to 8 m (26 ft.)
B. OU131281	Pin - Rigging, Artificial Feel Unit Elevator Mechanical Controls
C. 98A27307541000	Rigging Pin - Cable Quadrant, Elevator Mechanical Controls
D. 98A27307549000	Pin - Rigging, Elevator Control Bellcranks
R	(Qty. 3)
E.	Circuit Breaker Safety Clips
F.	Cotter Pins
G.	Corrosion-Resistant Steel Lockwire, 0.8 mm (0.032 in.) dia.
H. Material No. 05-005	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 27-31-00, P. Block 301	Mechanical Control and Pitch Uncoupling - Rigging
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 55-13-13, P. Block 401	Trailing Edge Access Panels

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Make certain that pitch trim control wheels and control column are set in neutral position.
(3)Display warning notices in flight compartment prohibiting operation of flight controls.
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/PITCH UNCOUPLING SOLENOID	1CF	331/V64
133VU	FLT CTL/EFCU/LAND RECOVERY/SPLR 6&7	9CP	333/T66

(5)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301) and display warning notices prohibiting pressurization.
(6)Remove access panels 344CT, (Ref. 55-13-13, P. Block 401).
(7)Open access doors 312AR and 313AL.
(8)Install rigging pin P/N 98A27307541000 and P/N 0U131281 (Ref. 27-31-00, P. Block 301).
R (9)Insert rigging pin P/N 98A27307549000 in bellcrank at RIB9 RH and LH.
(10)Insert rigging pin P/N 98A27307549000 in aft detent bellcrank.

B. Removal (Ref. Fig. 401)
(1)Remove cotter pins (2), nuts (3) and washers (4).
(2)Remove bolts (5), spacers (6) and control rods (1, 7).
(3)Disconnect electrical connector 4CF-A from pitch uncoupling unit (13).
(4)Remove cotter pins (10), nuts (11) and washers (12).
(5)Remove bolts (8), spacers (9) and pitch uncoupling unit (13) from supports.
(6)Secure bushes (15) temporarily.

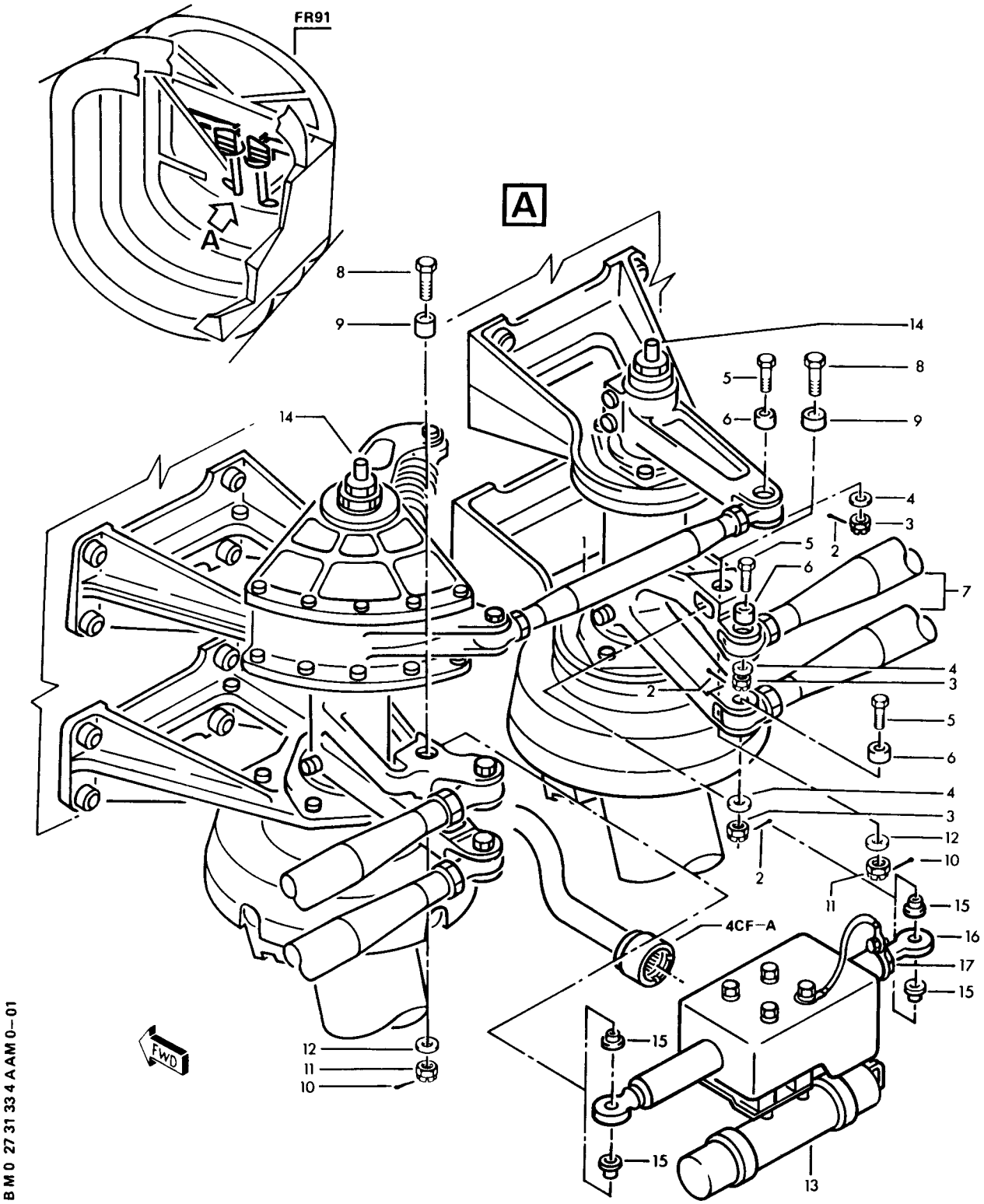
C. Preparation of Replacement Components
(1)Adjust pitch uncoupling unit (13) as follows:
(a)Measure distance between centering spigots (14) of universal joints.
(b)Cut and remove lockwire from nuts (17).
(c)Loosen nuts (17).
(d)Adjust distance between eye-ends (16) to measured distance between centering spigots (14).
(e)Tighten nuts (17).
(f)Make certain that eye-ends (16) are in safety.
(g)Safety nuts (17) with lockwire.

D. Installation (Ref. Fig. 401)
(1)Make certain that bushes (15) are positioned.
(2)Position pitch uncoupling unit (13), spacers (9) and install bolts (8).

(3)Install washers (12) and nuts (11), safety nuts (11) with cotter pins (10).
(4)Position control rods (1, 7), spacers (6) and install bolts (5).
(5)Install washers (4) and nuts (3), safety nuts (3) with cotter pins (2).
(6)Connect electrical connector 4CF-A at pitch uncoupling unit (13).
(7)Apply corrosion-preventive compound (Mat. No. 05-005) to all bolts, washers and nuts.
(8)Remove rigging pins P/N 98A27307541000, P/N 0U131281 (Ref. 27-31-00, P. Block 301) and P/N 98A27307549000.
(9)Remove safety clips, tags and close circuit breakers 9CP and 1CF.
(10)Make certain that elevator control travel ranges are clear.

E. Test
(1)Carry out pitch control uncoupling/coupling test (Ref. 27-31-00, P. Block 501).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install trailing edge access panels (Ref. 55-13-13, P. Block 401).
(3)Close access doors 312AR and 313AL.
(4)Remove Warning notices.
(5)Remove access platform.



Pitch Uncoupling Unit
Figure 401

PITCH UNCOUPLING SOLENOID 4CF - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR, MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF THE CONTROLS.

1. Equipment and Materials:

ITEM	DESIGNATION
A.	Access Platform, up to 8 m (26 ft.)
B. OU131281	Pin - Rigging, Artificial Feel unit, Elevator Mechanical Controls
C. 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
D. 98A27307549000	Pin - Rigging, Elevator Control Bellcranks (Qty - 2)
E. 98A27307541000	Rigging Pin - Cable Quadrant, Elevator Mechanical Controls
F.	Corrosion-Resistant Steel Lockwire, 0.8 mm (0.032 in.) dia.
G.	Cotter Pins
H.	Circuit Breaker Safety Clips
J.	Lockwasher
K. Material No. 04-004	Common Greases (Ref. 20-31-00)
L. Material No. 05-002	Special Materials (Ref. 20-31-00)
M. Material No. 05-005	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 27-31-00, P. Block 301	Mechanical Control and Pitch Uncoupling - Rigging
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 55-13-13, P. Block 401	Trailing Edge Access Panels

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Make certain that pitch trim control wheels and control column are set in neutral position and install locking equipment P/N 97A27302009000.
(3)Display warning notices in flight compartment prohibiting operation of the flight controls.
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/PITCH UNCOUPLING SOLENOID	1CF	331/V64
133VU	FLT CTL/EFCU/LAND RECOVERY/SPLR 6/7	9CP	333/T66

(5)Remove access panel 344CT (Ref. 55-13-13, P. Block 401).
(6)Open access doors 312AR and 313AL.
(7)Remove artificial feel Unit covers (Ref. 27-31-26, P. Block 401).
(8)Insert rigging pin P/N 98A27307541000 in cable quadrant.
(9)Insert rigging pin P/N 0U131281 in elevator artificial feel frame assembly.
(10)Insert rigging pin P/N 98A27307549000 in bellcrank at RIB9 RH and RH. and in aft detent bellcrank.

B. Removal (Ref. Fig. 401)
(1)Remove connector 4C7-A.
(2)Remove cotter pin (9).
(3)Remove nut (8) and washer (10).
(4)Remove bolt (4) and spacer (11).
(5)Remove cotter pins (7).
(6)Remove nuts (6) and washers (5).
(7)Remove solenoid (3) from pitch uncoupling unit (1).

C. Preparation of Replacement Components
(1)Release Lockwasher (14), remove end fitting (13), remove and discard lockwasher (14), remove washers (15).
(2)Apply grease (Mat. No. 04-004) to washers (15).
(3)Install washers (15), lockwasher (14) and end fitting (13) on replacement solenoid (3).

D. Installation (Ref. Fig. 401)
(1)Position solenoid (3) at pitch uncoupling unit (1).
(2)Position washers (5) and install nuts (6).
(3)Install cotter pins (7).
(4)Set the clutch lever (12) to locked position.
(5)Apply corrosion preventive paste (Mat. No. 05-002) to the bolt (4) and the spacer (11).
(6)Insert the spacer (11) and the bolt (4) thru the clutch lever (12)

and solenoid eye end (13).

(7)Install connector 4CF-A to solenoid (3).

(8)Make certain that bores in clutch lever (12) and solenoid eye (13) are pre-set to between 1.8 and 2.4 mm (0.07 and 0.093 in.). If preset is out of tolerance adjust by varying numbers of washers (15).

CAUTION: MAKE CERTAIN THAT FACES OF END FITTING (13) ARE PARALLEL WITH INNER FACES OF RELEASE LEVER (12).

NOTE: DO NOT ROTATE SOLENOID SHAFT TO ALIGN EYE END (13) WITH CLUTCH LEVER (12).

(a)Install lockwasher (14) and end fitting (13).

(b)Safety end fitting (13) with lockwasher (14).

(c)Apply corrosion-preventive paste (Mat. No. 05-002) to bolt (4) and spacer (11).

(d)Install spacer (11) and bolt (4).

(9)Install washer (10) and nut (8).

(10)Install cotter pin (9).

(11)Apply corrosion-protective compound (Mat. No. 05-005), to all bolt heads, protruding threads, washers and nuts.

(12)Remove rigging pins P/N 98A27307541000, P/N 0U131281, (Ref. 27-31-00, P. Block 301) P/N 98A27307549000, and locking equipment P/N 97A27302009000.

(13)Remove safety clips, and tags and close circuit breakers 1CF and 9CP.

(14)Make certain that elevator control travel ranges are clear.

E. Test

(1)Carry out pitch control uncoupling/coupling test (Ref. 27-31-00, P. Block 501).

F. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

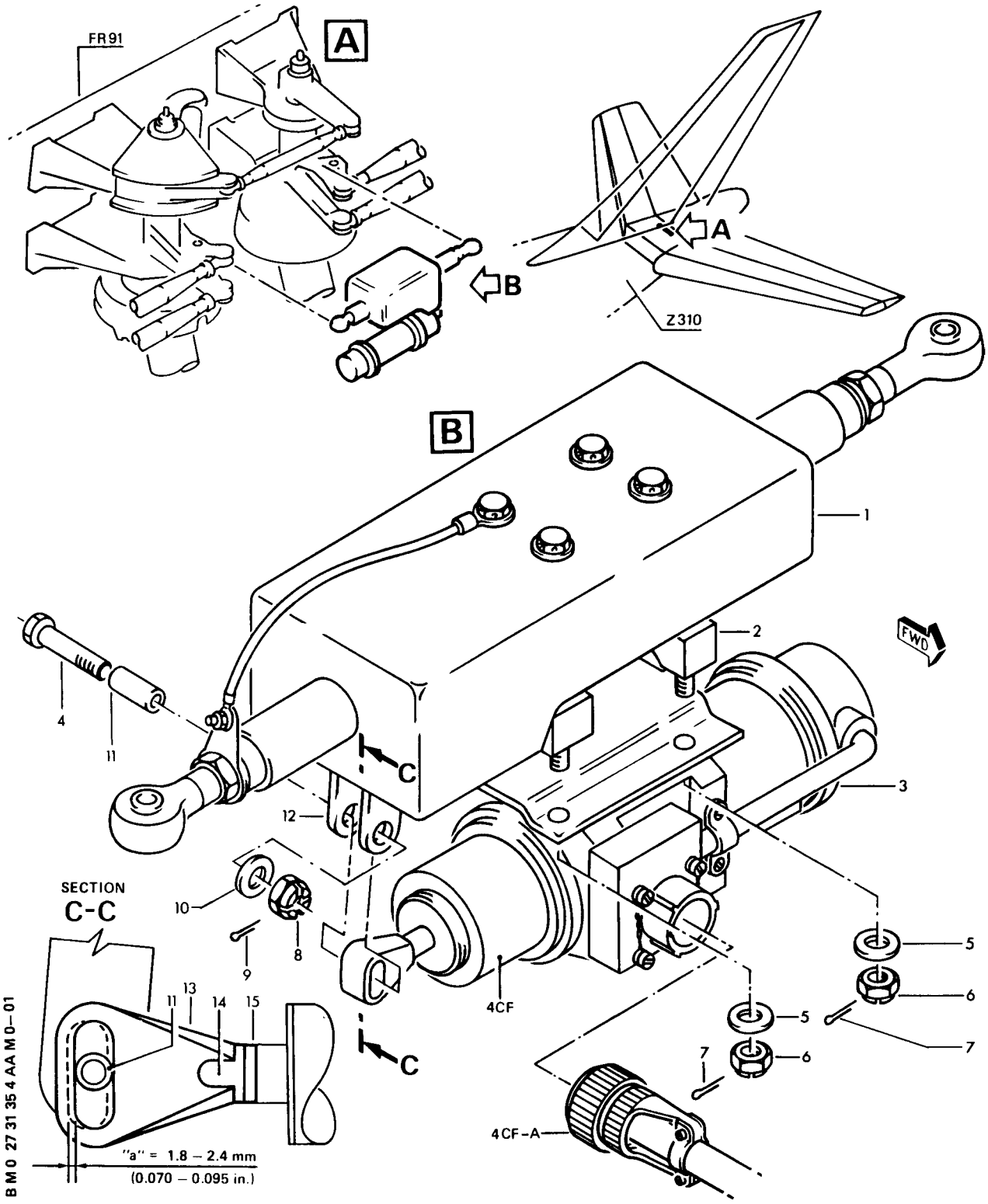
(2)Install artificial feel unit covers (Ref. 27-31-26, P. Block 401).

(3)Install trailing edge access panels 344CT (Ref. 55-13-13, P. Block 401).

(4)Close access doors 312AR and 313AL.

(5)Remove warning notices.

(6)Remove access platform.



Pitch Uncoupling Solenoid
Figure 401

R

ARTIFICIAL FEEL (ELEVATOR) - DESCRIPTION AND OPERATION

1. General

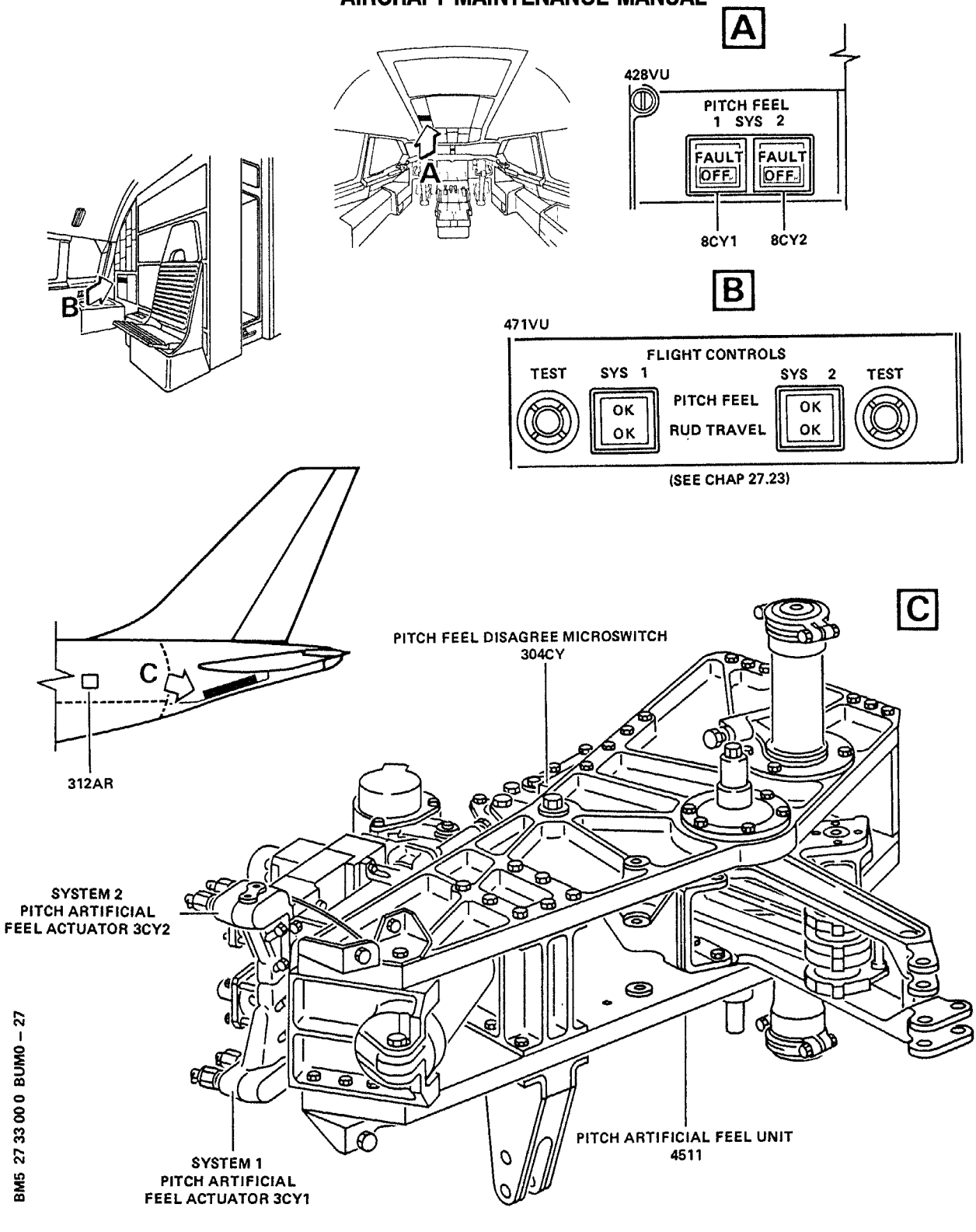
The pitch artificial feel system creates load feel at the control column which is variable with flight conditions, in order to reduce the variation of force per g throughout the whole flight envelope.

At high angle of attack, the system causes an increase in load at the control column resulting in aircraft return to permissible angle of attack configuration.

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
4511	PITCH ARTF FEEL UNIT		311	312AR	27-33-11
3CY1	ACTUATOR-PITCH ARTF FEEL, SYS1		311	312AR	27-33-14
3CY2	ACTUATOR-PITCH ARTF FEEL, SYS2		311	312AR	27-33-14
8CY1	P/BSW-PITCH FEEL/SYS1	428VU	211		
8CY2	P/BSW-PITCH FEEL/SYS2	428VU	212		
304CY	MSW-PITCH FEEL DISAGREE		311	312AR	27-33-15



Component Location
Figure 001

3. System Description

(Ref. Fig. 002)

The system is composed of.

- A mechanical assembly (artificial feel unit) including two electrohydraulic actuators, two spring rods and a torsion bar.
- Two control and monitoring computers called FLC (Feel and Limitation Computer).
- One PITCH FEEL control panel, one PITCH FEEL & RUD TRAVEL maintenance panel and four electrical power suppply circuit breakers.

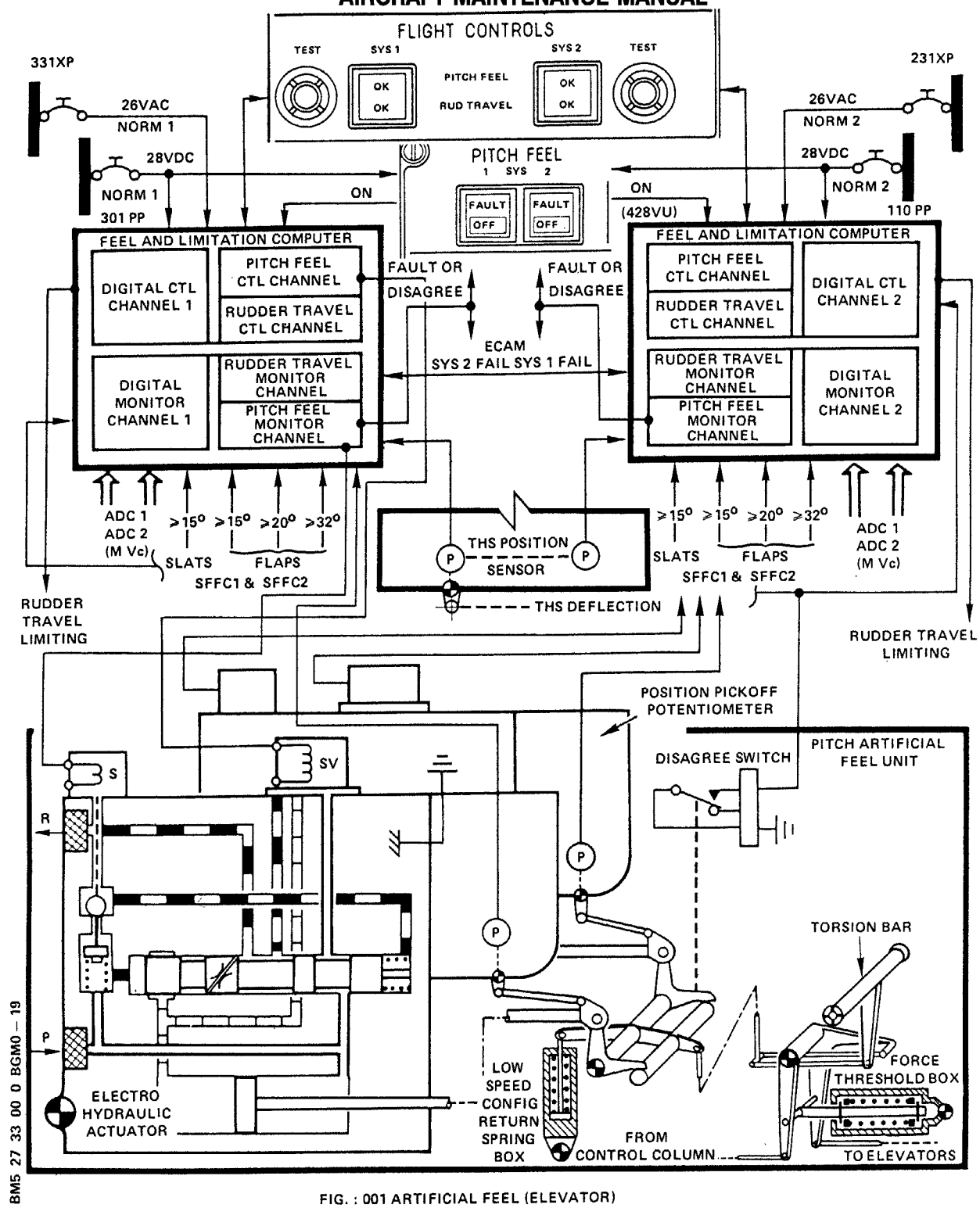


FIG. : 001 ARTIFICIAL FEEL (ELEVATOR)

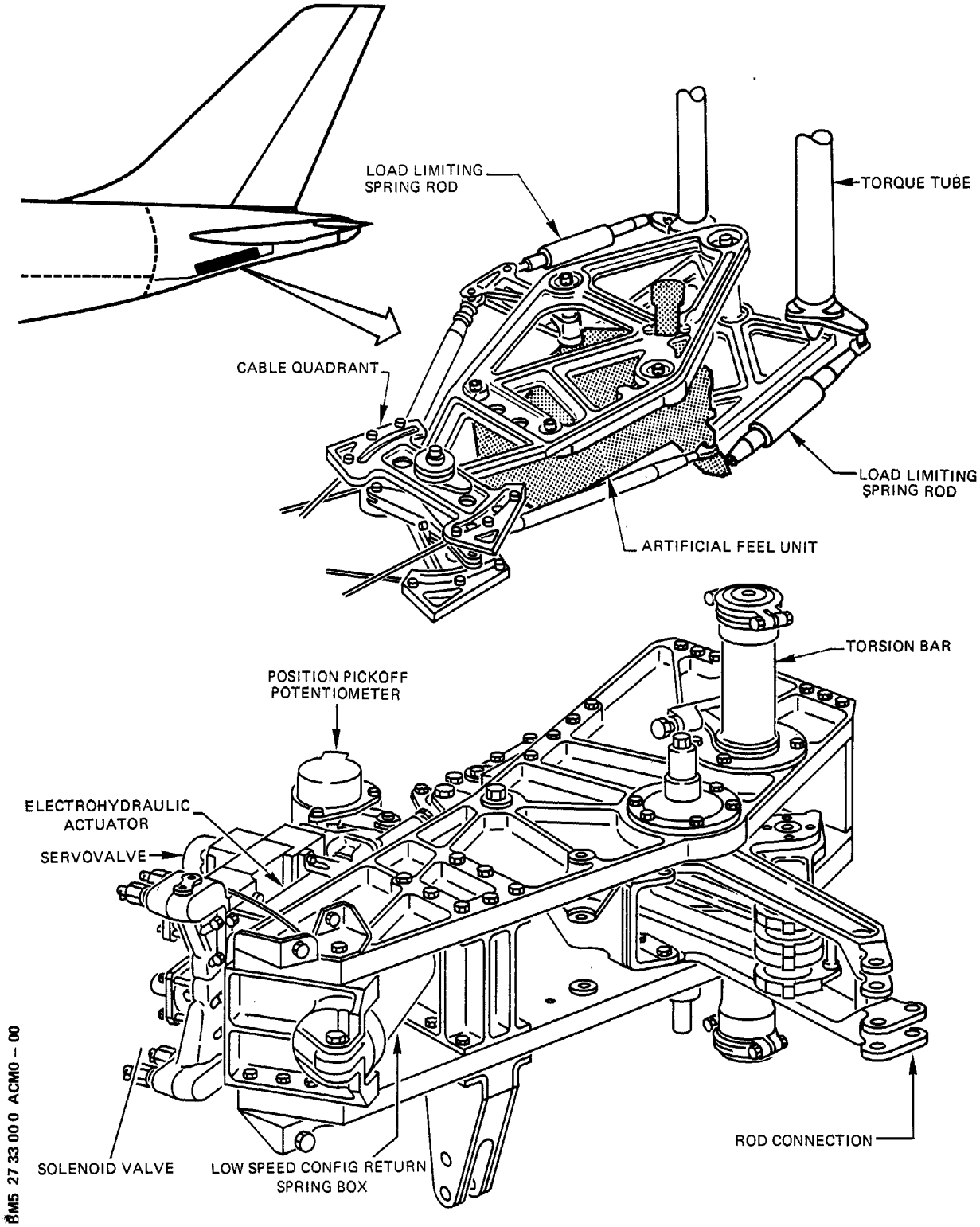
Artificial Feel (Elevator)
Figure 002

4. Mechanical Installation (Ref. Fig. 003, 004)

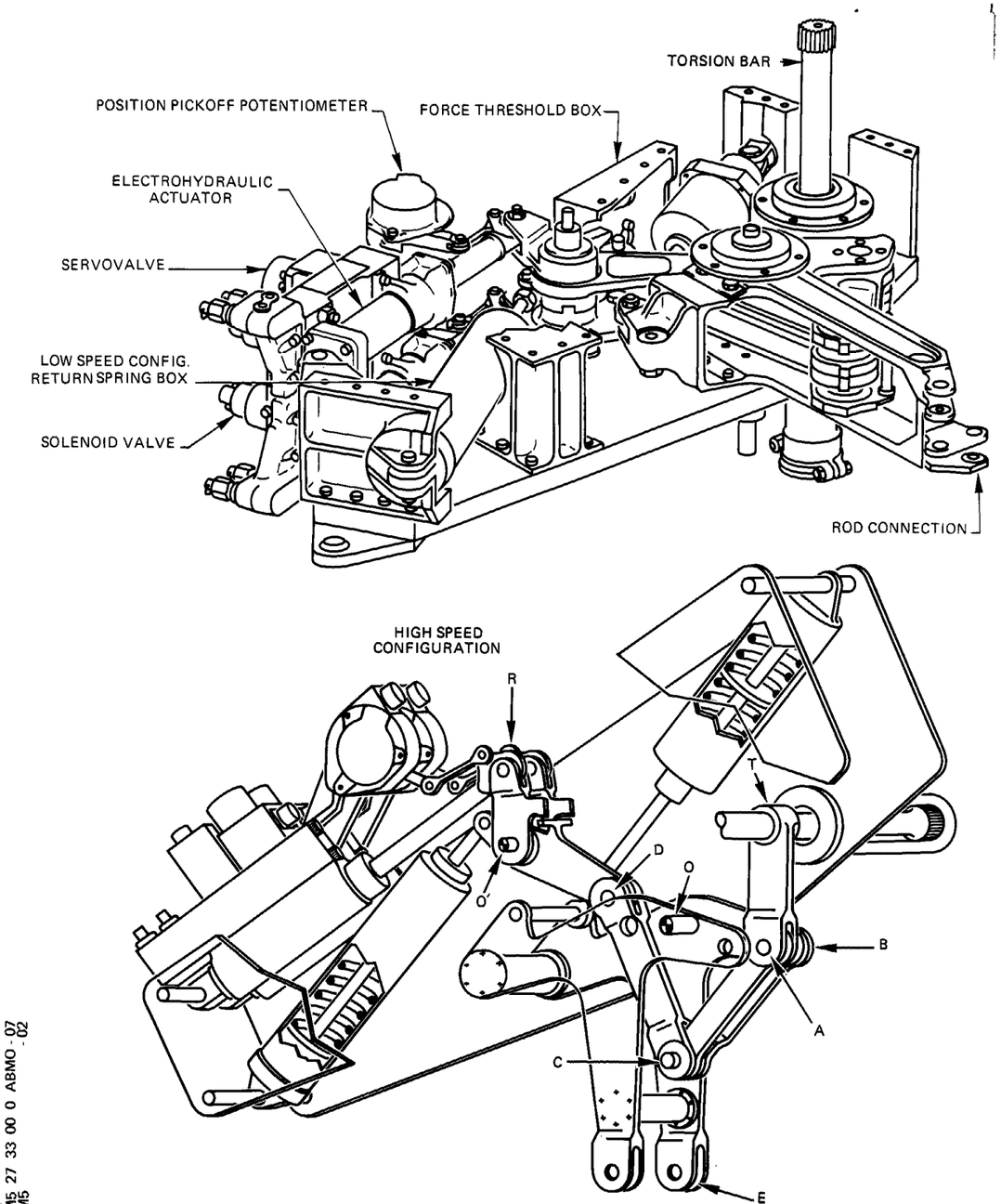
A. Pitch Artificial Feel Unit - Description
The artificial feel unit is composed of :
- A spring box providing a force threshold
- A torsion bar driven by a variable gain mechanism which generates variable load feel.
- Two electrohydraulic actuators, displacement of which produces the kinematic gain variation.
- One return spring box used to retract the two actuators to the position corresponding to "low speed" load feel, in the event of double hydraulic failure.

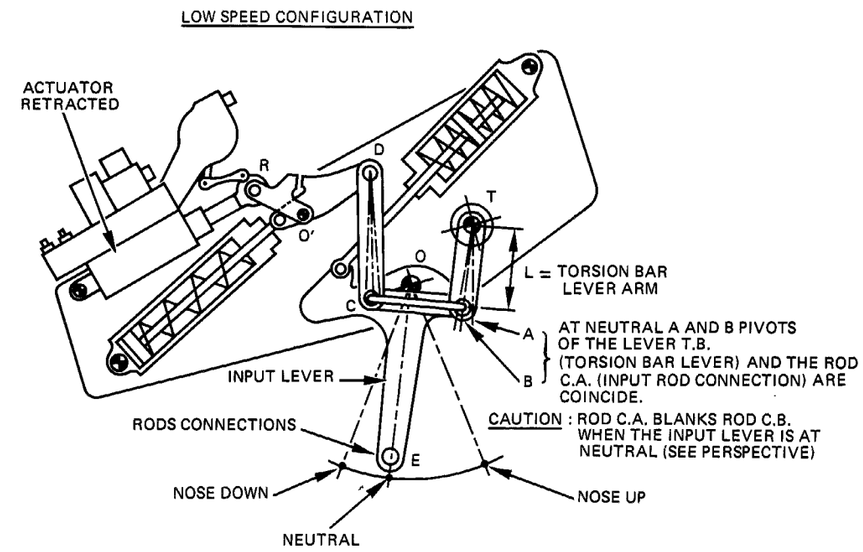
B. Pitch Artificial Feel Unit - Operation
The actuators act on the gain variation mechanism by means of levers. Gain is imposed by the actuator having extended the furthest. In the event of jamming of the mechanism, a microswitch transmits a pitch disagree warning signal.
The artificial feel unit includes a "fail safe" part to avoid loss of the force threshold and feel load at the same time.
(Ref. Fig. 005) contains graphs illustrating the control column feel load law in relation to actuator extension.

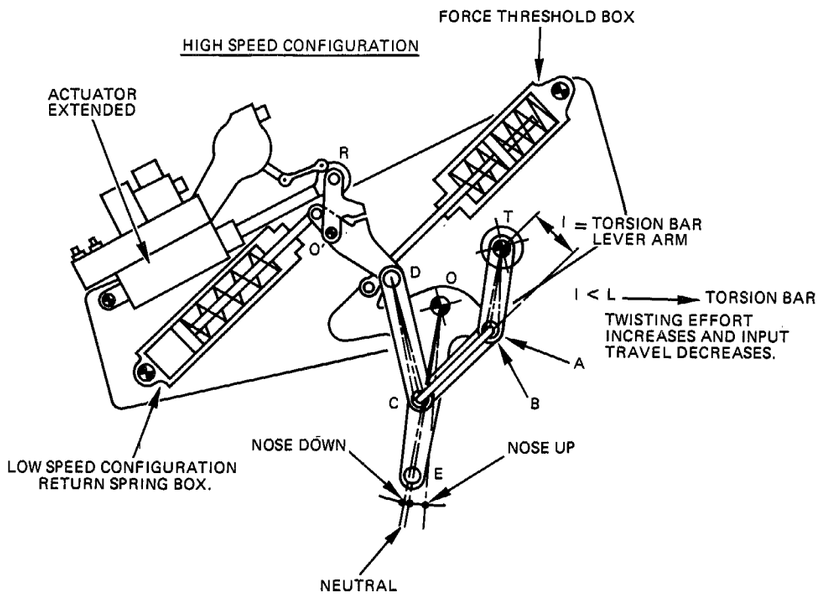
C. Pitch Artificial Feel Actuator - Description
Each actuator includes :
- A biased servovalve which modulates pressure in the actuator large chamber, the small chamber being permanently supplied with high pressure; in the event of an electrical failure, servovalve current is nulled and its control valve is displaced so that the actuator is retracted.
- A solenoid valve, energized in normal operation
- A bypass which connects the large chamber to return in order to retract the actuator when the solenoid valve is de-energized. It is therefore redundant with respect to the servovalve bias.
- A position pickoff potentiometer.



Pitch Artificial Feel - Location
Figure 003







Pitch Artificial Feel - Operation
Figure 004

D. Pitch Artificial Feel Actuator - Leading Particulars

(1)Mechanical

- Piston area
  - . large.....5.72 cm² (0.87 in²)
  - . small.....2.58 cm² (0.4 in.²)
- Operating stroke
- Stop-to-stop stroke.....75 mm (2.95 in.)
- Weight (without fluid).....4.1 kg (9 lb)

(2)Hydraulic

- Speed in millimeters/second (in./second)..15mm/s (0.59 in./s) ≤Speed <37.5 mm/s (1.48 in./s)
- Maximum internal leakage.....< 6 l/mn (1.56 US gal/mn)

(3)Electrical

- Solenoid valve supply.....28VDC
  current.....≤ 0.6 A
- Induction potentiometer.....26V 400 Hz
- Servovalve current.....32.5 ±32.5 mA

5. Electrical Installation

A. Feel and Limitation Computer (FLC)
This computer contains the circuitry required for two functions : pitch artificial feel and rudder travel limiting. It is described in 27-23.

B. PITCH FEEL Control Panel (Ref. 27-23)

C. PITCH FEEL & RUD TRAVEL Maintenance Panel (Ref. 27-23)

D. Electrical Power Supply (Ref. 27-23)

E. Trimmable Horizontal Stabilizer (THS) Position Sensor
THS deflection information is provided by a sensor including two linear inductive potentiometers.
Each potentiometer is associated with one FLC.

6. Operation

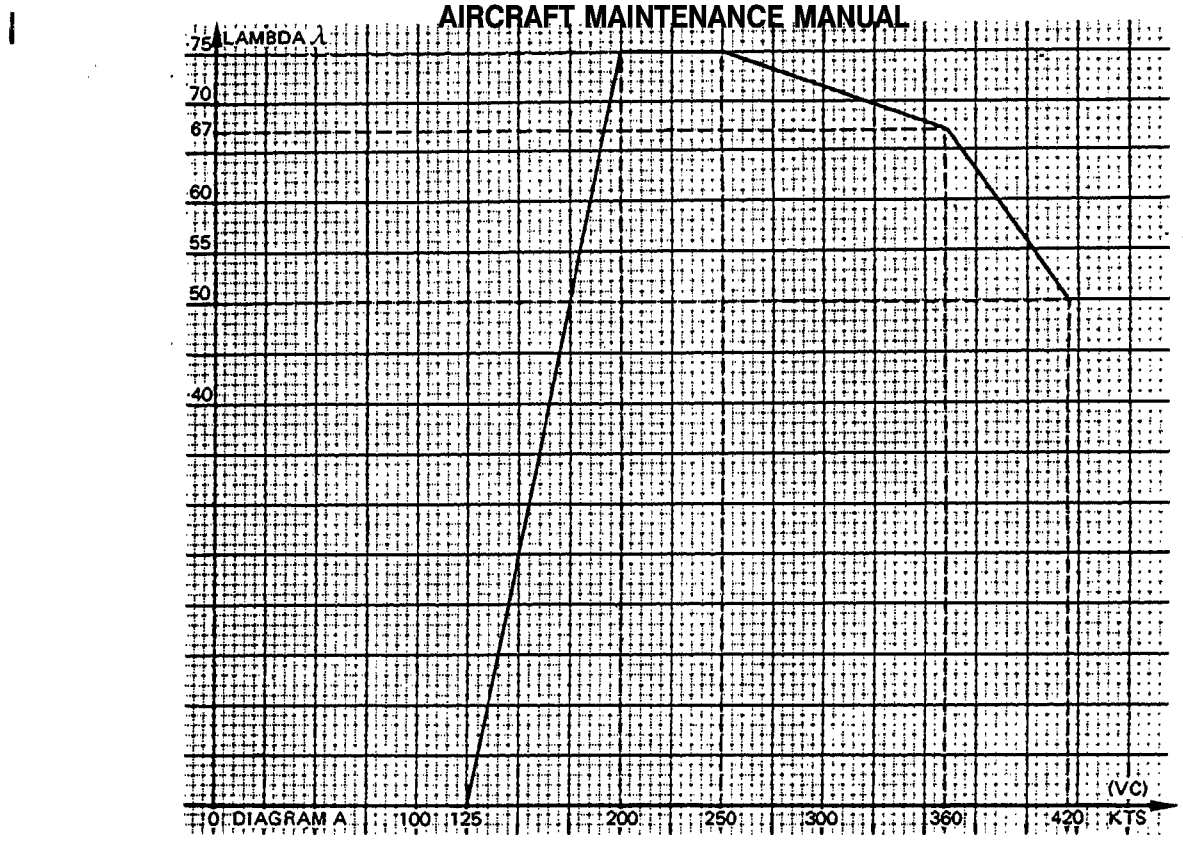
The load felt at the control column is proportional to actuator extension.
Each actuator is servoed to one FLC.
FLC1 controls the actuator supplied by the Green system, FLC2 controls the actuator supplied by the Yellow system.

A. Actuator Control (Ref. Fig. 005)

To achieve correct load feedback in keeping with flight conditions, the extension (l) of each actuator is computed by the associated FLC, using the following law :

$$l = \frac{lambda}{iHo - iH} - h$$

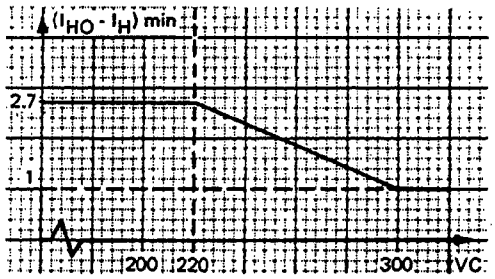
where lambda is a variable dependent on Vc (Ref. Fig. 005)
iHo (°) is a variable dependent on Mach (Ref. Fig. 005)
iH (°) is THS position
h is a constant value of 2.25 mm (0.089 in.)
The term iHo - iH is limited to between a min. value = f(Vc) and 10° (Ref. Fig. 005).
Each FLC receives Mach and Vc data from both air data computers (ADC 1 and ADC 2). FLC 1 uses ADC 1 parameters, FLC 2 uses ADC 2 parameters. In the event of failure of one ADC, both FLCs use the parameters from the remaining valid ADC.
Each FLC generates a slaving error signal from the difference between the calculated extension control input and actuator true extension as given by its position pickoff potentiometer ; this input is amplified and transmitted to the actuator servovalves.

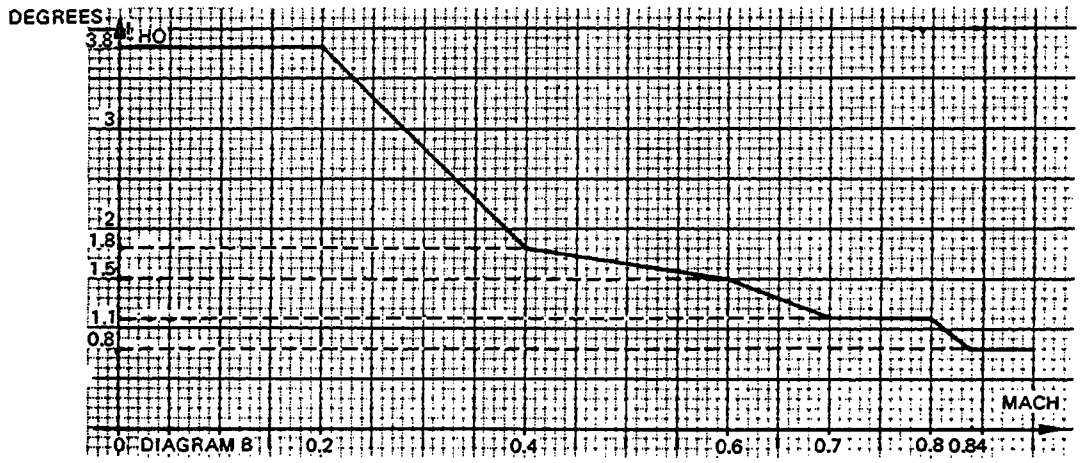


$$\Delta I = K\left[\frac{\lambda}{I_{HO}-I_H} - h\right]$$ with: min = f (Vc) ≤ $I_{HO} = I_H \leq 10$

k = 1 ; h = 2.25

I_H = THS DEFLECTION





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Pitch Artificial Feel Unit Actuators : Extension Laws
Figure 005

B. Anti-Stall System
(Ref. Fig. 006)
In high angle of attack configurations with the slats extended at 15° or more, the artificial feel system causes an abrupt increase the load feel at in control column.
- Required angle of attack information is delivered by buses from both ADCs (label 241). Information must be validated (parity, normal operation or test) to make the function operational :
  The function will be operational only it SFCC discretes are consistent.

NOTE : Flaps ≥20° signal used to generate PITCH and RUDDER DISAGREE warnings is transmitted to each FLC by both SFCCs.

The information of slats extended ≥ 15° is sent as a discrete signal by both SFCC'S to both FLC'S.
The sudden increase in load feel is triggered by a step form signal sent to the electrohydraulic actuator and which causes the actuator rod to extend 20 mm (0.787 in.).
As a provision, two additional discrete signals are wired from the associated SFCC (slats ≥15° ; flaps ≥32°).

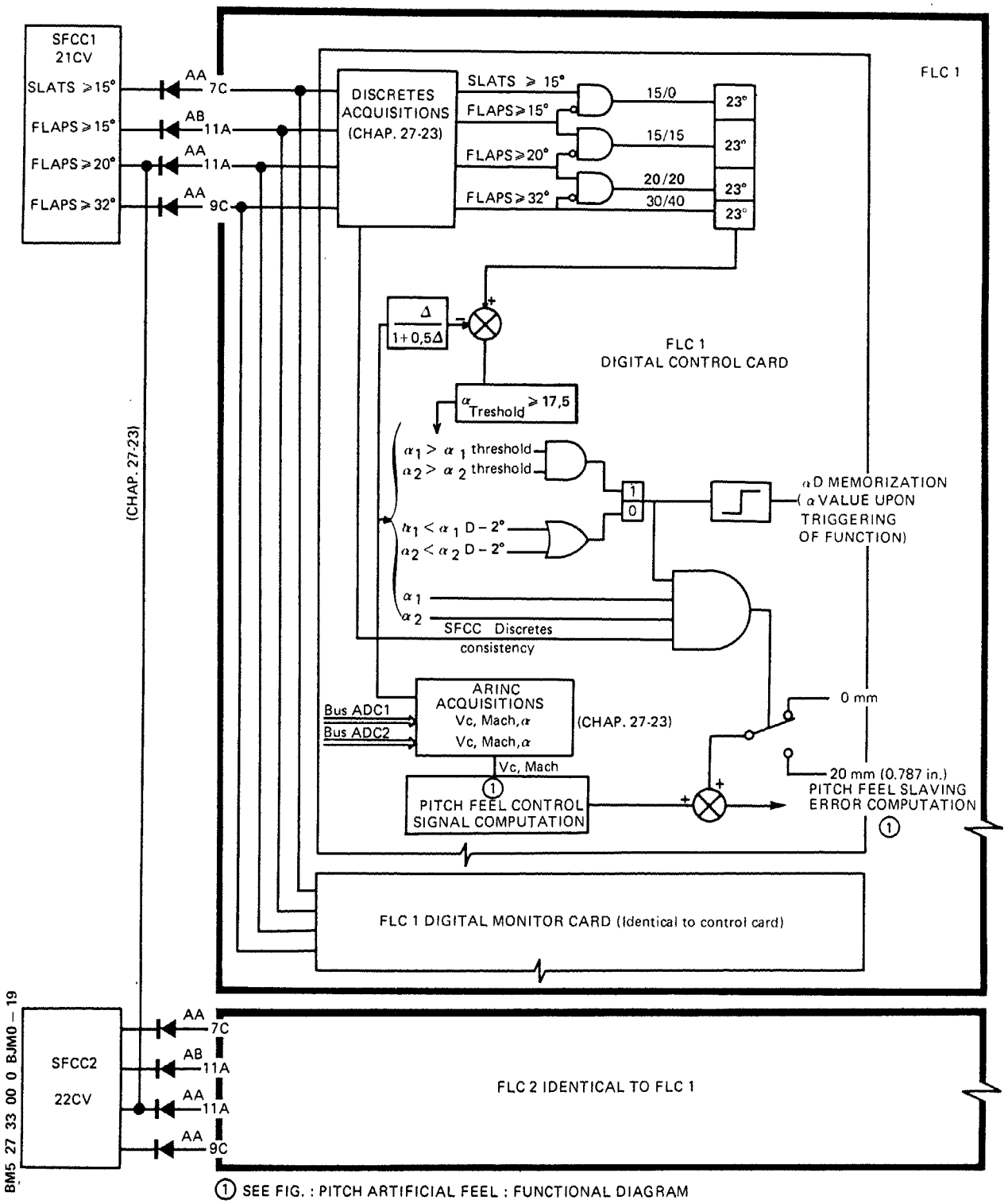
C. Monitoring
(Ref. Fig. 007)
Monitoring consists mainly in :
- Monitoring of digital computations by means of "hardware" comparison between a slaving error generated by the monitor channel and the slaving error generated by the control channel (comparator threshold corresponding to ±7.5 mm (±0.29 in.) of pitch artificial feel actuator length ; delay = 1.05 s).
- Power loop monitoring by "software" level detectors checking that each slaving error remains near zero (threshold = ±7.5 mm (±0.29 in.), delay = 1 s).

In addition each digital channel checks the validity of associated actuator position pickoff potentiometer signals, associated THS position sensor signals, ADS 1 & 2 data, discrete signals and software.
When a failure is detected, the computer :
- Cuts off the control current of the associated servovalve and de-energizes the associated solenoid valve (this is also performed when the system is not engaged).
- Activates the warning (Ref. para. D.).

  NOTE : To enhance safety, the solenoid valve supply signal is cut off again, outside the computer, by the relay which supplies the warning light.

Failure detection is memorized, it is therefore necessary to reset the monitor circuits by pressing the PITCH FEEL pushbutton switch (overhead control panel) to illuminate the OFF/R legend (Ref. para. D.) when the failure has disappeared.

NOTE : - An electrical power supply or double DADS loss are considered as failures, but are not memorized and do not correspond to any maintenance indicator.
- Return of the power supply or of one DADS resets the monitor circuits.



Pitch Artificial Feel Anti-Stall Function
Figure 006

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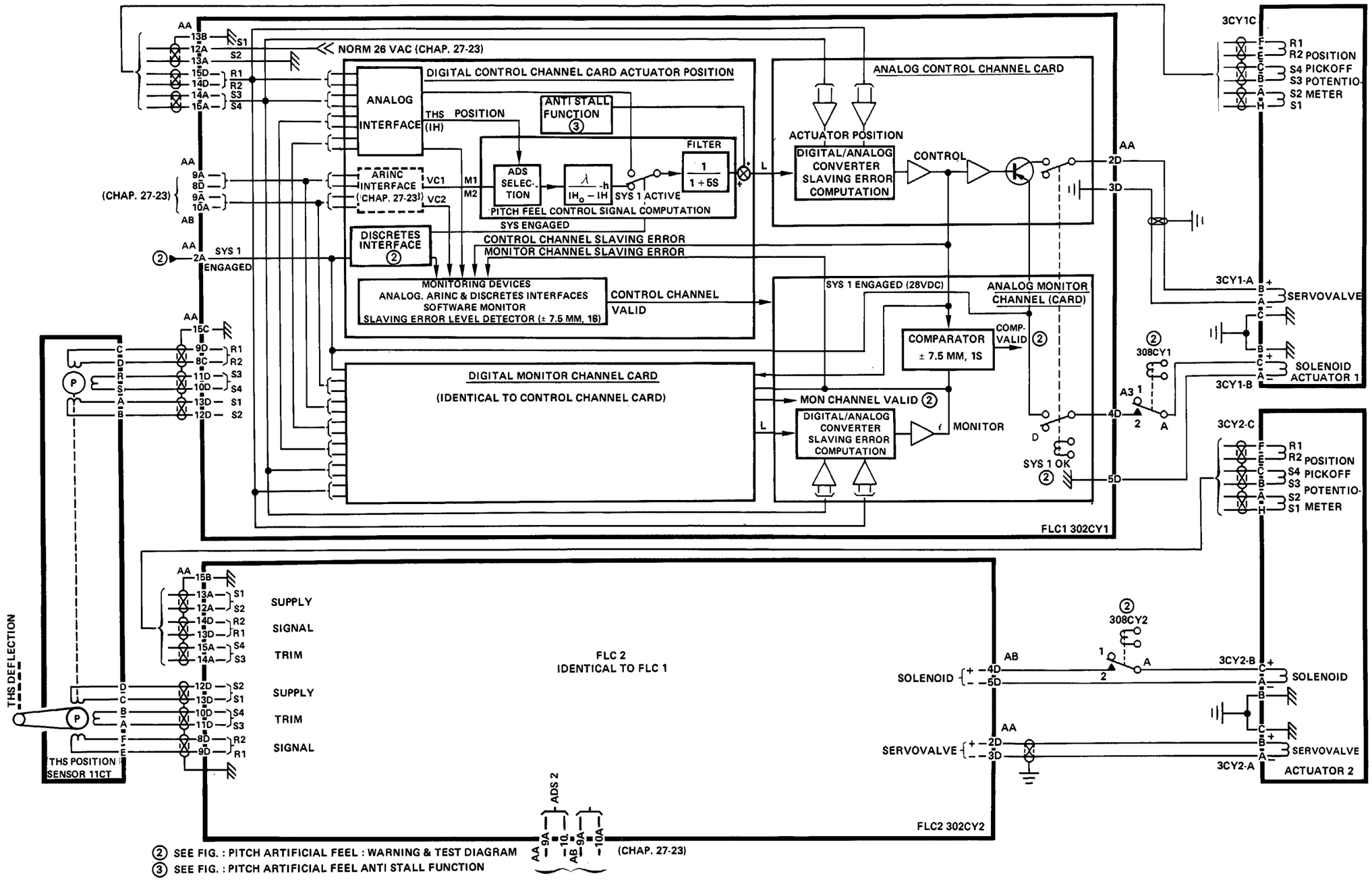


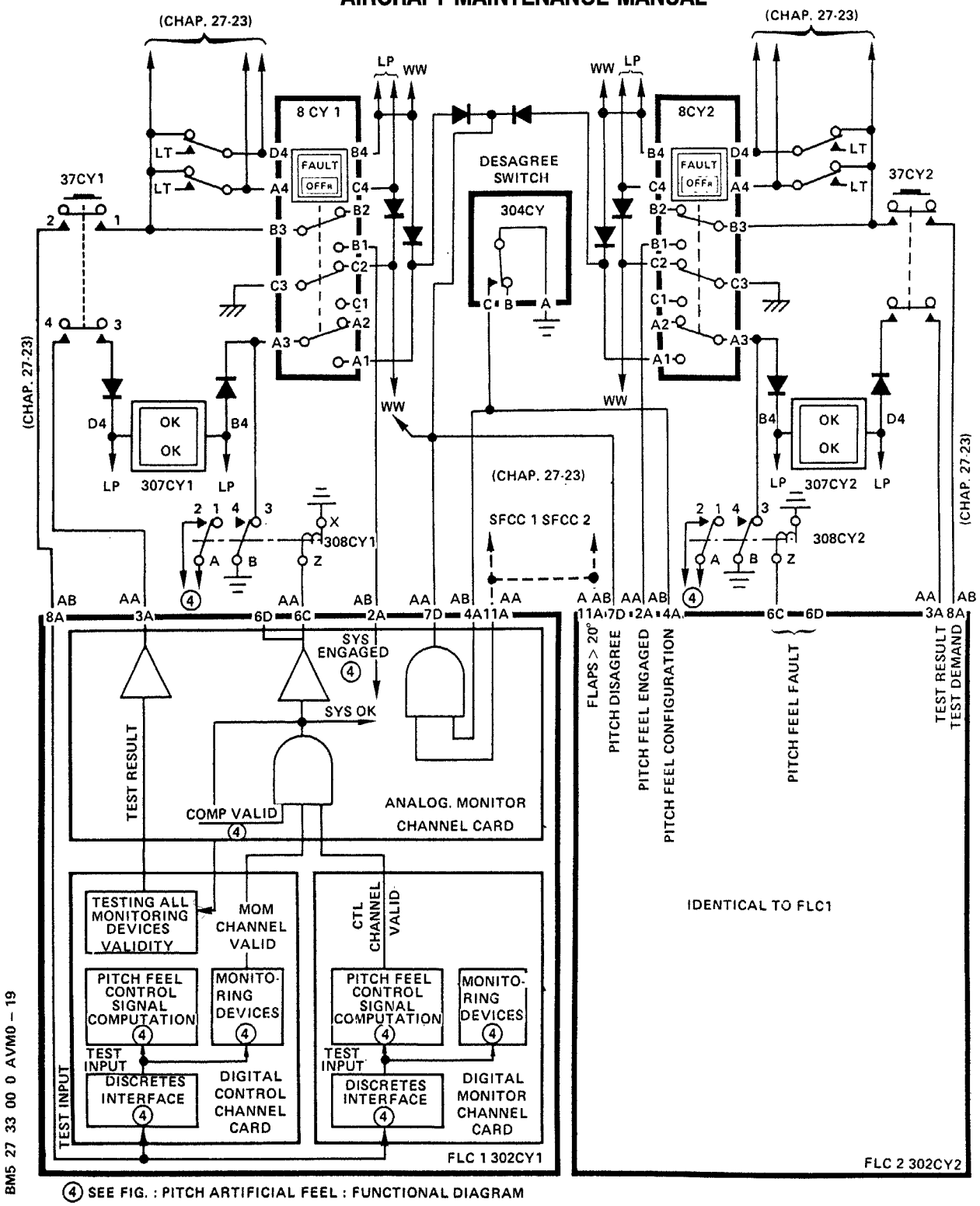
Pitch Artificial Feel - Functional Diagram
Figure 007

D. Engagement - Warnings
(Ref. Fig. 008)
Same as for rudder travel limiting (Ref. 27-23).

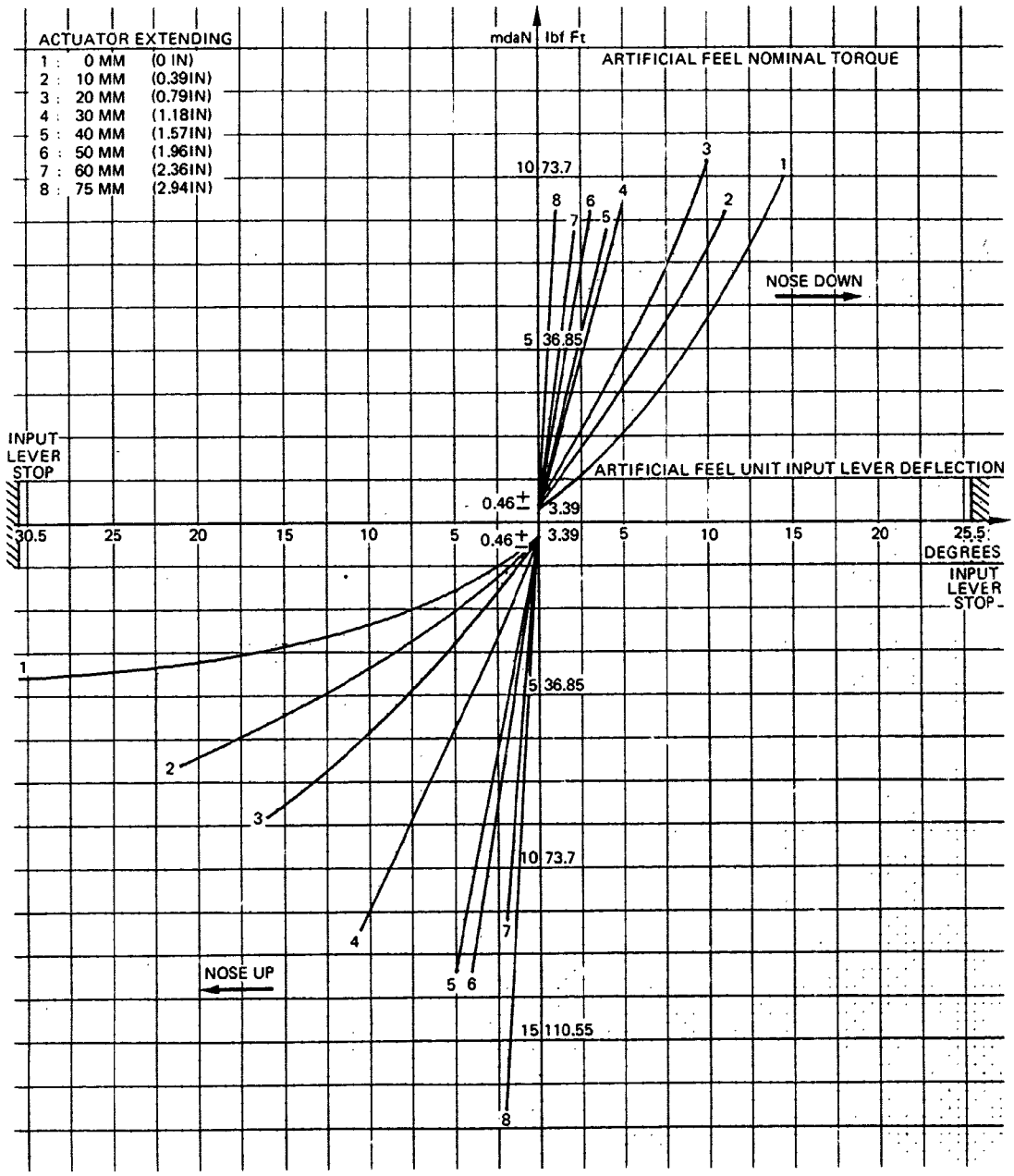
E. Pitch Disagree Warning
This warning is activated if the artificial feel unit mechanism has not returned to the "low speed" position (actuator length <26 mm/1.023 in.) when the flaps are extended 20° or more.
"Flaps extended" information is transmitted to each FLC by each slat/flap control computer.
Artificial feel unit mechanism position information is transmitted to each FLC by the same microswitch.
The warning consists of illumination of the FAULT legends on PITCH FEEL SYS 1 and SYS 2 pushbutton switches.
The warning is repeated in the ECAM system :
On CAPT AND F/O main instrument panels 3VU and 5VU
- MASTER CAUTION lights flash
- Single chime sounds
- Warning display
When the pushbutton switches are pressed the OFF/R legends come on, but FAULT does not go off as long as the failure conditions remain.

F. Test (Ref. Fig. 008)
Same as for rudder travel limiting (Ref. 27-23).

G. Leading Particulars
- Artificial feel unit characteristic (Ref. Fig. 009)
- Control column force versus elevator deflection (Ref. Fig. 010)



Pitch Artificial Feel : Warning & Test Diagram
Figure 008



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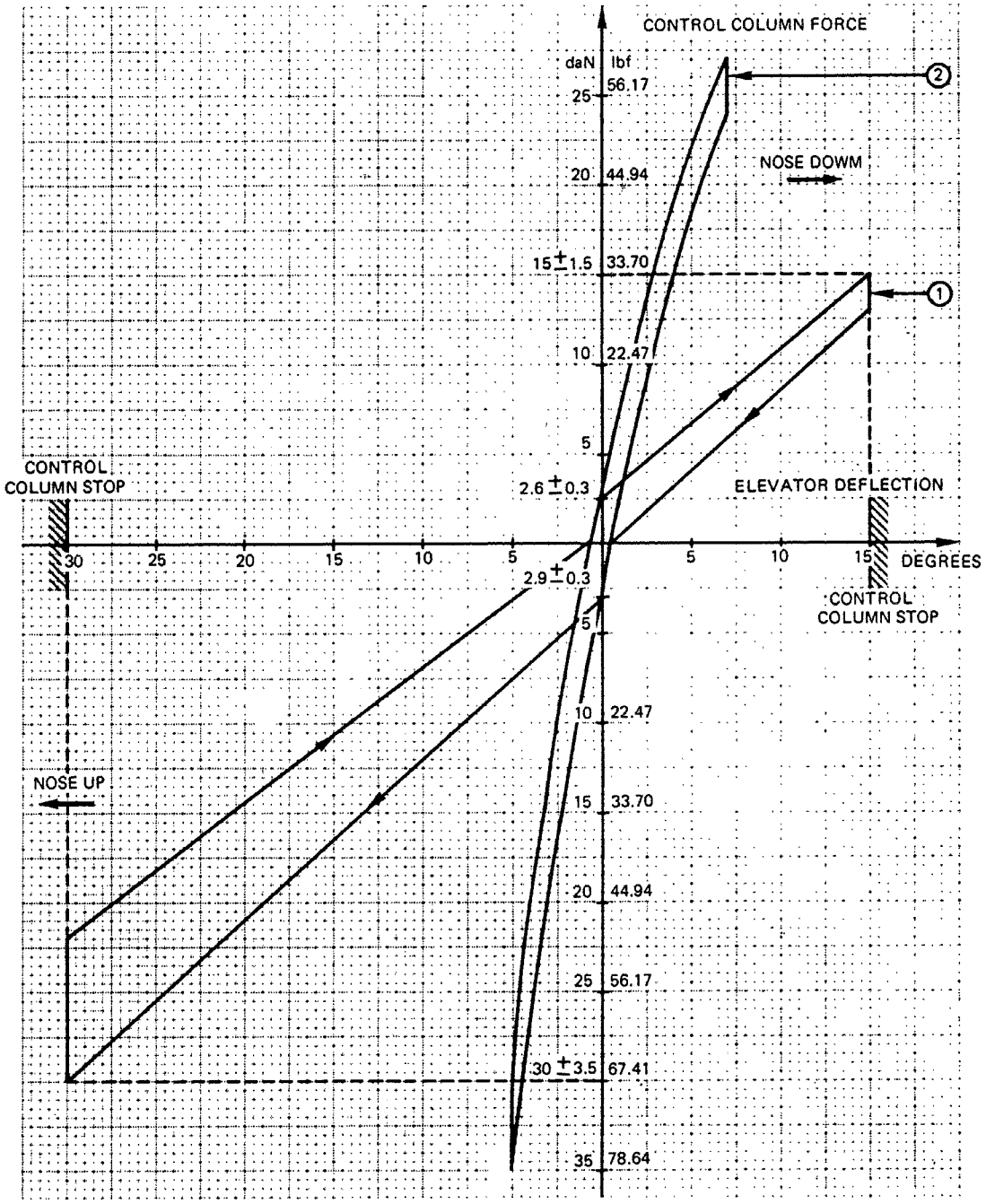
Artificial Feel Unit Characteristic
Figure 009



NOTE : THIS CHARACTERISTIC REPRESENTS A COMPLETE CYCLE MADE IN A SLOW MOVEMENT, FOR AN ARTIFICIAL FEEL UNIT ACTUATOR EXTENSION OF 0 mm : ① AND 40 MM : ②

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Control Column Force Versus Elevator Deflection
Figure 010

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Operational Test

NOTE : This test can be performed in conjunction with Artificial Feel and Rudder Travel Limiting Test (Ref. 27-23-00, P. Block 501). If not, do not take into account rudder travel warning.

A. Reason for the Job

Check correct operation of systems and warnings associated with the elevator artificial feel system.

(1)Annunciator light test.
(2)System disengagement test.
R (3)Operational check of monitoring circuits (SYS 1 and SYS 2).
(4)Test of warnings in the event of ADC failure.
(5)Test of pitch feel disagree warning.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Pressurize Green, Blue and Yellow hydraulic systems using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU, make certain that G, B and Y pushbutton switches are pressed in.
(d)Make certain that slat and flap control lever is in first notch

position. (Flaps/slats retracted).

(e)On PITCH FEEL section of panel 428VU, make certain that SYS 1 and 2 pushbutton switches are pressed (in).

(f)Make certain that SPEEDBRAKE control lever is in RET position, ground spoiler function not preselected.

(g)Make certain that pitch trim wheel is set to zero.

(h)On overhead panels, make certain that circuit breakers are closed, particularly those associated with ART FEEL system (panel 21VU).

(j)Open safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENGINES/ENG1&2/START/CTL &/WARN	1KG	335/R68
133VU	ENGINES/ENG1/FUEL/HP VALVE/CTL	3KC	333/T69
133VU	ENGINES/ENG2/FUEL/HP VALVE/CTL	4KC	333/T70

(k)On panel 11VU on ECAM control panel

- Press F/CTL pushbutton switch, FLT CTL page appears on Right Ecam Display unit.
- Press CLR pushbutton switch until legend goes off.

CAUTION : DISREGARD DISCRETE INPUT FAULT 321 ON LEFT ECAM DISPLAY UNIT WHEN ECAM INPUT TEST IS SWITCHED ON AND CORRESPONDING FAULT LEGENDS OF PITCH FEEL PUSHBUTTON SWITCHES ARE ON.

D. Test

(1)Annunciator light test

ACTION	RESULT
1. On ANN LT section of panel 436VU - place switch in TEST position	On PITCH FEEL section of panel 428VU - FAULT and OFF/R legends of SYS 1 and 2 pushbutton switches come on.
2. On ANN LT section of panel 436VU - place switch in BRT position	- Above annunciator lights go off.
3. On maintenance panel 472VU - place ANN LT test switch in TEST position	- On FLIGHT CONTROLS section of panel 471VU - OK legends of PITCH FEEL/SYS 1 and SYS 2 annunciators come on
4. On maintenance panel 472VU - place ANN LT test switch in OFF position	- Above annunciator lights go off.

(2)System disengagement test

NOTE : Only SYS1 test is described, repeat procedure with indications between brackets for test of SYS2.

ACTION	RESULT
1. On PITCH FEEL section of panel 428VU - release SYS 1 (SYS 2) pushbutton switch	- Corresponding OFF/R legend comes on
2. On maintenance panel 470VU - press and hold ECAM INHIB OVRD pushbutton switch	On left ECAM display unit, following messages come on : FLT CTL PITCH FEEL 1 OFF/R (PITCH FEEL 2 OFF/R)
3. On PITCH FEEL section of panel 428VU - press SYS 1 (SYS 2) pushbutton switch	Corresponding OFF/R legend goes off On left ECAM display unit - messages go off
4. On PITCH FEEL section of panel 428VU - release SYS 1 and 2 pushbutton switches	- Corresponding OFF/R legends come on On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on - single chime sounds. On left ECAM display unit, following messages come on : FLT CTL PITCH FEEL 1 OFF/R PITCH FEEL 2 OFF/R
5. On maintenance panel 470VU - release ECAM INHIB OVRD pushbutton switch	
6. On ANN LT section of panel 436VU - place switch in DIM position	On PITCH FEEL section of panel 428VU - OFF/R legends dim On CAPT and F/O main intrument panels 3VU and 5VU - MASTER CAUTION lights dim.
7. On ANN LT section of panel 436VU - place switch in BRT position	On PITCH FEEL section of panel 428VU - OFF/R legends come on with normal brightness On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on with normal brightness

ACTION	RESULT
8. On PITCH FEEL section of panel 428VU - press SYS 1 and 2 pushbutton switches	- Corresponding OFF/R legends go off On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On left ECAM display unit - messages go off

R (3)Operational test of FLC computer

R (a)Operational check of monitoring circuits (pitch feel SYS 1 and SYS 2).

NOTE : Only SYS1 test is described, repeat procedure with indications between brackets for test of SYS2.

ACTION	RESULT
1. On FLIGHT CONTROLS section of panel 471VU - press and hold TEST/SYS 1 (TEST/SYS 2) pushbutton switch	On FLIGHT CONTROLS section of panel 471VU - OK legend of PITCH FEEL/SYS 1 (SYS 2) annunciator comes on after 7 seconds. On PITCH FEEL section of panel 428VU - FAULT legend of SYS 1 (SYS 2) pushbutton switch comes on.
2. On ANN LT section of panel 436VU - place switch in DIM position	On PITCH FEEL section of panel 428VU - FAULT legend of SYS 1 (SYS 2) pushbutton switch dims
3. On ANN LT section of panel 436VU - place switch in BRT position	On PITCH FEEL section of panel 428VU - FAULT legend of SYS 1 (SYS 2) pushbutton switch comes on with normal brightness
4. On FLIGHT CONTROLS section of panel 471VU - release TEST/SYS 1 (SYS 2) pushbutton switch	On FLIGHT CONTROLS section of panel 471VU - OK legend of PITCH FEEL/SYS 1 (SYS 2) annunciator goes off On PITCH FEEL section of panel 428VU - FAULT legend of SYS1 (SYS2) pushbutton switch goes off.

**ON A/C ALL

R

(b)Operational test of FLC computer at a weekly interval.
Repeat procedure with indication between brackets for test of FLC 2.

1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2 Get access to the 80VU electronic rack in the avionics compartment.

3 Record the bite code, if any, on the FLC 1(2) located on shelf 83VU (84VU) and perform adequate maintenance action if required.

4 Push on both pushbuttons "LAMP TEST" and "RESET" located on FLC 1(2)

front face.

5 Check that the "COMPUTER" light flashes on FLC 1(2) front face to confirm the correct operation of the computer.

R **ON A/C ALL

(4)Test of warnings in the event of ADC failure.

ACTION	RESULT
1. On panel 22VU - Open circuit breaker 9FL1 location 208/B19 ADS/ADC1/115VAC	On PITCH FEEL section of panel 428VU - FAULT and OFF/R legends are off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on Single chime sounds On left ECAM display unit message appears NAV ADC ADC1 FAULT
2. On panel 22VU - Close circuit breaker 9FL1.	On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off On left ECAM display unit, screen is cleared
3. On panel 21VU - Open circuit breaker 9FL2 ADS/ ADC2/115VAC location 105/E10.	On PITCH FEEL section of panel 428VU - FAULT and OFF/R legends are off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on Single chime sounds On left ECAM display unit message appears NAV ADC ADC2 FAULT
4. On panel 22VU - Open circuit breaker 9FL1	On PITCH FEEL section of panel 428VU - SYS1 and 2 FAULT legends are on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights remain on Single chime sounds On left ECAM display unit message appears NAV ADC ADC1+2 FAULT
5. On panel 22VU - Close circuit breaker 9FL1 On panel 21VU - Close circuit breaker 9FL2	On PITCH FEEL section of panel 428VU - SYS1 and 2 FAULT legends go off. On left ECAM display unit SCREEN is cleared

ACTION	RESULT
	On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off.

(5)Test of pitch feel disagree warning

NOTE : After the following test, check by operating the control wheels that the elevators fully deflect when the Green and Yellow hydraulic systems are pressurized.

ACTION	RESULT
1. On ADS section of panel 47OVU - press SYS 1/TEST and SYS 2/TEST pushbutton switches	On Captain and First Officer PFDs - 367 (± 1) Kts speed is displayed after 5 seconds. - MACH 0.660 ± 0.010 is displayed Single chime sounds twice
2. On panel 133VU, open circuit breakers SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1 9CV location 335/R66 SFCC/NORM SUPPLY/SLATS/ SYS 1 7CV location 333/T63 SFCC/NORM SUPPLY/SLATS/ SYS 2 8CV location 333/T64.	On panel 428VU - SLATS SYS 1 & 2 FAULT legends come on Single chime sounds On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on
3. On center pedestal - place slat and flap control lever in 4th notch position	- flaps extend 20°
- display a warning notice prohibiting operation of this control lever.	On PITCH FEEL section of panel 428VU - FAULT legends of SYS 1 and SYS 2 pushbutton switches come on. on CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights remain on - single chime sounds. On left ECAM display unit following message comes on : FLT CTL PITCH FEEL in HI SPEED -PITCH FEEL 1..... OFF/R -PITCH FEEL 2..... OFF/R
4. On PITCH FEEL section of panel 428VU - release SYS 2 pushbutton switch	- Corresponding OFF/R legend comes on and corresponding FAULT legend remains on
- release SYS 1 pushbutton switch	- Corresponding OFF/R legend comes on and corresponding FAULT legends of SYS1 and SYS2 pushbutton switches go off. Single chime sounds On CAPT and F/O main intrument

ACTION	RESULT
	panels 3VU and 5VU - MASTER CAUTION lights remain on. On left ECAM display unit following message comes on : FLT CTL PITCH FEEL 1... OFF/R PITCH FEEL 2... OFF/R MAX SPD 285/78 ELEV WITH CARE ABV SPD 170
5. On center pedestal - place slat and flap control lever in first notch position	- Flaps retract
6. On PITCH FEEL section of panel 428VU - press SYS 1 and SYS 2 pushbutton switches	- Corresponding OFF/R legends go off On left ECAM display unit - message goes off
7. On panel 133VU, close circuit breakers 7CV, 8CV, 9CV	On CAPT and F/O main intrument panels 3VU and 5VU - MASTER CAUTION lights go off. On panel 428VU - SLATS SYS 1 & 2 Fault legends go off.
8. On ADS section of panel 470VU - release SYS 1/TEST and SYS 2/TEST pushbutton switches	On Captain and First Officer PFDs - airspeed and MACH indications return to zero
9. On panel 133VU, close circuit breakers 1KG, 3KC, 4KC	

E. Close-Up
(1)Shut down hydraulic power supply. Depressurize systems.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Functional Test

A. Reason for the Job
To check that load required to operate elevator control increases as aircraft speed increases.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Pressurize Green, Blue and Yellow hydraulic systems using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
R (c)On PITCH FEEL section of panel 428VU, make certain that SYS 1 (SYS 2)
R pushbutton switches are pressed (in) and SYS2 (SYS1) pushbutton switch
R are released
(d)On overhead panels, make certain that circuit breakers are closed, particularly those associated with ART FEEL system (panel 21VU).
(e)Make certain that slat and flap control lever is in first notch position.
(f)Make certain that SPEED BRAKE control lever is in RET position and ground spoiler function not preselected.
(g)Make certain that pitch trim control wheel is set to zero.
(h)On panel 11VU, on ECAM control panel. Press F/CTL pushbutton switch, FLT CTL page appears on right ECAM Display unit.

D. Test
(1)Functional test
R NOTE : Only SYS 1 test is described, repeat procedure with indications
R between brackets for test of SYS 2.

ACTION	RESULT
1. On Captain's and First Officer's MACH/AIRSPEED indicators - check that IAS is zero	
2. Actuate control column full nose down	On right ECAM display unit FLT CTL page, ELEV SCALE - bug shifts to DN

ACTION	RESULT
3. Return control column to neutral position	On right ECAM display unit FLT CTL page, ELEV scale - bug returns to zero
4. Actuate control column full nose up	On right ECAM display unit FLT CTL page, ELEV scale - bug shifts to NOSE UP
5. Return control column to neutral position	On right ECAM display unit FLT CTL page, ELEV scale - bug returns to zero
6. On ADS section of panel 47OVU - press SYS 1/TEST (SYS 2/TEST) pushbutton switch	On Captain (First Officer) PFD indicator - 367 (± 1) Kts speed is displayed after 5 seconds - Single chime sounds
7. Actuate control column nose down	Make certain that actuation load is greater than load of para.2.
8. Return control column to neutral position	On right ECAM display unit FLT CTL page, ELEV scale - bug returns to zero
9. Actuate control column nose up	Make certain that actuation load is greater than load of para.4
10. Return control column to neutral position	On right ECAM display unit FLT CTL page, ELEV scale - bug returns to zero
11. On ADS section of panel 47OVU - Release SYS 1/TEST (SYS 2/TEST) pushbutton switch	On Captain (First Officer) PFD indicator - speed returns to zero

E. Close-Up
(1) Shut down hydraulic power supply. Depressurize systems.
(2) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

3. Functional Test (Anti High-Incidence Function)

A. Reason for the Job
Check anti high-incidence function.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 34-10-00, P. Block 501	Flight Environment Data

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Pressurize Green, Blue and Yellow hydraulic systems using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
(c)On PITCH FEEL section of panel 428VU, make certain that SYS 1 and 2 pushbutton switches are pressed (in).
(d)On overhead panels, make certain that circuit breakers are closed, particularly those associated with ART FEEL and ADC systems (panel 21VU).
(e)Open, safety and tag the following circuits breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	STICKSHAKER-CAPT	12FU1	Line 109
21VU	STICKSHAKER-F/O	12FU2	Line 109

(f)Make certain that flap and slat control lever is in second notch position (Slats 15°).
(g)Make certain that SPEED BRAKE control lever is in RET position and ground spoiler function not preselected.
(h)On panel 11VU, on ECAM control panel, press F/CTL pushbutton switch. FLT CTL page appears on right ECAM display unit.
(j)On center pedestal, set pitch trim control wheel to -10° (UP).
(k)On complementary navigation control panels 412VU and 413VU, using PFD knobs, adjust brightness on Captain and F/O PFDs.

D. Test
(1)Functional test

ACTION	RESULT
1. Actuate control column full nose up.	

ACTION	RESULT
2. On ALPHA PROBES section of maintenance panel 47OVU - press ALL/TEST pushbutton switch	- Force back control column to neutral (stiffening of control column).
3. On ALPHA PROBES section of maintenance panel 47OVU - release ALL/TEST pushbutton switch.	

E. Close-Up
(1)On center pedestal, set pitch trim control wheel to neutral.
(2)Place slat and flap control lever in first notch position.
(3)Remove safety clips and tags and close circuit breakers 12FU1, 12FU2.
(4)Shut down hydraulic power supply. Depressurize systems.
(5)De-energize the aircraft electrical network. (Ref. 24-41-00, P. Block 301).

4. Functional Test of Elevator Artificial Feel Operating Loads

A. Reason for the Job
Measurement of elevator operating loads.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27903501001	Measuring Equipment - Pitch and Roll Operating Load
(2)97A27902016000	Spring Scale Assy
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
(1)Job set-up
(a)Initial Conditions
Correct electrical power supply (Ref. 24-41-00, P. Block 301).
Forward services ventilation system in operation.
Overhead and lateral panel circuit breakers closed, particularly those associated with FLT CTL (133VU).
Aircraft on ground (circuit breakers L/G PROX DET & RELAYS SYS1 and SYS2 closed on panel 133VU).
(b)Pressurize Green, Blue and Yellow hydraulic systems using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU make certain that G, B and Y pushbuttons are pressed (in) and legends off.
(d)Make certain that flap and slat control lever is in first notch position (flaps and slats fully retracted).
(e)On PITCH FEEL section of panel 428VU, make certain that SYS 1 and 2 pushbutton switches are pressed (in).
(f)Make certain that SPEEDBRAKE control lever is in RET position, ground spoiler function not preselected.
(g)On center pedestal, make certain that pitch trim control wheel is set to zero.
(h)Install tool 98A27903501001.

D. Test
CAUTION : DURING THE FOLLOWING TEST MAX. LOAD VALUE OF 60 daN (134.8 lbf) FOR NOSE UP POSITION AND 30 daN. (67.41 lbf). FOR NOSE DOWN POSITION MUST NOT BE EXCEEDED TO AVOID DAMAGE TO CONTROL.
NOTE : On FLT CTL page of right ECAM display unit, ELEV pointers reproduce deflection of elevators.

ACTION	RESULT
1. Move control column to nose up stop. Using tool 97A27902016000, measure load exerted at control column.	Elevators move upward. Make certain that load is 30 daN ± 3.5 daN (67.41 lbf ± 7.86 lbf).
2. Return control column to neutral.	Right and left elevators return to zero.
3. Move control column to nose down stop. Using tool 97A27902016000, measure load exerted at control column.	Elevators move downward. Make certain that load is 15 daN ± 1.5 daN (33.7 lbf ± 3.37 lbf).
4. Return control column to neutral.	Right and left elevators return to zero.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Depressurize hydraulic systems.
(3)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

5. System Test

NOTE : Check that the AOA sensors are parallel to the airflow and if it is not the case, put them in this configuration.

A. Reason for the Job

Measurement of artificial feel actuator extension with respect to speed and Mach number.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 6 m (19 ft. 8 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
34-10-00, P. Block 501	Flight Environment Data

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)Pressurize Green, Blue and Yellow hydraulic systems either :

- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c)On PITCH FEEL section of panel 428VU, make certain that SYS1 and SYS2 pushbutton switches are pressed (legends off).

(d)On overhead panels, make certain that circuit breakers are closed, particularly those associated with ART FEEL system (panel 21VU).

(e)Make certain that pitch trim control wheel is at zero.

(f)Make certain that flap and slat control lever is in first notch position.

(g)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.

(h)Position access platform and safety barriers.

(j)Open access door 312AR.

D. Test

(1)Measurement of actuator extension with respect to speed and Mach number.

NOTE : SYS1 test is performed with Green hydraulic system.
SYS2 test is performed with Yellow hydraulic system.
(For ADC1 or ADC2 speed selection, (Ref. 34-10-00, P. Block 501), para. 2.B.).

NOTE : With the SYS (1 or 2) pushbutton switch pressed and a speed of 0 Kt, make a mark on the actuator rod at the end of the body. Then the measure of the extension is the difference between

the mark done before and the end of the body.

	SYS			ADC				ACTUATOR EXTENSION	
HYD	1 FAULT OFF/R	2 FAULT OFF/R	THS	1 CAS in kts	M	2 CAS in kts	M	1 mm (in.)	2 mm (in.)
Green	Pressed (in)	Released (out) OFF/R	0°	30		30		- 0 0 + 1 (- 0 0 + 0.039)	- 0 0 + 1 (- 0 0 + 0.039)
Green	"	"	0°	250	0.38	30		34.1 ± 2 (1.342 ± 0.079)	"
Green	"	"	+2°	300	0.38	30		69.1 ± 3 (2.720 ± 0.118	"
Green	"	"	-10°	250	0.4	30		5.25 ± 1 (0.206 ± 0.039)	"
Green	"	"	0°	OFF	OFF	250	0.38	34.1 ± 2 (1.342 ± 0.079	"
Yellow	FAULT	"	0°	OFF	OFF	250	0.38	- 0 0 + 1 (- 0 0 + 0.039)	- 0 0 + 1 (- 0 0 + 0.039)
Yellow	Released (out) OFF/R	Pressed (in)	0°	30		30		"	"
Yellow	"	"	0°	30		250	0.38	"	34.1 ± 2 (1.342 ± 0.079)
Yellow	"	"	+2°	30		300	0.38	"	69.1 ± 3 (2.720 ± 0.118)
Yellow	"	"	-10°	30		250	0.4	"	5.25 ± 1 (0.206 ± 0.039
Yellow	"	"	0°	250	0.38	OFF	OFF	"	34.1 ± 2

	SYS			ADC				ACTUATOR	EXTENSION
HYD	1 FAULT OFF/R	2 FAULT OFF/R	THS	1 CAS in kts	M	2 CAS in kts	M	1 mm (in.)	2 mm (in.)
									(1.342 ± 0.079)

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 312AR.
(3)Remove safety barriers and access platform.
(4)Shut down hydraulic power supply. Depressurize systems. Where applicable, disconnect hydraulic ground power cart.
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. BLock 301).

6. System Test (Anti High - Incidence Function)

A. Reason for the Job
Measurement of artificial feel actuator extension with anti high - incidence function

B. Equipment and Materials

ITEM	DESIGNATION
(1)35M5M01150000	Test Set - DADC
or	
35M5M01150001	Test Set - DADC
(2)35M5M01060000	ALPHA Probes Simulator
(3)	Access Platform 6 m (19 ft. 8 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
34-10-00, P. Block 501	Flight Environment Data

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Pressurize Green, Blue and Yellow hydraulic systems either :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
(c)On PITCH FEEL section of panel 428VU, make certain that SYS1 and SYS2 pushbutton switches are pressed in (legends off).
(d)On overhead panel, make certain that circuit breakers are closed, particularly those associated with ARTF FEEL system (panel 21VU).
(e)Open, safety and tag the following circuits breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	STICKSHAKER-CAPT	12FU1	Line 109
21VU	STICKSHAKER-F/O	12FU2	Line 109

(f)On center pedestal set pitch trim control wheel to -10° up.
(g)Make certain that flap and slat control lever is in second notch position (Slats 15°) and SPEED BRAKE control lever in RET position.
(h)On complementary navigation control panels 412VU and 413VU, using PFD knobs adjust brightness on Captain and F/O PFDs.
(j)Open access door 121BL.

(k)Connect DADC test set 35M5M01150000 or 35M5M01150001 to electrical connectors 62FL1(located in electronics rack 90VU) and 62FL2 (located in electronics rack 80VU) (Ref. 34-10-00, P. Block 501).
- place S1 switches in ON position
- place S2 switches in OFF position
- place S3 switches in VC position :

(l)On overhead panel, place PITCH TRIM 1 lever in ON position.
(m)On glareshield panel, on FCU :
- push SPD/MACH knob to select a Mach value in SPEED/MACH window
- turn SPD/MACH knob to display M 0.4.

(n)On DADC test set 35M5M01150000 or 35M5M01150001 :
- adjust speed with the two HP/VC RATE rotating knobs to align with cyan index displayed at Mach selection.

(p)Disconnect connector 48FL1 (48FL2) from ALPHA probe.
(q)Connect ALPHA probe simulator 35M5M01060000 to connector 48FL1A (48FL2A).
(r)Position access platform and safety barriers.
(s)Open access door 312AR.

D. Test
(1)Measurement of actuator extension with anti high-incidence fonction.

SIMULATOR		ACTUATOR EXTENSION	
S1	S2	1 mm (in.)	2 mm (in.)
0°	0°	5.25 (0.206)	5.25 (0.206)
30°	0°	5.25 (0.206)	5.25 (0.206)
30°	30°	25.25 (0.994)	25.25 (0.994)
0°	30°	5.25 (0.206)	5.25 (0.206)
0°	0°	5.25 (0.206)	5.25 (0.206)

E. Close-Up
(1)Disconnect ALPHA probe simulator 35M5M01060000 from connector 48FL1A (48FL2A).
(2)Connect connector 48FL1A (48FL2A) to ALPHA probe.
(3)Disconnect DADC test set 35M5M01150000 or 35M5M01150001.
(4)Place PITCH TRIM 1 lever in OFF position.
(4)On center pedestal, set pitch trim control wheel to neutral.

(5)Remove safety clips and tags and close circuit breakers 12FU1, 12FU2.
(6)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(7)Close access doors 312AR and 121BL.
(8)Remove safety barriers and access platform.
(9)Shut down hydraulic power supply. Depressurize systems. Where applicable, disconnect hydraulic ground power cart.
(10)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

NOTE : After following test ; check by operating the pedals that the rudder fully deflects when the green hydraulic system is pressurized.

Ref. MMEL Sect. 1-27, Item 12
WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Deactivation

A. Reason for the Job

Check correct operation of system in the event of PITCH FEEL FAULT warning failure by display of messages of left ECAM display unit.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1) Job Set-Up

(a) Initial Conditions

Correct electrical power supply (Ref. 24-41-00, P. Block 301).
Forward services ventilation system in operation.
Overhead and lateral panels circuit breakers closed, particularly those associated with FLT CTL (133VU).
Aircraft on ground (Circuit breakers L/G PROX DET & RELAYS SYS1 and SYS2 closed on panel 133VU).

(b) Pressurize Green, Blue and Yellow hydraulic systems using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c) On SERVO CTL section of panel 428VU make certain that G, B and Y pushbuttons are pressed (in) and legends off.

(d) Make certain that flap and slat control lever is in first notch position (flaps and slats fully retracted).

(e)On PITCH FEEL section of panel 428VU, make certain that SYS 1 and 2 pushbutton switches are pressed (in).
(f)Make certain that SPEEDBRAKE control lever in in RET position, ground spoiler function not preselected.
(g)On center pedestal, make certain that pitch trim control wheel is set to zero.
(h)On panel 11VU, on ECAM control panel
- press CLR pushbutton switch until it goes off
- press F/CTL pushbutton switch FLT CTL page appears on right ECAM display unit.

(2)Deactivation

ACTION	RESULT
1. On ANN LT section of panel 436VU - place switch in TEST position	On PITCH FEEL section of panel 428VU - FAULT legend of SYS 1 (SYS 2) pushbutton is off. - legends of pushbutton switches surrounding FAULT legend flash
2. On ANN LT section of panel 436VU - place switch in BRT position	- legends go off
3. On FLIGHT CONTROLS section of panel 471VU - press and hold TEST/SYS 1 (TEST SYS 2) pushbutton switch	On FLIGHT CONTROLS section of panel 471VU - OK legend of PITCH FEEL/SYS 1 (SYS 2) annunciator comes on after 7 seconds. On left ECAM display unit, following message appears : FLT CTL PITCH FEEL 1 (2) FAULT.....OFF R
4. On FLIGHT CONTROLS section of panel 471VU - release TEST/SYS 1 (TEST/SYS 2) pushbutton switch	On FLIGHT CONTROLS section of panel 471VU - OK legend of PITCH FEEL/SYS 1 (PITCH FEEL SYS 2) annunciator goes off. On left ECAM display unit - message disappears

(3)Close-up
(a)Shut down pressurization of Green, Blue and Yellow hydraulic systems
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Restore aircraft to normal operating condition.

2. Reactivation
Refer to TSM 27-33-00.

ARTIFICIAL FEEL UNIT 274511 - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR. BEFORE PRESSURIZING HYDRAULIC SYSTEM, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : AFTER ANY DISCONNECTION WITHIN THE PITCH FEEL SYSTEM A FUNCTIONAL TEST OF SYSTEM (REF. 27-33-00, P. BLOCK 501) MUST BE PERFORMED.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 5.5 m (18 ft.)
R	B. 14701NSA506310	Wrenches-Notched, Tightening of Nuts NSA5063
R	C. 14701NSA506316/18	Wrenches-Notched, Tightening of Nuts NSA5063
R	D. 0U131281	Pin - Rigging, Artificial Feel Unit, Elevator Mechanical Controls
R	E. 97A27302009000	Locking Tool - Pitch Trim Control Wheel
R	F. 98A27307541000	Rigging Pin - Cable Quadrant, Elevator Mechanical Controls
R	G. 98A27307549000	Pin - Rigging, Elevator Control Bellcranks
R	H. 98A27901007000	Pin - Rigging, Elevator Control (Qty. 2)
R	J. 98A27907509000	Tool Set - Extraction/Insertion, SHUR-LOK
R	K.	Torque Wrench, up to 5.5 m.daN (40.5 lbf.ft.)
R	L.	Blanking Caps - Electrical Line
R	M.	Blanking Plugs/Caps - Hydraulic Line
R	N.	Container - Hydraulic Fluid Spillage
R	P.	Warning Notices
R	Q.	Circuit Breaker Safety Clips
R	R.	Cotter Pins
R	S. Material No. 05-002	Special Materials (Ref. 20-31-00)
R	T. Material No. 05-027	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 20-28-11, P. Block 1	Electrical Bonding
- 27-31-00, P. Block 301	Mechanical Control and Pitch Uncoupling
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 27-31-26, P. Block 401	Artificial Feel Unit Frame
- 27-33-00, P. Block 501	Artificial Feel (Elevator)
- 51-75-10, P. Block 801	Repair of Paint Coatings

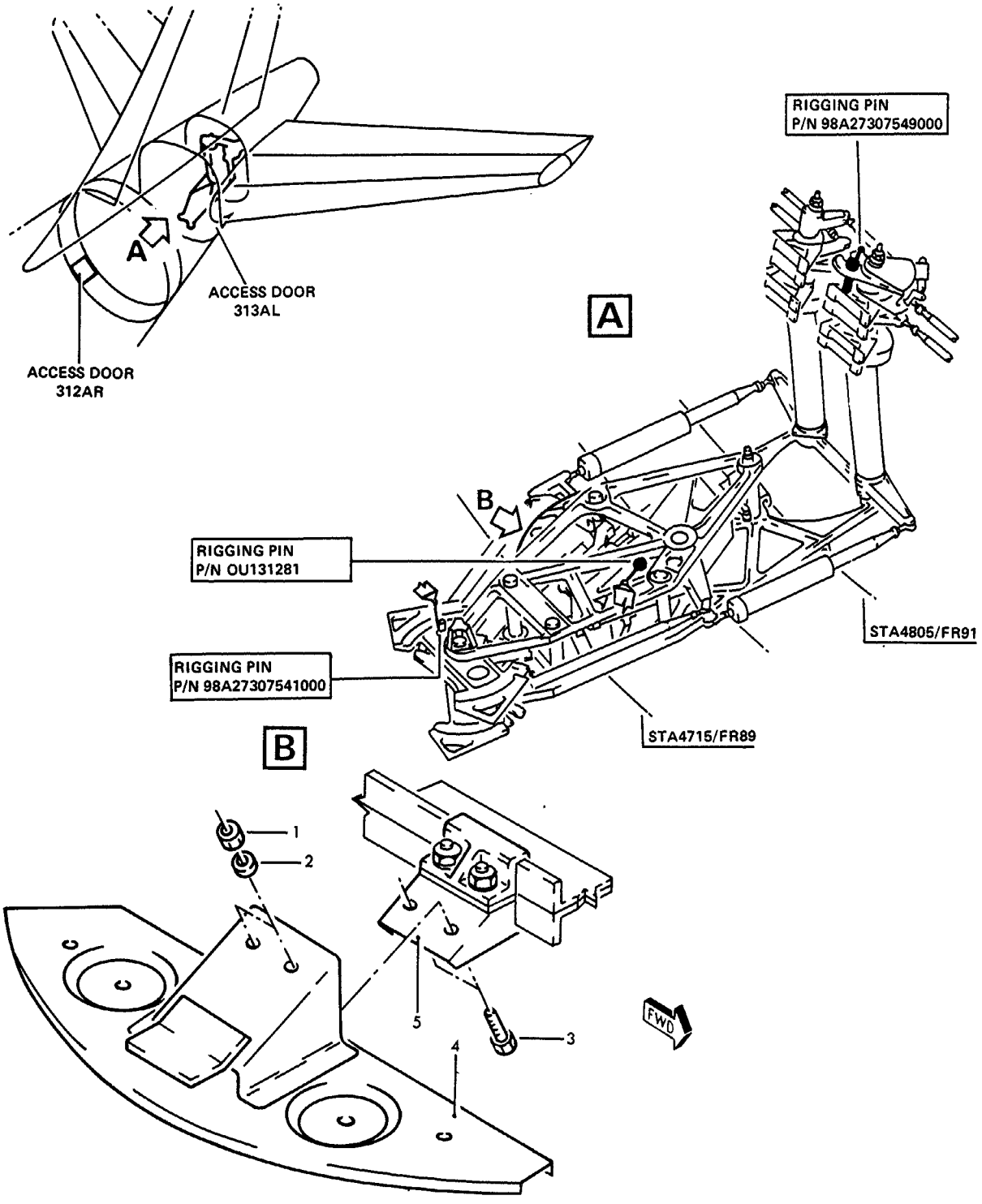
2. Procedure

A. Job Set-Up (Ref. Fig. 401)
(1)Position access platform.
(2)Make certain that horizontal stabilizer pitch trim control is set at zero, and install locking tool P/N 97A27302009000 on pitch trim control wheel in flight compartment.
(3)Make certain that elevator controls are set at neutral, and install rigging pins P/N 98A27901007000 (Qty. 2) in elevator control bellcranks on control mechanism mounting beam in avionics compartment.
(4)Display warning notices in flight compartment prohibiting operation of flight controls.
(5)Open, safety and tag the following circuit breakers:

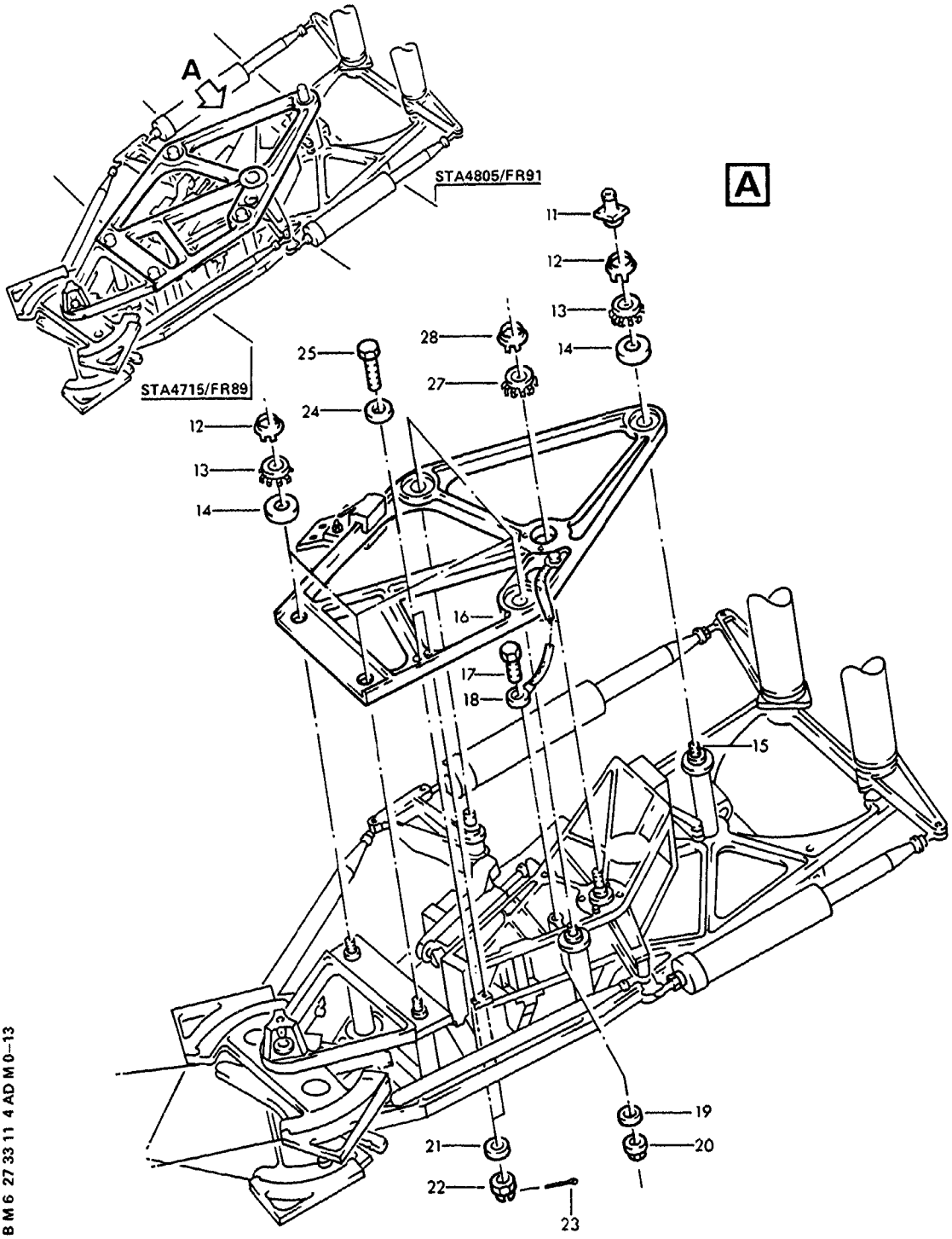
PANEL	SERVICE	IDENT.	LOCATION
21VU	ARTF FEEL/FLC 1/28VDC	5CY1	101/J 1
21VU	ARTF FEEL/FLC 1/26VAC/ESS	305CY1	101/J 2
21VU	ARTF FEEL/FLC 1/26VAC/EMER	306CY1	101/J 3
21VU	ARTF FEEL/FLC 2/26VAC	305CY2	101/J 4
21VU	ARTF FEEL/FLC 2/28VDC	5CY2	101/J 5

(6)Display warning notice, prohibiting repressurization of hydraulic systems.
(7)Open access door 313AL.
(8)Install rigging pin P/N 98A27307549000 in aft detent bellcrank at torque tubes assembly.
(9)Open access door 312AR.
(10)Gain access to artificial feel unit (Ref. 27-31-00, P. Block 301).
(11)Install rigging pins P/N 98A27307541000 and P/N 0U131281.

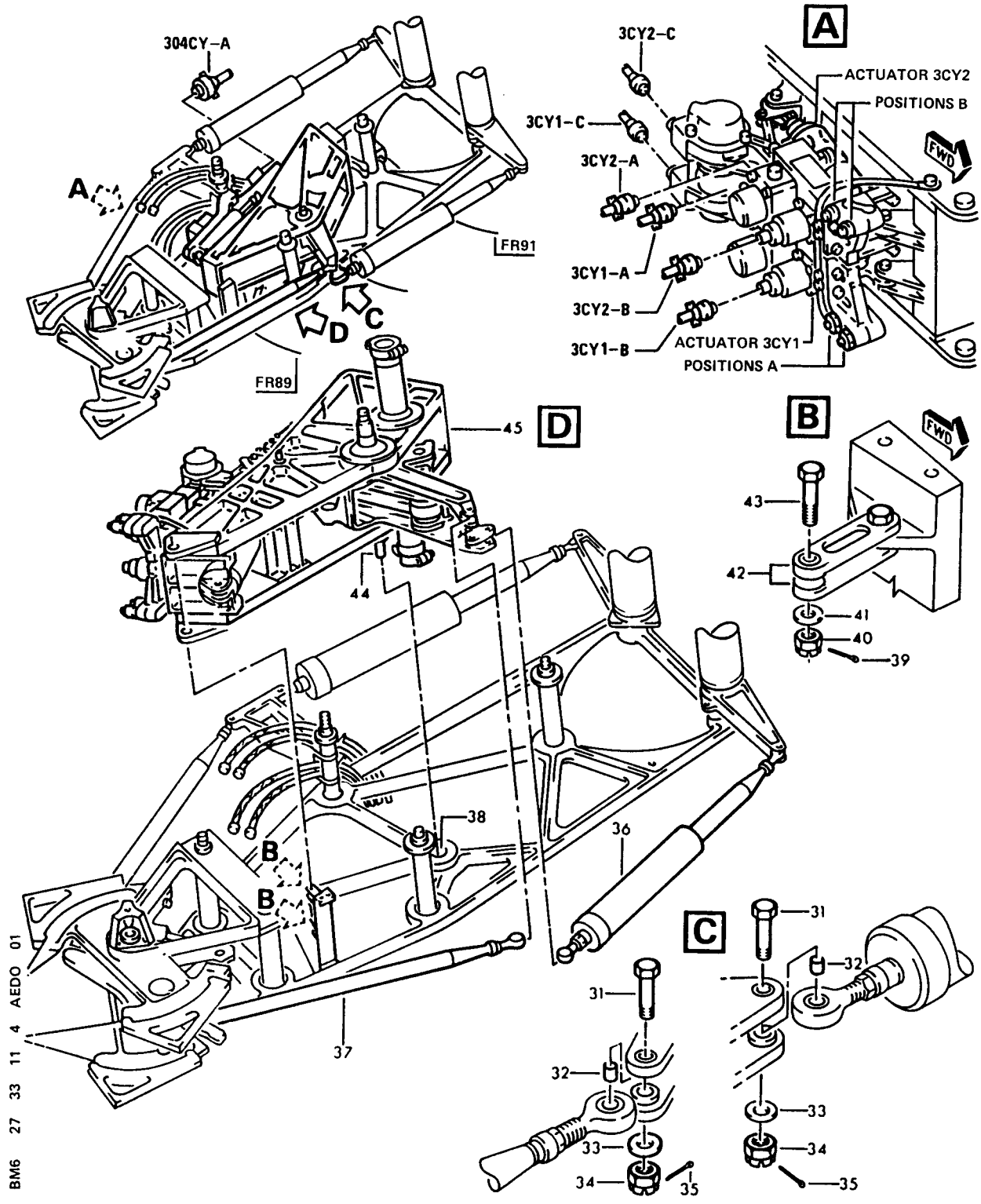
B. Removal
(Ref. Fig. 402)
(Ref. Fig. 403)
(1)Removal of baffle plate (Ref. Fig.)
(a)Remove nuts (1), washers (2), bolts (3) and baffle plate (4) from clip (5).
(2)Removal of aft top frame plate (Ref. Fig. 402)
(a)Remove spacer (11) from aft support (15).
(b)Remove lockwashers (12) with SHUR-LOK tool set P/N 98A27907509000 and
R remove nuts (13) with notched wrench P/N 14701NSA506316/18.
R Remove washers (14).
(c)Remove cotter pins (23), nuts (22), washers (21), bolts (25) and washers (24).
(d)Not applicable
(e)Remove lockwasher (28) with SHUR-LOK tool set P/N 98A27907509000 and
R remove nut (27) with notched wrench P/N 14701NSA506310.
(f)Remove nut (20), washer (19), bolt (17) and disconnect bonding strap (18).
(g)Remove aft top frame plate (16).
(3)Removal of artificial feel unit (Ref. Fig. 403)



Rigging Points and Baffle Plate
Figure 401



Aft Top Frame Plate
Figure 402



Artificial Feel Unit
Figure 403

R

(a)Remove cotter pins (35), nuts (34), washers (33), bolts (31) and disconnect LH pushrod (37) and LH spring rod (36).
(b)Remove bushes (32).
(c)Remove cotter pins (39), nuts (40), washers (41), bolts (43) and disconnect links (42).
(d)Position container for hydraulic fluid spillage.
(e)Disconnect hydraulic flexible hoses at the following positions and install blanking caps:
1 Positions A - Green hydraulic system - Actuator 3CY1 (lower)
2 Positions B - Yellow hydraulic system - Actuator 3CY2 (upper)
(f)Disconnect the following electrical connectors and install blanking caps:
1 Actuator 3CY1 - 3CY1-A, 3CY1-B, 3CY1-C (lower)
2 Actuator 3CY2 - 3CY2-A, 3CY2-B, 3CY2-C (upper)
3 Microswitch - 304CY-A
CAUTION : ARTIFICIAL FEEL UNIT WEIGHS APPROXIMATELY 28 kg (62 lb.)
(g)Remove artificial feel unit (45).

C. Installation
(Ref. Fig. 401, 402, 403)
(1)Make certain that rigging pin P/N 0U131281 is installed with artificial feel unit in neutral position (Ref. Fig. 401).
(2)Position artificial feel unit (45) by engaging trunnion (44) to bearing (38).
(3)Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (43).
(4)Connect links (42) and install bolts (43), washers (41) and nuts (40).
(5)TORQUE nuts (40) to between 0.21 and 0.23 m.daN (18.58 and 20.35 lbf.in.) and safety with cotter pins (39).
(6)Installation of aft top frame plate (Ref. Fig. 402).
(a)Position aft top frame plate (16) and install washers (14) and nuts (13, 27).
R (b)TORQUE nuts (13) to 1.5 m.daN (11.0 lbf.ft.) with notched wrench
R P/N 14701NSA506316/18 and install lock washers (12) with SHUR-LOK
R tool set P/N 98A27907509000.
(c)TORQUE nuts (27) to between 4.75 and 5.25 m.daN (35.0 and
R 38.7 lbf.ft.) with notched wrench P/N 14701NSA506310 and
R install lockwashers (28) with SHUR-LOK tool set P/N 98A27907509000.
(d)Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (25).
(e)Install bolts (25), washers (24, 21) and nuts (22).
(f)TORQUE nuts (22) to between 0.76 and 0.84 m.daN (67.26 and 74.35 lbf.in.) and safety with cotter pins (23).
(g)Install bonding strap (18) with bolt (17), washer (19) and nut (20). For electrical bonding refer to 20-28-11, P. Block 1.
(h)Install spacer (11) in aft support (15).
(7)Install bushes (32), connect LH pushrod (37) and LH spring rod (36) and install bolts (31) (Ref. Fig. 403).
(8)If bolts (31) cannot be easily inserted, adjust length of pushrod (37) and/or spring rod (36).
(9)Install washers (33) and nuts (34).
(10)TORQUE nuts (34) to between 0.21 and 0.23 m.daN (18.58 and 20.35 lbf.in.) and safety with cotter pins (35).

(11)Install baffle plate (4) with bolts (3), washers (2) and nuts (1).
(12)Remove blanking caps and connect hydraulic flexible hoses at the following positions:
(a)Positions A - Green Hydraulic System - Actuator 3CY1 (lower)
(b)Positions B - Yellow Hydraulic System - Actuator 3CY2 (upper)
(13)Remove hydraulic fluid container and make certain that all excess fluid is cleaned off all components.
WARNING : DO NOT CROSS-CONNECT ELECTRICAL CONNECTORS.
(14)Remove blanking caps and connect the following electrical connectors:
(a)On lower actuator 3CY1 : 3CY1-A, 3CY1-B and 3CY1-C
(b)On upper actuator 3CY2 : 3CY2-A, 3CY2-B and 3CY2-C
NOTE : The color of the electrical connectors is in no way related to the color coding of the hydraulic systems.
(c)Connector 304CY-A at position detection microswitch.
(15)Remove rigging pins P/N 98A27307541000, P/N 0U131281, P/N 98A27307549000, P/N 98A27901007000 (Qty. 2) and locking tool P/N 97A27302009000.
(16)Remove safety clips and tags, and close circuit breakers 5CY1, 305CY1, 306CY1, 305CY2 and 5CY2.
(17)Make certain that travel ranges of artificial feel unit and elevators are clear.

D. Test
(1)Carry out mechanical controls functional test (Ref. 27-31-00, P. Block 501).
(2)Check that hydraulic connections on artificial feel unit actuators are free from leaks.
(3)Carry out artificial feel functional test (Ref. 27-33-00, P. Block 501).
(4)Carry out measurement of artificial feel actuator extension with respect to speed, which is part of atificial feel system test (Ref. 27-33-00, P. Block 501).
(5)Carry out test of disagree warning which is part of artificial feel operational test (Ref. 27-33-00, P. Block 501).

E. Close-Up
CAUTION : ARTIFICIAL FEEL UNIT ACTUATOR PISTON RODS MUST NOT BE TREATED WITH MOISTURE-REMOVING OIL.
(1)Check coating of moisture-removing oil (Mat. No. 05-027) for good condition on artificial feel unit (45) and renew as necessary (Ref. 51-75-10, P. Block 801).
(2)Install cover assembly (Ref. 27-31-00, P. Block 301).
(3)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(4)Close access doors 312AR and 313AL.
(5)Remove warning notices.
(6)Remove access platform.

PITCH ARTIFICIAL FEEL ACTUATOR 3CY1, 3CY2 - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : AFTER ANY DISCONNECTION WITHIN THE PITCH FEEL SYSTEM A FUNCTIONAL TEST OF THE FEEL SYSTEM (REF. 27-33-00, P. BLOCK 501) MUST BE PERFORMED.

NOTE : The Pitch Artificial Feel Actuators 3CY1 and 3CY2 are identical in design and function. The Removal/Installation procedure for both actuators is identical, therefore only one procedure is described.

1. Reason for the Job

A. Removal and Installation of the following parts:
(1)Pitch artificial feel actuator 3CY1 and/or 3CY2
(2)Servo valve
(3)Solenoid
(4)Bonding straps
(5)Upper and/or lower manifold

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18 ft.)
B.	Blanking Plugs and Caps - Electrical Connector
C.	Blanking Plugs and Caps - Hydraulic Line
D.	Circuit Breaker Safety Clips and Tags
E.	Container - Hydraulic Fluid Spillage
F.	Warning Notices
G.	Torque Wrench up, to 2.25 m.daN (200 lbf.in.)
H. 0U129453	Mounting Cone
J. 0U129454	Precasting Bush
K. 0U129484	Mounting Cone
L. 0U129485	Precasting Bush
M. 0U131281	Pin - Rigging, Artificial Feel Unit, Elevator Mechanical Controls
N. 97A27302009000	Locking Tool - Pitch Trim Control Wheel
P. 98A27307541000	Rigging Pin - Cable Quadrant, Elevator Mechanical Controls
Q. 98A27307549000	Pin - Rigging, Elevator Control Bellcranks
R. 98A27901007000	Pin - Rigging, Elevator Control
S.	Corrosion-Resistant Steel Lockwire, 0.8 mm (0.031 in.) dia.

ITEM	DESIGNATION
T.	Cotter Pins
U.	Packings
V.	Teflon Rings
X. Material No. 05-027	Special Materials (Ref. 20-31-00)
Y. Material No. 16-003	Structure Paints (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-31-00, P. Block 301	Mechanical Control and Pitch Uncoupling
- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
- 27-33-00, P. Block 501	Artificial Feel (Elevator)
- 27-33-15, P. Block 401	Artificial Feel Unit Position Detection Microswitch 304CY
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 51-75-10, P. Block 801	Repair of Paint Coatings

3. Procedure

A. Job Set-Up (Ref. Fig. 401)
(1)Position access platform and open access door 312AR.
(2)Actuators to be removed are identified as follows:

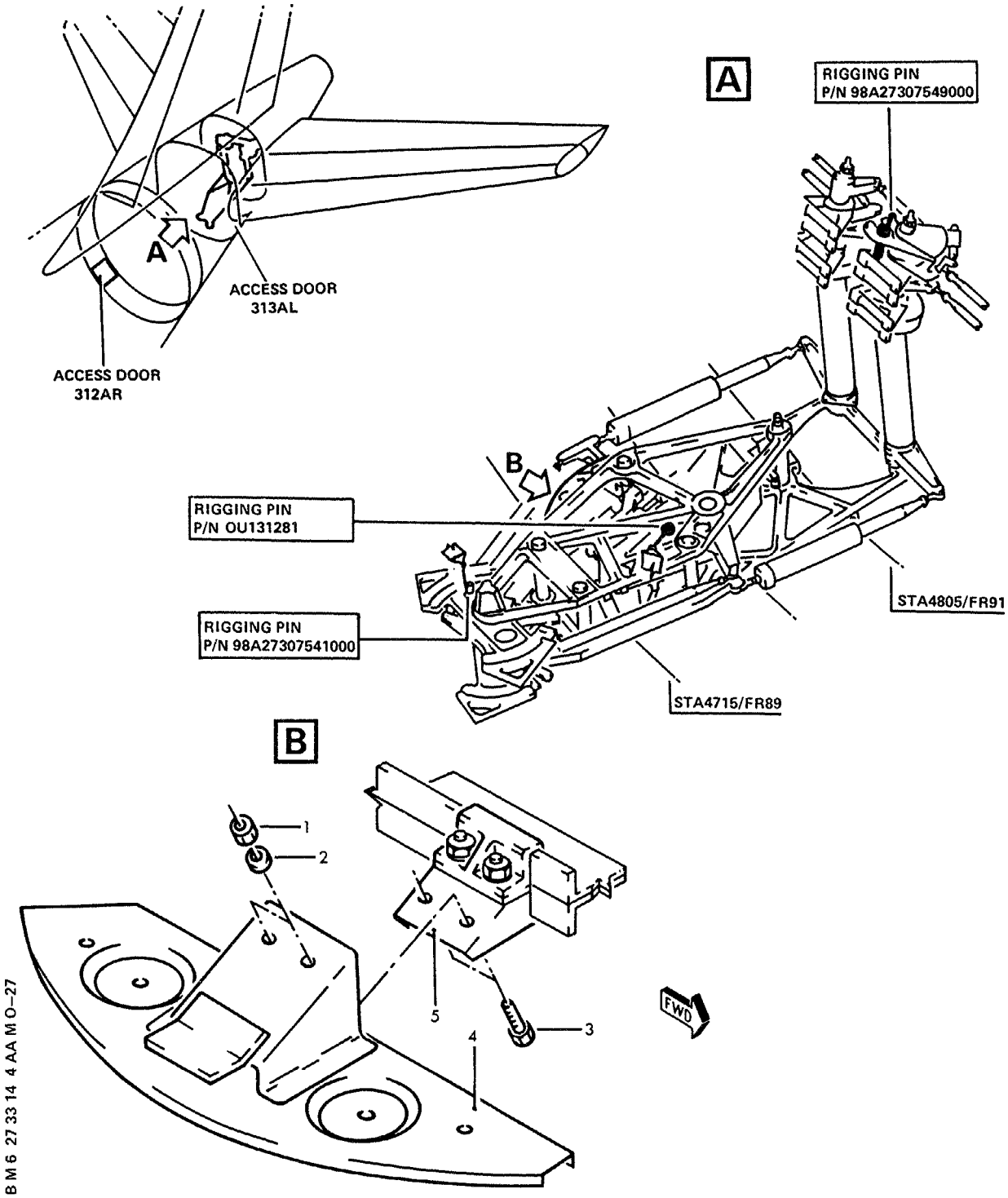
HYDRAULIC SYSTEM	PITCH ARTIFICIAL FEEL ACTUATOR	
	ACTUATOR IDENTIFIER	LOCATION
GREEN	3CY1	LOWER ACTUATOR
YELLOW	3CY2	UPPER ACTUATOR

(3)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(5)Move trimmable horizontal stabilizer (THS) and elevator to neutral position.
(6)Open, safety and tag the following circuit breakers:

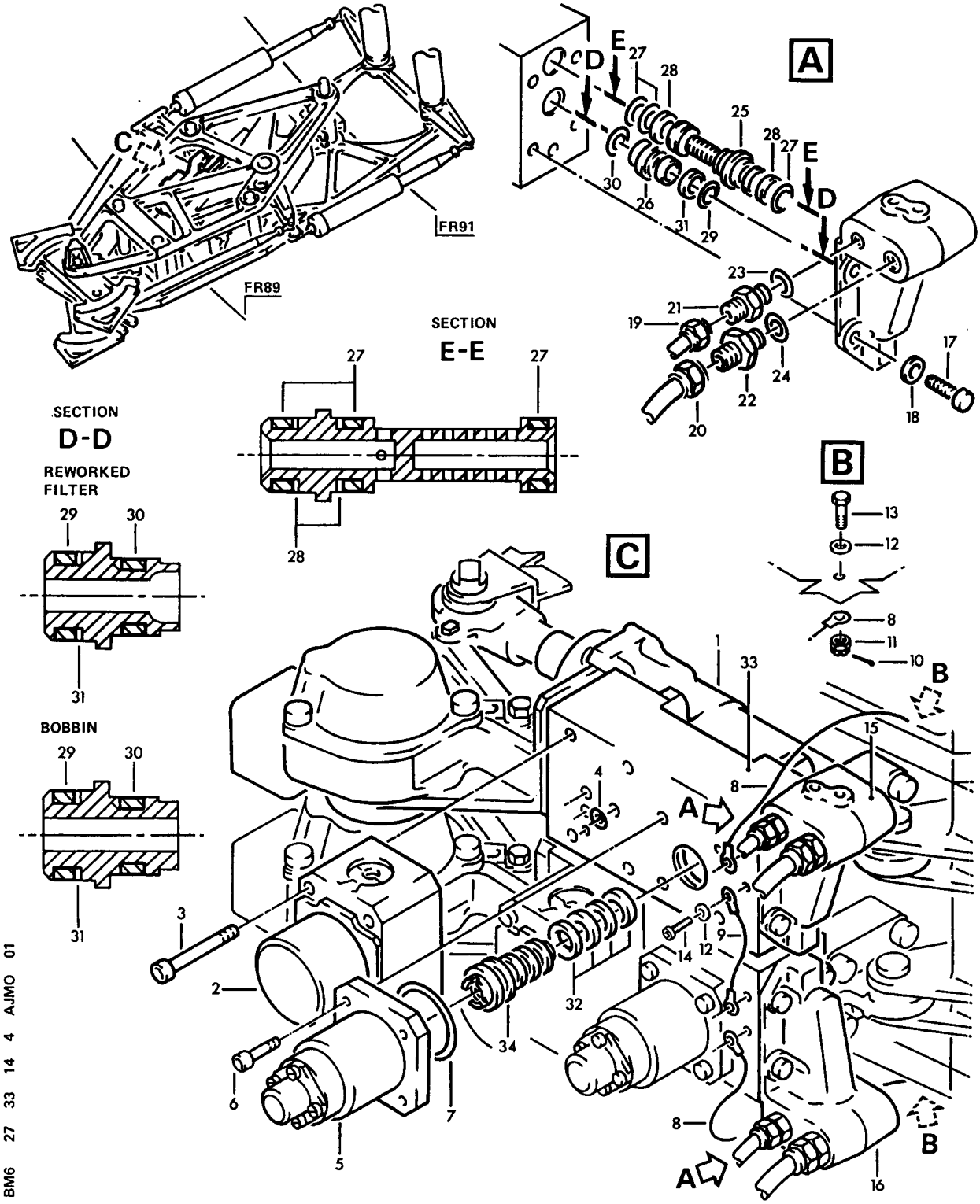
PANEL	SERVICE	IDENT.	LOCATION
21VU	ARTF FEEL/FLC 1/28VDC	5CY1	101/J1
21VU	ARTF FEEL/FLC 1/26VAC/ESS	305CY1	101/J2
21VU	ARTF FEEL/FLC 1/26VAC/EMER	306CY1	101/J3
21VU	ARTF FEEL/FLC 2/26VAC	305CY2	101/J4
21VU	ARTF FEEL/FLC 2/28VDC	5CY2	101/J5

(7)Display warning notices in flight compartment prohibiting operation of pitch controls.
(8)Install locking tool P/N 97A27302009000 on pitch trim control wheel in flight compartment.
(9)Install rigging pins P/N 98A27901007000 (Qty. 2) in elevator control bellcranks on control mechanism mounting beam in avionics compartment.
(10)Gain access to artificial feel unit (Ref. 27-31-00, P. Block 301).
(11)Remove nuts (1), washers (2), bolts (3) and baffle plate (4) from clip (5).
(12)Install rigging pin P/N 0U131281 in artificial feel unit.
(13)Install rigging pin P/N 98A27307541000 in elevator cable quadrant.
(14)Open access door 313AL.
(15)Install rigging pin P/N 98A27307549000 in aft detent bellcrank at torque tube assembly.
R (16)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).

B. Removal
(1)Removal of components (Ref. Fig. 402)



Rigging Points and Baffle Plate
Figure 401



Actuator Components
Figure 402

R

NOTE : The following components can be changed when the actuator is installed or removed:
- Servo valve
- Solenoid
- Bonding straps
- Manifolds

(a)Removal of servo valve (2)
1 Disconnect electrical connector 3CY1-A and/or 3CY2-A and install blanking caps (Ref. Fig. 403).
2 Cut and remove lockwire from bolts (3).
3 Position container for hydraulic fluid spillage.
4 Remove bolts (3).
5 Remove servo valve (2) from actuator assembly (1).
6 Remove and discard packings (4).

(b)Removal of solenoid (5)
1 Disconnect electrical connector 3CY1-B and/or 3CY2-B and install blanking caps (Ref. Fig. 403).
2 Cut and remove lockwire from bolts (6).
3 Position container for hydraulic fluid spillage.
4 Remove bolts (6).
5 Remove solenoid (5) from actuator assembly (1).
6 Remove and discard packing (7).

(c)Removal of bonding straps (8, 9).
1 Remove cotter pin (10).
2 Remove nut (11), washer (12) and bolt (13).
3 Remove lockwire from bolts (14).
4 Remove bolts (14) and washers (12).
5 Remove bonding straps (8, 9).

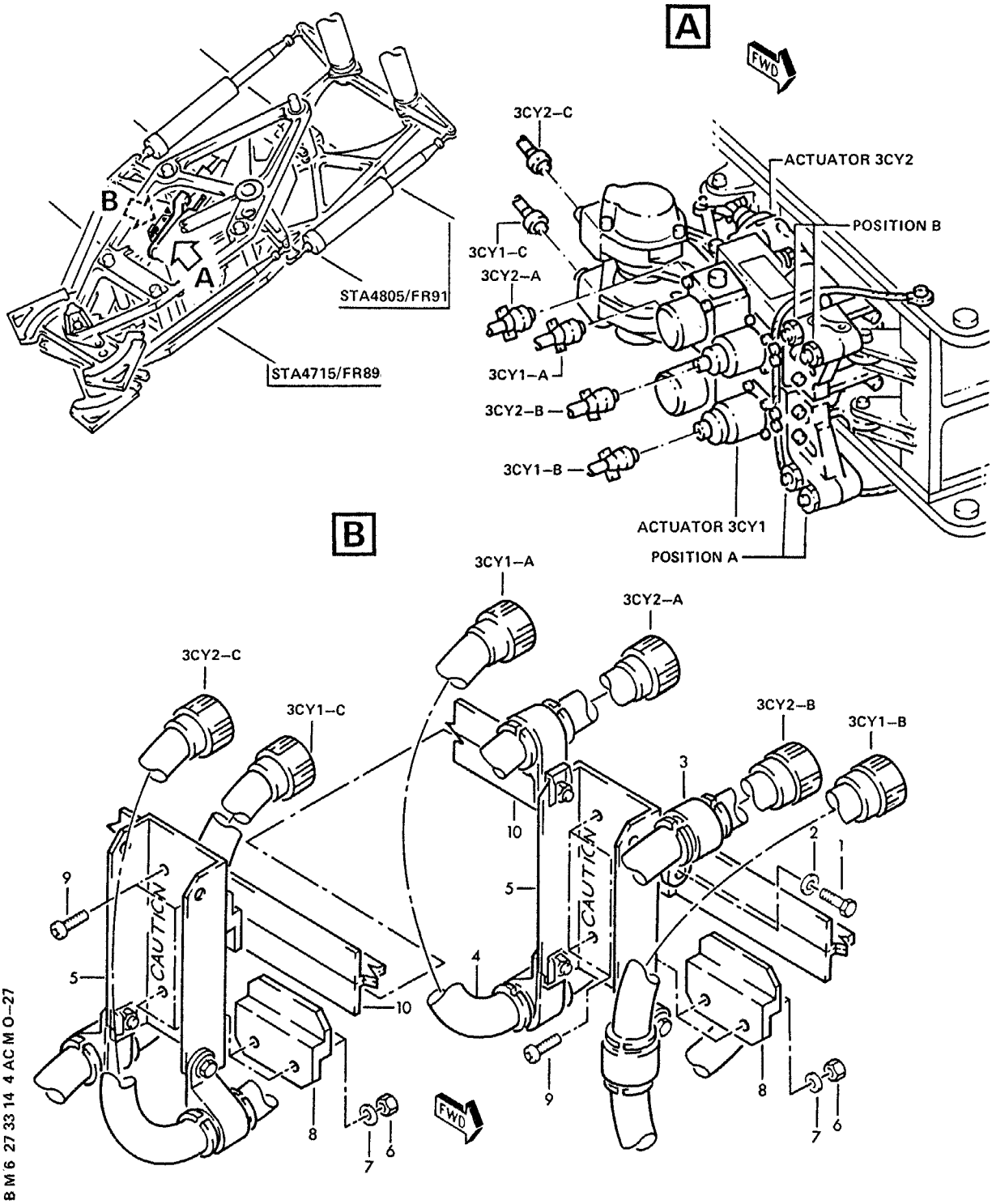
(d)Removal of upper manifold (15) and/or lower manifold (16)
Note : The attachments of manifolds (15, 16) are similar.
1 Position container for hydraulic fluid spillage.
2 Disconnect hydraulic flexible hoses (19, 20) and fit blanking caps.
3 Remove lockwire from bolts (17).
4 Remove bolts (17) and washers (18).
5 Remove manifold (15) and/or (16).
6 Remove unions (21, 22).
7 Remove and discard packings (23, 24).

(e)Removal of filter (25)
NOTE : The filter (25) can only be removed after the manifolds (15, 16) have been removed.
1 Remove filter (25).
2 Remove and discard packings (27) and teflon rings (28).

R (f)Removal of bobbin (26)
NOTE : The bobbin (26) can only be removed after the manifolds (15,16) have been removed.
R NOTE : If a filter is installed, replace filter by bobbin.
R Removal/Installation procedure is identical.

R 1 Remove bobbin (26).
2 Remove and discard packings (29, 30) and teflon ring (31).

(2)Removal of pitch artificial feel actuator.



Electrical Connections and Cable Looms
Figure 403

NOTE : One actuator may be removed but the other must remain in place, the removal procedure for both actuators is identical. It is assumed in this description that no components have been removed. If components have to be removed it is recommended that this is done after the removal of the actuator.

(a)Disconnect the following electrical connectors and install blanking caps (Ref. Fig. 403).

1 On upper actuator 3CY2: 3CY2-A, 3CY2-B and 3CY2-C

2 On lower actuator 3CY1: 3CY1-A, 3CY1-B and 3CY1-C

(b)Removal of brackets (5) (Ref. Fig. 403)

NOTE : This step is only applicable for the removal of upper actuator 3CY2.

1 Remove screw (1) and washer (2), but do not remove cable clamp (3).

2 Mark position of brackets (5) on frame base plate (10).

3 Loosen upper screws (9) but do not remove them.

4 Remove lower screws (9), nuts (6), washers (7) and clips (8).

5 Fold cable looms and brackets (5) back from artificial feel unit frame.

R (c)Disconnection of manifold (Ref. Fig. 403)

R 1 Position container for hydraulic fluid spillage.

R 2 Remove lockwire from bolts (17).

R 3 Remove bolts (17) and washers (18).

R 4 Remove manifold (15) and/or (16).

(d)Disconnection of bonding straps (8, 9) (Ref. Fig. 402)

1 Remove lockwire from bolts (14).

2 Remove bolts (14) and washers (12).

(e)Unlocking of spring box (Ref. Fig. 404)

CAUTION : DO NOT TRY TO REMOVE AN ACTUATOR BEFORE THE SPRING BOX HAS BEEN UNLOCKED. THIS IS DONE BY READJUSTING THE MECHANICAL STOP OF THE ACTUATOR REMAINING IN PLACE. THIS ACTUATOR MUST REMAIN INSTALLED UNTIL THE OTHER ACTUATOR IS REINSTALLED.

NOTE : The following steps apply only to the actuator remaining in place.

1 Release lockwashers (2).

2 Loosen nut (3).

3 Mark original position of screw (1).

4 Tighten screw (1) by three turns.

(f)Removal of actuator (Ref. Fig. 405)

1 Remove cotter pins (3).

2 Remove nuts (4), washers (5) and bolts (7).

3 Remove actuator and washers (6).

C. Installation

(1)Installation of components (Ref. Fig. 402)

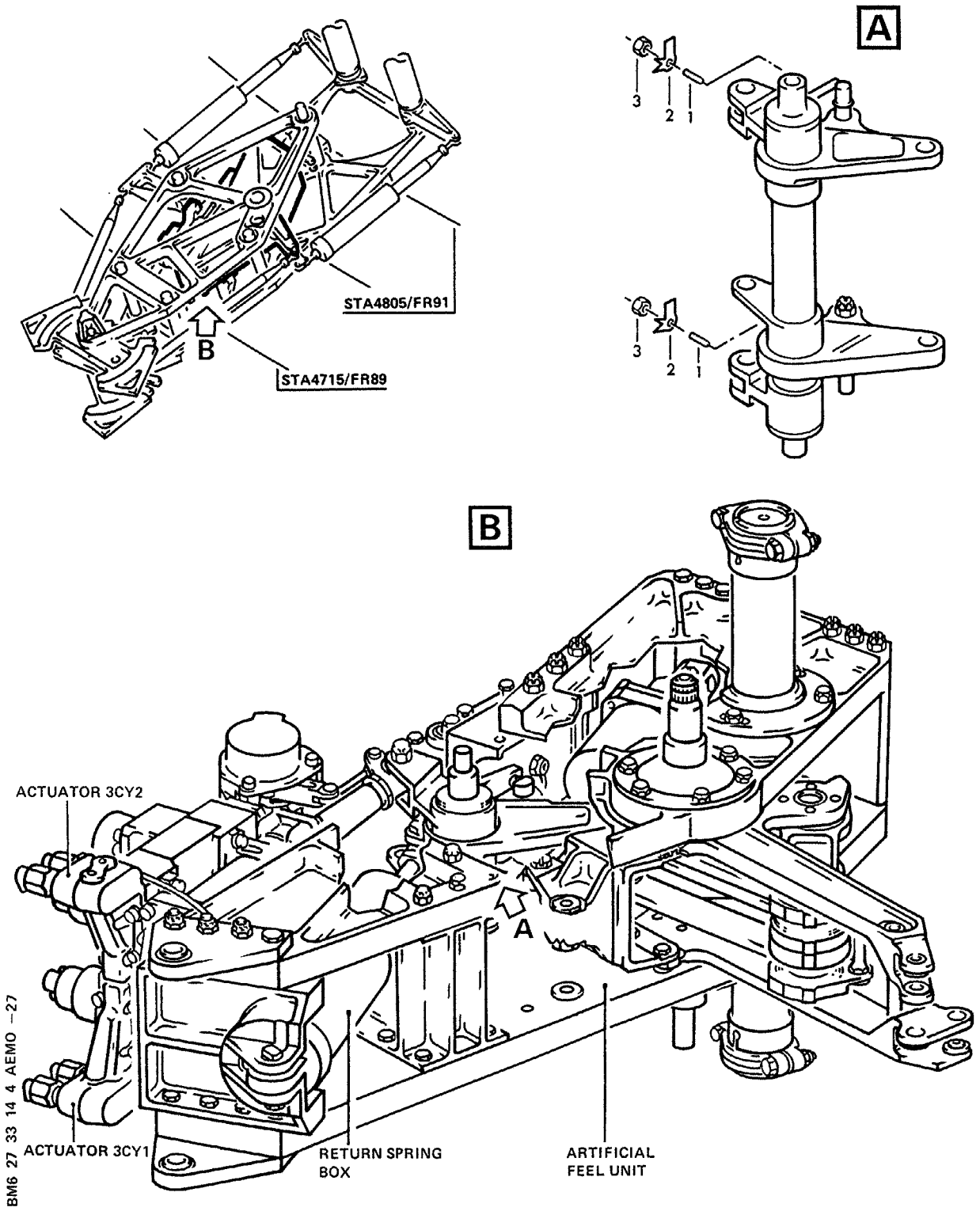
(a)Installation of bobbin (26)

1 Using mounting cone P/N 0U129453, install teflon ring (31) and two packings (29, 30) on bobbin (26).

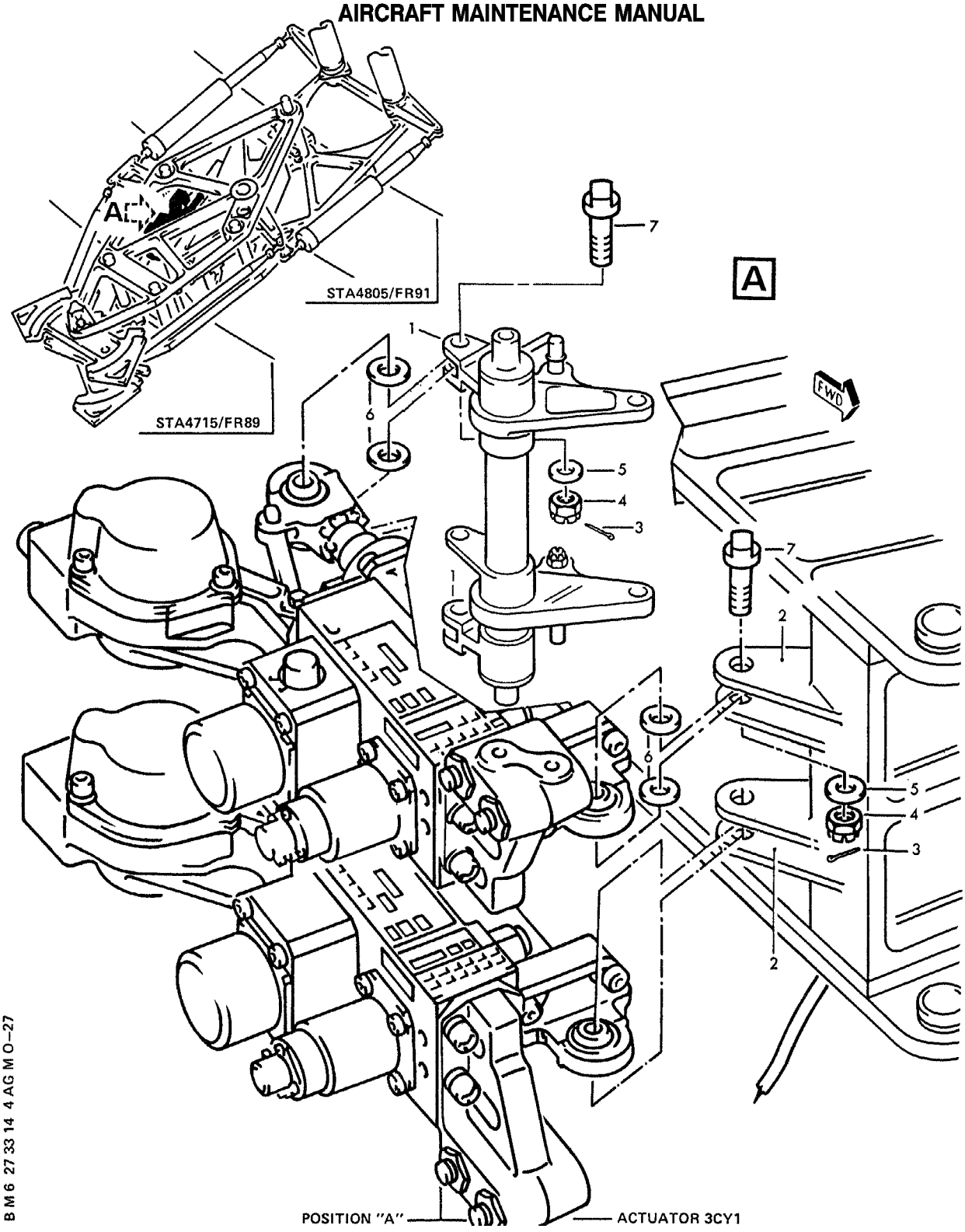
2 Shrink the teflon ring (31) with precasting bush P/N 0U129454.

3 Install bobbin (26).

(b)Installation of filter (25)



Pitch Artificial Feel Actuator Locking
Figure 404



Pitch Artificial Feel Actuator
Figure 405

1 Using mounting cone P/N OU129484, install two teflon rings (28) and three packings (27) on filter (25).
2 Shrink the teflon rings (28) with bush P/N OU129485.
3 Install filter (25).

(c)Installation of upper manifold (15) and/or lower manifold (16)

NOTE : The attachments of manifold (15, 16) are similar.

R NOTE : Make sure that filter (25) and bobbin (26) is installed.

1 Install packings (23, 24) to unions (21, 22).
2 Install unions (21, 22) on manifold (15) and/or (16).
3 TORQUE unions (21, 22) to between 1.70 and 2.05 m.daN (12.54 and 15.12 lbf.ft.).
4 Position manifold (15) and/or (16) on actuator.
5 Install bolts (17) and washers (18).
6 TORQUE bolts (17) to between 0.91 and 1.13 m.daN (6.71 and 8.33 lbf.ft.) and safety with lockwire.
7 Remove blanking caps and connect hydraulic flexible hoses (19, 20).
8 Remove container for hydraulic fluid spillage.

(d)Installation of bonding straps (8, 9)

1 Position bonding strap (8).
2 Install bolt (13), washer (12) and nut (11).
3 TORQUE bolt (13) to between 0.40 and 0.50 m.daN (2.95 and 3.69 lbf.ft.) and safety with cotter pin (10).
4 Position bonding strap (9).
5 Install bolts (14) and washers (12).
6 Safety bolts (14) with lockwire.

(e)Installation of solenoid (5)

1 Make certain that control unit (34) and seals (32) are correctly seated in hydraulic unit (33).
2 Position packing (7) on solenoid (5).
3 Position solenoid (5) on actuator assembly (1).
4 Install bolts (6).
5 TORQUE bolts (6) to between 0.40 and 0.52 m.daN (2.95 and 3.84 lbf.ft.) and safety with lockwire.
6 Remove blanking caps and connect electrical connectors 3CY1-B and/or 3CY2-B (Ref. Fig. 403).

NOTE : The color of the electrical connectors is in no way related to the color coding of the hydraulic systems.

7 Remove container for hydraulic fluid spillage.

(f)Installation of servo valve (2)

1 Position packings (4) on servo valve (2).
2 Position servo valve (2) on actuator assembly (1).
3 Install bolts (3).
4 TORQUE bolts (3) to between 0.48 and 0.56 m.daN (3.54 and 4.13 lbf.ft.) and safety with lockwire.
5 Remove blanking caps and connect electrical connector 3CY1-A and/or 3CY2-A (Ref. Fig. 403).
6 Remove container for hydraulic fluid spillage.

(2)Installation of pitch artificial feel actuator

NOTE : The installation procedure for both actuators is identical. It is assumed in this description that all components have been installed. If components have to be installed it is recommended that this is done before the installation of the actuator.

(a)Installation of actuator (Ref. Fig. 405)

1 Position actuator and washers (6).
2 Install bolts (7), washers (5) and nuts (4).
3 TORQUE bolts (7) to between 1.80 and 2.25 m.daN (13.28 and 16.60 lbf.ft.) and safety with cotter pins (3).

(b)Locking of spring box (Ref. Fig. 404)

NOTE : The following steps apply only to the actuator remaining in place.

1 Loosen screw (1) by three turns.
2 Make sure that screw (1) has returned to the original, marked position of screw (1).
3 Tighten nut (3) and safety with lockwasher (2).

(c)Connection of bonding straps (8, 9) (Ref. Fig. 402)

1 Position bonding straps (8, 9).
2 Install bolts (14) and washers (12) and safety with lockwire.

(d)Connection of manifolds (Ref. Fig. 403)

NOTE : The attachments of manifold (15, 16) are similar.
NOTE : Make sure that filter (25) and bobbin (26) is installed.
1 Position manifold (15) and/or (16) on actuator.
2 Install bolts (17) and washers (18).
3 TORQUE bolts (17) to between 0.91 and 1.13 m.daN (6.71 and 8.33 lbf.ft.) and safety with lockwire.
4 Remove container for hydraulic fluid spillage.

(e)Installation of brackets (5) (Ref. Fig. 403)

NOTE : This step is only applicable for the installation of the upper actuator 3CY2.

1 Position cable looms and brackets (5) on marked positions on frame base plate (10).
2 Install lower screws (9), nuts (6), washers (7) and clips (8).
3 Tighten upper screws (9).
4 Install screws (1) and washer (2) for cable clamp (3).
5 Apply sealing lacquer (Mat. No. 16-003) to screw (1).

(f)Remove blanking caps and connect the following electrical connectors (Ref. Fig. 403).

1 On upper actuator 3CY2: 3CY2-A, 3CY2-B and 3CY2-C
2 On lower actuator 3CY1: 3CY1-A, 3CY1-B and 3CY1-C

NOTE : The color of the electrical connectors is in no way related to the color coding of the hydraulic systems.

D. Test (Ref. Fig. 401)

R (1)Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(2)Remove rigging pin P/N 98A27307549000 from aft detent bellcrank at torque tube assembly.
(3)Remove rigging pin P/N 98A27307541000 from elevator cable quadrant.
(4)Remove rigging pin P/N 0U131281 from artificial feel unit.
(5)Remove rigging pins P/N 98A27901007000 (Qty. 2) from elevator control bellcranks on control mechanism mounting beam in avionics compartment.

(6)Remove locking tool P/N 97A27302009000 from pitch trim control wheel in flight compartment.
(7)Remove warning notices.
(8)Remove safety clips and tags, and close circuit breakers 5CY1, 305CY1, 306CY1, 305CY2 and 5CY2.
(9)Make certain that travel ranges of elevator controls are clear.
(10)Check that all hydraulic connections are free from leaks.
(11)Carry out functional test of elevator controls (Ref. 27-31-00, P, Block 501).

(12)Carry out functional test for load required to operate elevator control check (Ref. 27-33-00 P. Block 501).

E. Close-Up

CAUTION : ARTIFICIAL FEEL UNIT ACTUATOR PISTON RODS MUST NOT BE TREATED WITH MOISTURE-REMOVING OIL.

(1)Check coating of moisture-removing oil (Mat. No. 05-027) for good conditon on pitch artificial feel actuator assembly and renew as necessary (Ref. 51-75-10, P. Block 801).
(2)Position baffle plate (4) on clip (5).
(3)Install bolts (3), washers (2) and nuts (1).
(4)Install cover assembly (Ref. 27-31-00, P. Block 301).
(5)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(6)Close access door 312AR and 313AL.
(7)Remove access platform.
(8)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) and disconnect electrical ground power unit.

ARTIFICIAL FEEL UNIT POSITION DETECTION MICROSWITCH 304CY
REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : AFTER ANY DISCONNECTION WITHIN THE PITCH FEEL SYSTEM, A FUNCTIONAL TEST OF SYSTEM (REF. 27-33-00, P. BLOCK 501) MUST BE PERFORMED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18.0 ft.)
B. 0U131281	Pin - Rigging, Artificial Feel Unit, Elevator Mechanical Controls
C. 97A27302009000	Locking Tool - Pitch Trim Control Wheel
D. 98A27901007000	Pin - Rigging, Elevator Control (Qty. 2)
E. 35M5M01150000 or	Test Set DADC
R 35M5M01150001	Test Set DADC
F.	Torque Wrench, 0.07 to 0.5 m.daN (6.2 to 44.25 lbf.in.)
G.	Electrical Connector Protective Caps/Plugs
H.	Circuit Breaker Safety Clips
J.	Corrosion-Resistant Steel Lockwire, 0.6 mm (0.024 in.) dia.
K.	Warning Notices
L. Material No. 05-027	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-31-00, P. Block 301	Mechanical Control and Pitch Uncoupling
- 27-33-00, P. Block 501	Artificial Feel (Elevator)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 51-75-10, P. Block 801	Repair of Paint Coatings

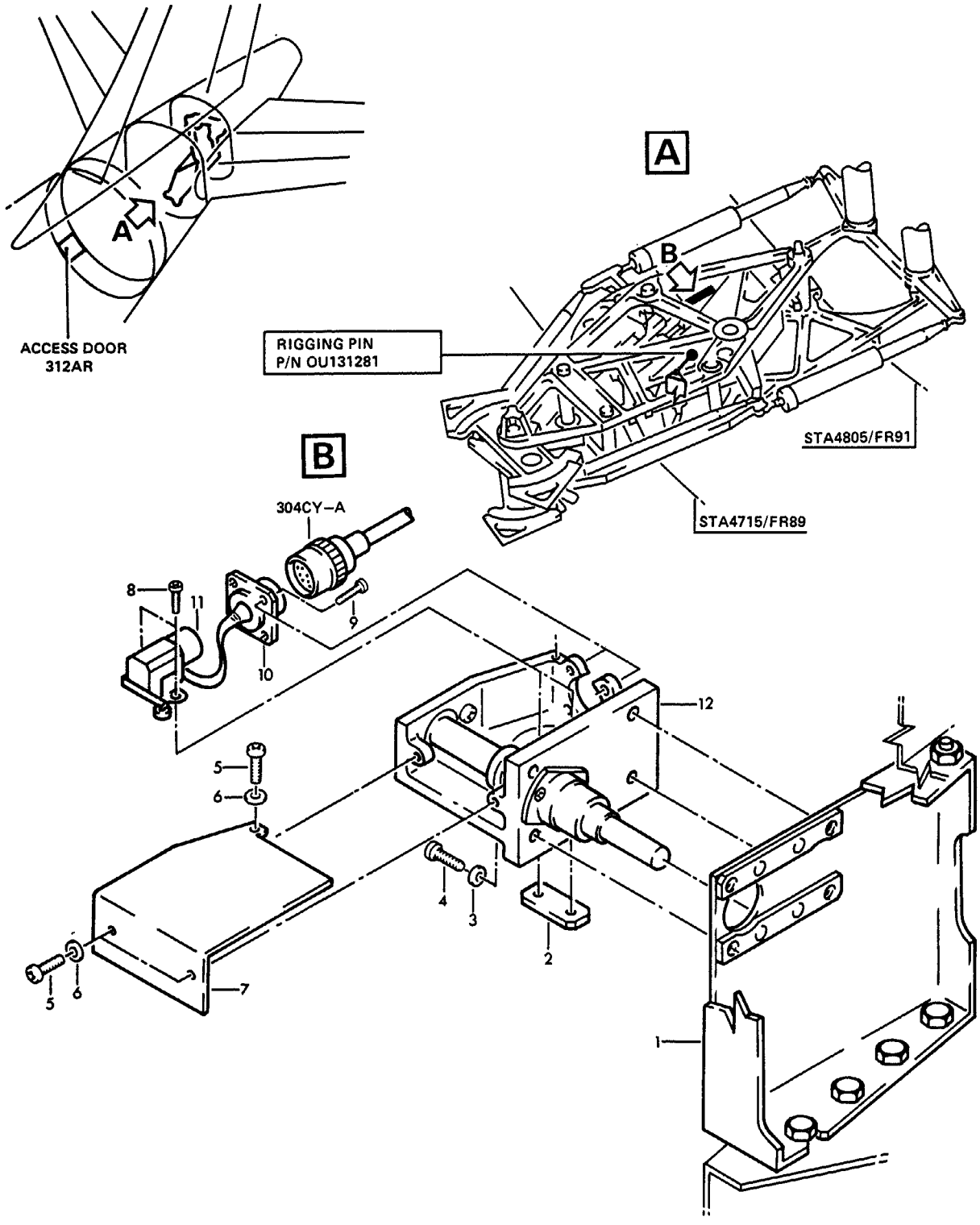
2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Make certain that horizontal stabilizer pitch trim control is set at zero, and install locking tool P/N 97A27302009000 at pitch trim control wheel in flight compartment.
(3)Make certain that elevator controls are set at neutral, and install rigging pins P/N 98A27901007000 (Qty. 2) in elevator control bellcranks on control mechanism mounting beam in avionics compartment.
(4)Display warning notices in flight compartment prohibiting operation of flight controls.
(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	ARTF FEEL/FLC 1		101/J 1 to J 3
21VU	ARTF FEEL/FLC 2		101/J 4 to J 5

(6)Open access door 312AR.
(7)Gain access to artificial feel unit (Ref. 27-31-00, P. Block 301).
(8)Install rigging pin P/N 0U131281 in artificial feel unit.

B. Removal (Ref. Fig. 401)
NOTE : Either the switch system or the microswitch assembly may be removed.
(1)Disconnect electrical connector 304CY-A and cap open line end and electrical connector.
(2)Removal of switch system (12).
(a)Cut and remove lockwire and remove screws (4), washers (3) and switch system (12).
(3)Removal of microswitch assembly (10, 11).
(a)Cut and remove lockwire and remove screws (5), washers (6) and cover (7).
(b)Cut and remove lockwire and remove screws (8, 9), plate (2) and microswitch assembly (10, 11).



Position Detection Microswitch
Figure 401

C. Installation (Ref. Fig. 401)

(1) Install microswitch assembly (10, 11) with plate (2) and screws (8, 9). Do not fully tighten screws (8) at this stage.

(2) TORQUE screws (9) to between 0.07 and 0.09 m.daN (6.19 and 7.96 lbf.in.) and safety with lockwire.

(3) Install switch system (12) on support (1) at artificial feel unit with screws (4) and washers (3).

(4) TORQUE screws (4) to between 0.4 and 0.5 m.daN (35 and 44 lbf.in.) and safety with lockwire.

(5) Remove protective caps from plug and from line end and connect electrical connector 304CY-A.

(6) Remove rigging pins P/N 0U131281 and P/N 98A27901007000 (Qty. 2) and locking tool P/N 97A27302009000.

(7) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301.

(8) Connect hydraulic ground power cart and pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).

(9) Remove safety clips and tags, and close circuit breakers, ARTF FEEL/ FLC 1 and FLC 2, previously opened in Para. 2. A. (5).

(10) On SERVO CTL section of panel 428VU, make certain that B, G and Y push-button switches are pressed (legends OFF).

(11) Make certain that travel ranges of artificial feel unit are clear of tools and miscellaneous items of equipment.

D. Adjustment/Test (Ref. Fig. 401, 402)

NOTE : The microswitch (11) can only be finally adjusted during test. Cover (7) will be installed after test.

(1) Move THSA to +2° (nose-down) position and simulate a speed near 200 kts using test set P/N 35M5M01150000 or 35M5M01150001.

(2) Check that actuators extend to position 'a'=26 mm (1.0236 in.).

R

(3) Adjust microswitch as follows:

(a) When extending from Low Speed to High Speed, microswitch ANNUN LT comes ON at position 'a'=28.5 +0 -2.5 mm (1.1220 +0 -0.0984 in.).

(b) When retracting from High Speed to Low Speed, microswitch ANNUN LT goes OFF at position 'a'=26.0 +2.5 -0 mm (1.0236 +0.0984 -0 in.).

(4) Adjust reversing microswitch (11) as near as possible to 26 mm (1.0236 in.) position.

R If the adjustment is not possible following para (3)or no shift of
R microswitch ANNUN LT is noted as per para (2), check the contact
R between roller and the cam follower.

(5) Fully retract actuator extension and make certain that microswitch roller (13) is not in contact with guide (15).

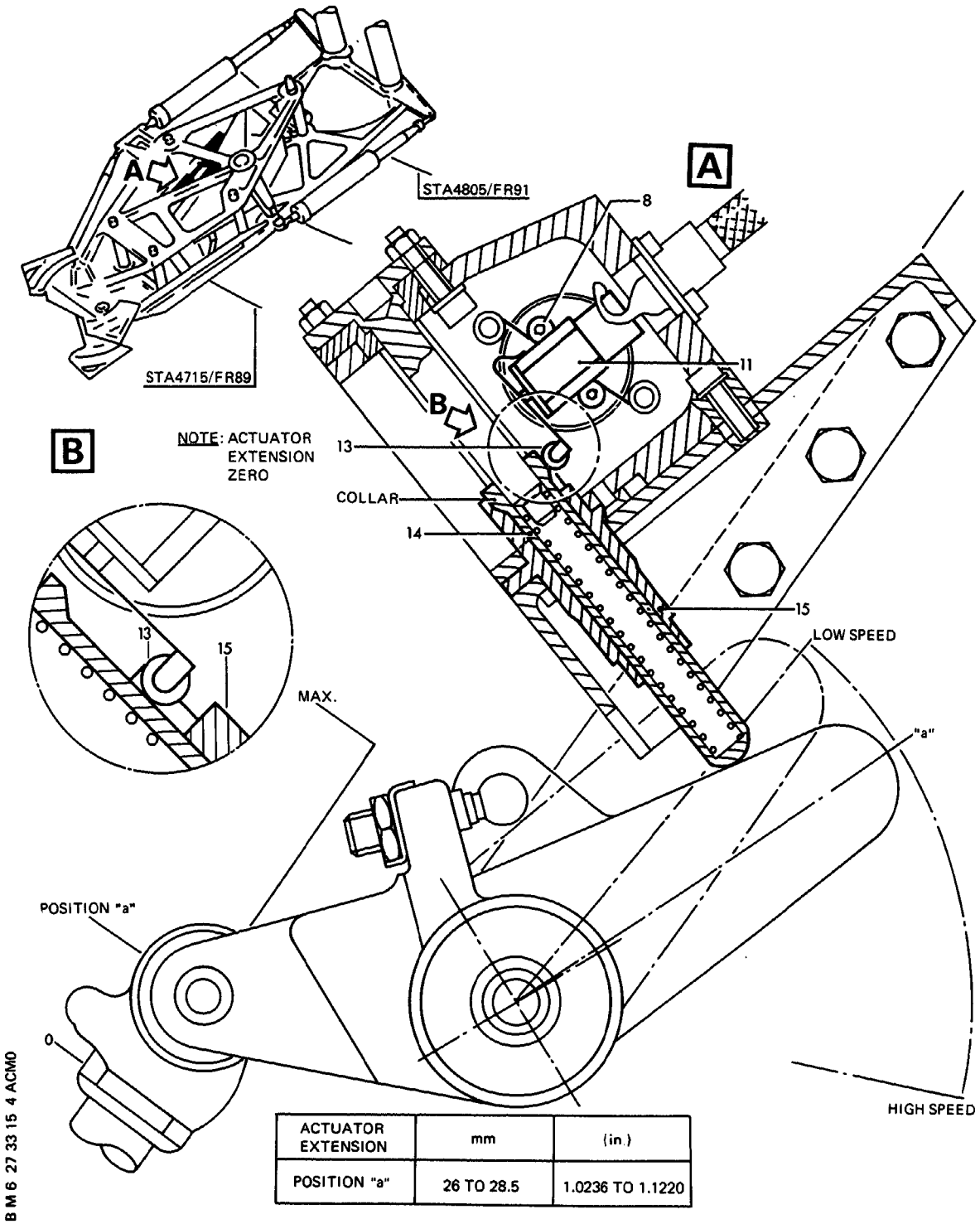
(6) TORQUE screws (8) to between 0.07 and 0.09 m.daN (6.19 and 7.96 lbf.in.) and safety with lockwire.

(7) Carry out test of disagree warning, which is part of artificial feel operational test (Ref. 27-33-00, P. Block 501).

(8) Install cover (7) with washers (6) and screws (5).

(9) TORQUE screws (5) to between 0.07 and 0.09 m.daN (6.19 and 7.96 lbf.in.) and safety with lockwire.

(10) Carry out artificial feel functional test (Ref. 27-33-00, P. Block 501).



ACTUATOR EXTENSION	mm	(in.)
POSITION "a"	26 TO 28.5	1.0236 TO 1.1220

Position Detection Microswitch - Adjustment
Figure 402

E. Close-Up
(1)Check coating of moisture-removing oil (Mat. No. 05-027) for good condition on microswitch system (12) and renew as necessary (Ref. 51-75-10, P. Block 801).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Shut down and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(4)De-energize the aircraft electrical network and disconnect ground power unit (Ref. 24-41-00, P. Block 301).
(5)Install cover assembly (Ref. 27-31-00, P. Block 301).
(6)Close access door 312AR.
(7)Remove warning notices.
(8)Remove access platform.

HYDRAULIC ACTUATION (ELEVATOR) - DESCRIPTION AND OPERATION

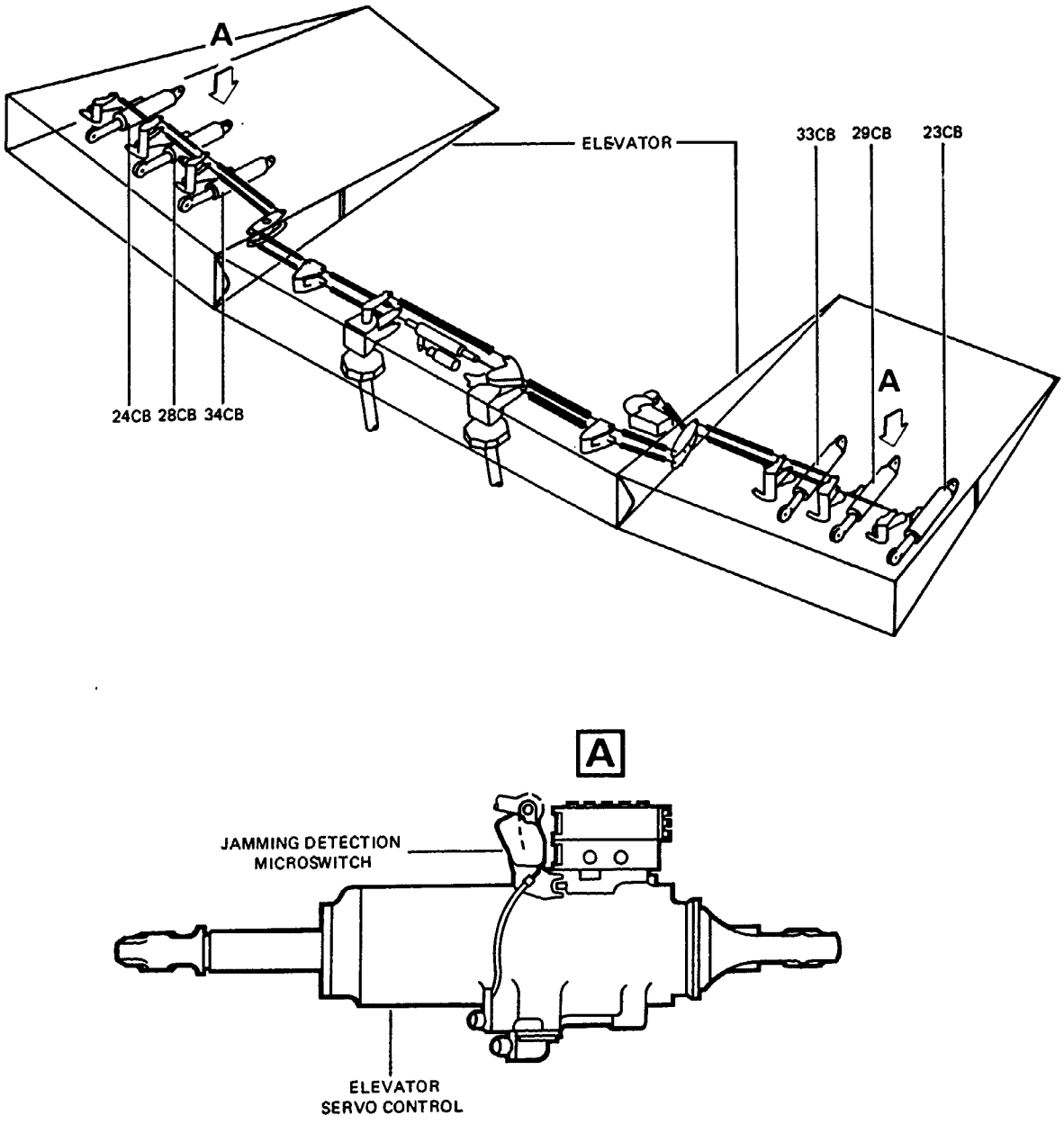
1. General

Hydraulic actuation is achieved by six mechanical input servo controls, three per elevator. Each servo control on a given elevator is powered by a different hydraulic system (Ref. 27-00). The servo controls are associated with a control valve jamming detection system (Ref. 27-14).

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
23CB	SERVO CTL-L ELEVATOR, BLUE		334	334BB	27-34-11
24CB	SERVO CTL-R ELEVATOR, BLUE		344	344BB	27-34-11
28CB	SERVO CTL-R ELEVATOR, GREEN		344	344BB	27-34-11
29CB	SERVO CTL-L ELEVATOR, GREEN		334	334BB	27-34-11
33CB	SERVO CTL-L ELEVATOR, YELLOW		334	334BB	27-34-11
34CB	SERVO CTL-R ELEVATOR, YELLOW		344	344BB	27-34-11
	MICROSWITCH-ELEV SERVO CTL JAMMING DETECTION, L		334	334BB	27-34-12
	MICROSWITCH-ELEV SERVO CTL JAMMING DETECTION, R		344	344BB	27-34-12



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Component Location
Figure 001

3.Component Description

A. Elevator Servo Control (Ref. Fig. 002, 003)

(1)General

The servo controls are interchangeable.

(2)Normal operation with the servo control pressurized

Same as for the rudder servo control (Ref. 27-24).

(3)Operation in the event of control valve jamming

When the input force is higher than preloaded spring (4) force, roller (9) moves onto its cam. This depresses microswitch (3) which transmits a warning signal to the crew via the jamming detection system (Ref. 27-14). The crew must then shut off the power supply from the hydraulic system involved. The warning is provided to prevent asymmetrical deflection of the elevators in the event of hidden control valve jamming plus loss of hydraulic pressure.

(4)Operation on the ground with the servo control depressurized. Same as for rudder servo control (Ref. 27-24).

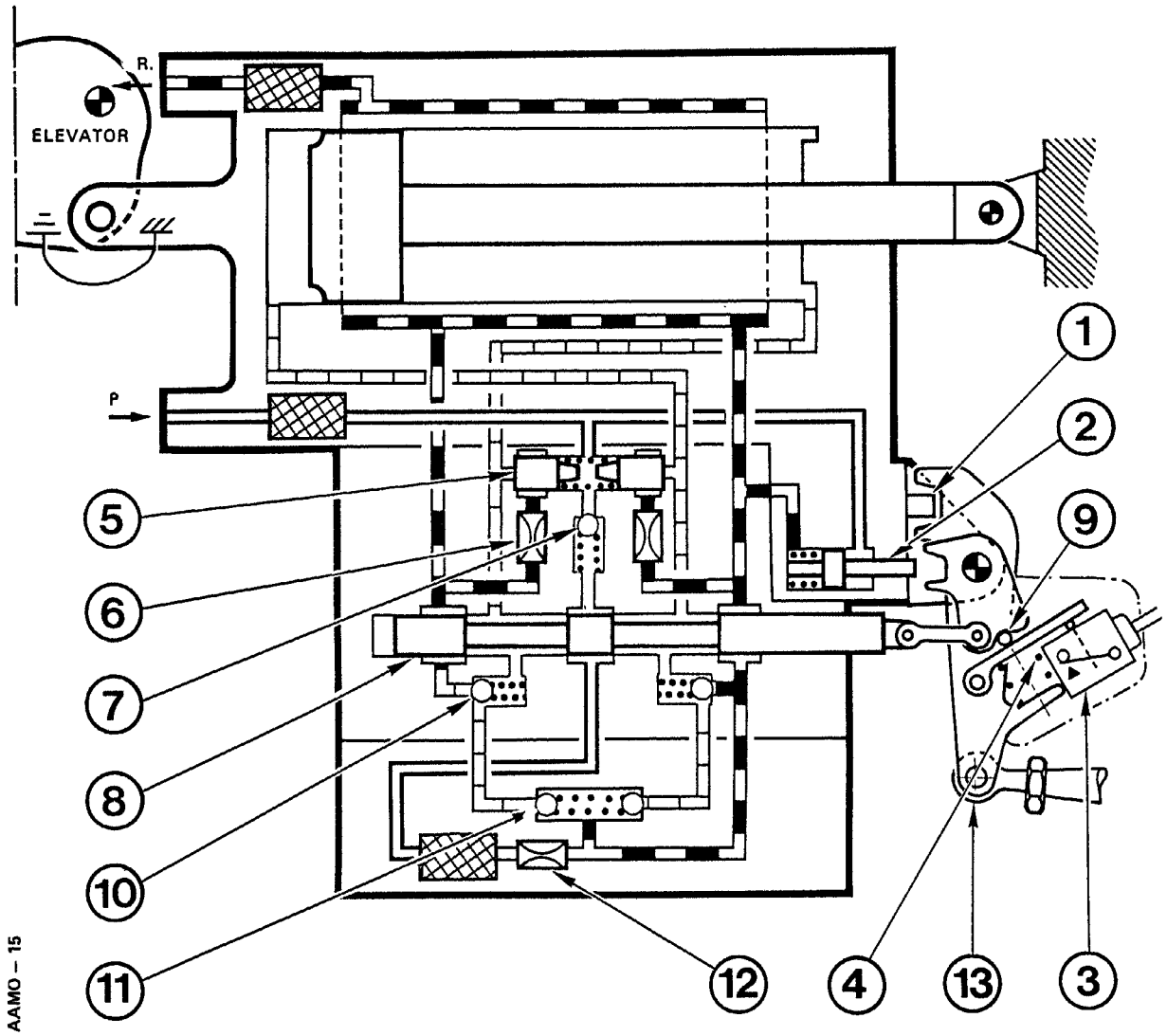
(5)Ground test device Same as for rudder servo control (Ref. 27-24).

(6)Maintenance Same as for rudder servo control (Ref. 27-24).

(7)Leading particulars

(a)Mechanical

Piston area	
. Large	25.61 cm² (3.97 in.²)
. Small (annular)	19.00 cm² (2.95 in.²)
Stall load (for HP = 200 bars/2900 psi and LP = 5 bars/73 psi)	
. Extension	5027 daN (11,322 lbf.)
. Retraction	3672 daN (8270 lbf.)
Operating stroke	107.3 mm (4.22 in.)
corresponding to elevator deflection of	30° A/C nose up 15° A/C nose down
Stop-to-stop stroke	122.32 mm (4.82 in.)
Maximum jamming detection spring breakout force	50 N (11.26 lbf.)
Maximum input lever operating force	2 N (0.45 lbf.)
Weight (filled with fluid)	11.4 kg (25.13 lb.)



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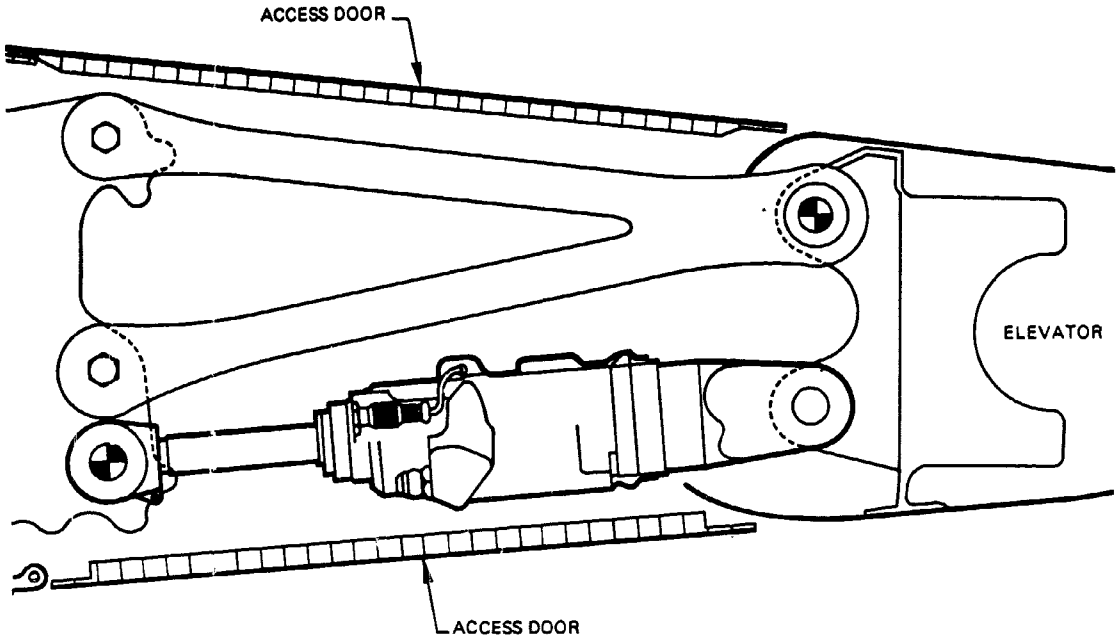
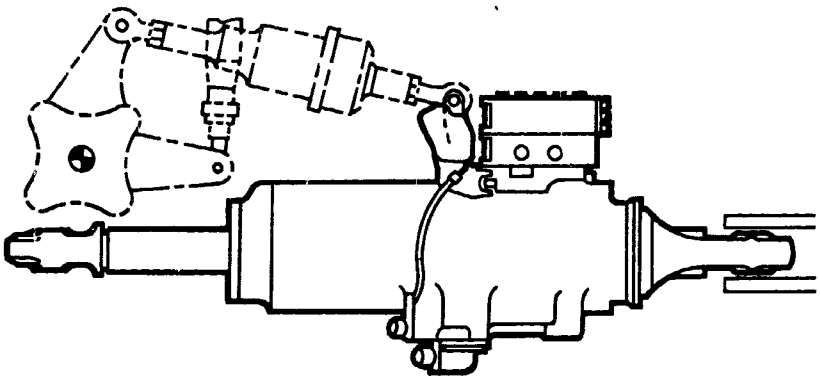
1 – INPUT LEVER STOP
2 – GROUND TEST STOP
3 – JAMMING DETECTION MICROSWITCH
4 – PRELOADED SPRING
5 – PRESSURE CONTROLLED RELIEF VALVE
6 – GROUND DAMPING ORIFICE
7 – CHECK VALVE
8 – CONTROL VALVE
9 – CAM/ROLLER
10 – ANTI CAVITATION CHECK VALVE
11 – RELIEF VALVE
12 – HEATING ORIFICE
13 – INPUT LEVER

Elevator Servo Control
Figure 002





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Elevator Servo Control - Installation
Figure 003

(b)Hydraulic

Maximum speed without external load, in degrees/s of elevator deflection

- Extension----------34 ±4°/s
- Retraction----------42 ±5°/s

Corresponding to a maximum flow (l/mn) for HP = 202.6 bars (29.38 psi) and LP = 4 bars (58 psi)

- Extension----------14 l/mn (3.7 US gal/mn)
- Retraction----------12.8 l/mn (3.38 US gal/mn)

Maximum internal leakage

- When new----------0.800 l/mn (0.21 US gal/mn)
- Permissible in service----------2.4 l/mn (0.63 US gal/mn)

Maximum external leakage

- When new----------1 drop/mn
- Permissible in service----------15 drops/mn

1. Operational/Functional Test
   Refer to 27-14-00, P. Block 501.

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF THE CONTROLS.

R

NOTE : SHUR-LOK and STA-LOK Locking systems are interchangeable.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, up to 8.0 m (26 ft.)
B.	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz
C. EMH1569S	Cart - Hydraulic Ground Power Supply, 150 l/min (36.6 USGPM)
D. 98A27307549000	Pin, Rigging, Elevator Control Bellcranks
E. TR12-18	Rigmaster system
F. TR31	Rigmaster system - Protactor (Qty. 2)
or	
G. 98A27308005000	Protactor - Control Surface Deflection
H. 98A27408018000	Socket Wrench Set - Elevator Bearings
J. 98A27907509000	Tool Set - Extraction/Insertion, SHUR-LOK (for SHUR-LOK Locking System)
K. SL90.313-0.7500	Tool - Installation, Tab Washers STA-LOK NSA5454 (for STA-LOK Locking System)
L. SL90.314-0.7500	Tool - Extraction, Tab Washers STA-LOK NSA5454 (for STA-LOK Locking System)
M. SL90.374-0.7500	Wrenches - Notched, Tightening of Nuts NSA5454 (for STA-LOK Locking System)
N.	Torque Wrench, up to 3.0 m.daN (22.0 lbf.ft.)
P.	Circuit Breaker Safety Clips
Q.	Container - Hydraulic Fluid
R.	Electrical Connection - Blanking Caps
S.	Hydraulic Line - Blanking Caps/Plugs
T.	Cotter Pins
U.	Warning Notices
V.	Corrosion-Resistant Steel Lockwire,

	ITEM	DESIGNATION
		0.8 mm (0.032 in.) dia.
	W. Material No. 04-004	Common Greases (Ref. 20-31-00)
	X. Material No. 05-002	Special Materials (Ref. 20-31-00)
R	Y. Material No. 05-005	Special Materials (Ref. 20-31-00)
R	Z. Material No. 09-013	Sealants (Ref. 20-31-00)
	Referenced Procedures	
	- 20-28-11, P. Block 1	Electrical Bonding
	- 24-41-00, P. Block 301	AC External Power Control
	- 27-31-00, P. Block 501	Mechanical Control and Pitch Uncoupling
	- 27-31-22, P. Block 401	THS Bellcranks
	- 27-31-23, P. Block 401	Servo Control Actuating Spring Rod
	- 27-34-12, P. Block 401	Servo Control Jamming Detection Microswitches
	- 27-35-00, P. Block 501	Control Surface Position Indicating (Elevator)
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 51-75-10, P. Block 801	Repair of Paint Coatings
	- 55-13-13, P. Block 401	Trailing Edge Access Panels
	- 55-22-13, P. Block 401	Leading Edge Access Panels

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Make certain that elevator and trimmable horizontal stabilizer controls are set at neutral position.
NOTE : Check and record elevator neutral positions (trailing edge aligned with alignment marks, located on tail cone side skins).
(3)Display warning notices in flight compartment prohibiting operation of flight controls.
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL/ & THS/HYD/SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL/ & THS/JAM/DET	2CB	332/U64
133VU	FLT CTL/TRIM/AIL	3CG	331/V63
133VU	FLT CTL/SURF/POS	1CT	334/S61

(5)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301) and display warning notices, prohibiting pressurization.
(6)Open access panels associated with servo control to be removed:
LH panels 334CT, 334CB (Ref. 55-13-13, P. Block 401) and 335BT, 335BB (Ref. 55-22-13, P. Block 401).
RH panels 344CT, 344CB (Ref. 55-13-13, P. Block 401) and 345BT, 345BB (Ref. 55-22-13, P. Block 401).
(7)Install rigging pin P/N 98A27307549000 in bellcrank at RIB9 of horizontal stabilizer.

** ON ELEVATOR SERVO CONTROLS WITH SHUR-LOK LOCKING SYSTEM

B. Removal

** ON ELEVATOR SERVO CONTROL P/N 30504

(Ref. Fig. 401)

** ON ELEVATOR SERVO CONTROL P/N 31043

(Ref. Fig. 402)

** ON ALL ELEVATOR SERVO CONTROLS

CAUTION : IT IS ESSENTIAL TO IDENTIFY BOLTS, BUSHES AND SIMILAR SMALL COMPONENTS AT EACH CONNECTION, TO ENSURE INSTALLATION IN ORIGINAL POSITIONS.

(1) Remove control bellcrank (Ref. 27-31-22, P. Block 401) and servo control actuating spring rod (15) (Ref. 27-31-23, P. Block 401).
(2) Position container for hydraulic fluid spillage.
(3) Disconnect hydraulic hoses (11) and drain residual hydraulic fluid into container.
(4) Cap and plug hydraulic hoses and servo control ports.
(5) Remove nut (9) and disconnect electrical connector (12) from jamming detection microswitch and install blanking caps.

** ON ELEVATOR SERVO CONTROL P/N 30504

(6) Remove nut (18), washer (17) and disconnect bonding strap (16).

** ON ELEVATOR SERVO CONTROL P/N 31043

(6) Remove screw (18), washer (17) and disconnect bonding strap (16).

** ON ALL ELEVATOR SERVO CONTROLS

(7) Remove cotter pins (3, 22).
(8) Remove lockwashers (6, 25) using SHUR-LOK tool set P/N 98A27907509000.
(9) Remove slotted ring nuts (5, 24) using socket wrench set P/N 98A27408018000.
(10) Remove cupwashers (4, 23).
(11) Support servo controls (10).
(12) Remove bolts (1, 19) and washer (20).

** ON ELEVATOR SERVO CONTROL P/N 30504

CAUTION : SERVO CONTROL WEIGHS APPROX. 11 kg (25 lb.).

** ON ELEVATOR SERVO CONTROL P/N 31043

CAUTION : SERVO CONTROL WEIGHS APPROX. 8.5 kg (19 lb.).

** ON ALL ELEVATOR SERVO CONTROLS

(13)Remove servo control (10) and bush (2).
(14)Remove washers (8, 14) and bushes (7, 13).

** ON ELEVATOR SERVO CONTROL LS WITH STA-LOK LOKING SYSTEM

B. Removal

** ON ELEVATOR SERVO CONTROL P/N 30504

(Ref. Fig. 401)

** ON ELEVATOR SERVO CONTROL P/N 31043

(Ref. Fig. 402)

** ON ALL ELEVATOR SERVO CONTROLS

CAUTION : IT IS ESSENTIAL TO IDENTIFY BOLTS, BUSHES AND SIMILAR SMALL COMPONENTS AT EACH CONNECTION, TO ENSURE INSTALLATION IN ORIGINAL POSITIONS.

(1)Remove control bellcrank (Ref. 27-31-22, P. Block 401) and servo control actuating spring rod (15) (Ref. 27-31-23, P. Block 401).
(2)Position container for hydraulic fluid spillage.
(3)Disconnect hydraulic hoses (11) and drain residual hydraulic fluid into container.
(4)Cap and plug hydraulic hoses and servo control ports.
(5)Remove nut (9) and disconnect electrical connector (12) from jamming detection microswitch and install blanking caps.

** ON ELEVATOR SERVO CONTROL P/N 30504

(6)Remove nut (18), washer (17) and disconnect bonding strap (16).

** ON ELEVATOR SERVO CONTROL P/N 31043

(6)Remove screw (18), washer (17) and disconnect bonding strap (16).

** ON ALL ELEVATOR SERVO CONTROLS

(7)Remove cotter pins (3, 22).
R (8)Remove retaining ring (36, 45) using STA-LOK extractor

R P/N SL90.314-0.7500
R (9)Remove ring nuts using notched wrench P/N SL90.374-0.7500.
(10)Remove cupwashers (4, 23).
(11)Support servo controls (10).
(12)Remove bolts (1, 19) and washer (20).

** ON ELEVATOR SERVO CONTROL P/N 30504

CAUTION : SERVO CONTROL WEIGHS APPROX. 11 kg (25 lb.).

** ON ELEVATOR SERVO CONTROL P/N 31043

CAUTION : SERVO CONTROL WEIGHS APPROX. 8.5 kg (19 lb.).

** ON ALL ELEVATOR SERVO CONTROLS

(13)Remove servo control (10) and bush (2).
(14)Remove washer (8, 14) and bushes (7, 13).

C. Preparation for Installation

(1)Check identification placards on servo controls:
LH side:
- 3160 - For Yellow hydraulic system - inboard servo control.
- 1160 - For Green hydraulic system - middle servo control.
- 2160 - For Blue hydraulic system - outboard servo control.

RH side:
- 3161 - For Yellow hydraulic system - inboard servo control.
- 1161 - For Green hydraulic system - middle servo control.
- 2161 - For Blue hydraulic system - outboard servo control.

(2)Check condition of all bolts, bushes etc.
(3)Apply grease (Mat. No. 04-004) or special material (Mat. No 05-002) to all bolts and threaded fasteners.

** ON ELEVATOR SERVO CONTROL WITH SHUR-LOK LOCKING SYSTEM

D. Installation

** ON ELEVATOR SERVO CONTROL P/N 30504

(Ref. Fig. 401)

** ON ELEVATOR SERVO CONTROLS P/N 31043

(Ref. Fig. 402)

** ON ALL ELEVATOR SERVO CONTROLS

(1)Apply sealant (Mat. No. 09-013) to washer (8).
(2)Install bushes (7, 13) and washer (8, 14).
(3)Position servo control (10).
(4)Install bush (2) and bolt (1).
(5)Install washer (20) and bolt (19).

(6)Install cupwashers (4, 23) and slotted ring nuts (5, 24).
(7)TORQUE slotted ring nuts (5, 24) to between 2.21 and 2.70 m.daN (16.30 and 20.0 lbf.ft.) using socket wrench set P/N 98A27408018000.
(8)Install lockwashers (6, 25) using SHUR-LOK tool set P/N 98A27907509000.
(9)Install cotter pins (3, 22).

** ON ELEVATOR SERVO CONTROL P/N 30504

(10)Position bonding strap (16), install washer (17) and nut (18). For electrical bonding refer to 20-28-11, P. Block 1.

** ON ELEVATOR SERVO CONTROL P/N 31043

(10)Position bonding strap (16), install washer (17) and screw (18). For electrical bonding refer to 20-28-11, P. Block 1.

** ON ALL ELEVATOR SERVO CONTROLS

(11)Install control bellcrank (Ref. 27-31-22, P. Block 401).
(12)Install servo control actuating spring rod (15) (Ref. 27-31-23, P. Block 401).
(13)Remove caps and plugs from hydraulic hoses (11) and from servo control ports, and connect hoses to servo control.
(14)Remove protective caps from plug and from open line end position electrical connector (12), install nut (9) and connect jamming detection microswitch to electrical connector (12).
(15)Remove hydraulic fluid container from working area and make certain that all excess fluid is cleaned off all components.
(16)Coat all visible cadmium-plated steel parts with corrosion-preventive compound (Mat. No. 05-005) (Ref. 51-75-10, P. Block 801).

** ON ELEVATOR SERVO CONTROLS WITH STA-LOK LOCKING SYSTEM

D. Installation

** ON ELEVATOR SERVO CONTROL P/N 30504

(Ref. Fig. 401)

** ON ELEVATOR SERVO CONTROL P/N 31043

(Ref. Fig. 402)

** ON ALL ELEVATOR SERVO CONTROLS

(1)Apply sealant (Mat. No. 09-013) to washer (8).
(2)Install bushes (7, 13) and washers (8, 14).
(3)Position servo control (10).
(4)Install bush (2) and bolt (1).
(5)Install washer (20) and bolt (19).
(6)Install cupwashers (4, 23) and ring nuts (35, 44).
(7)TORQUE nuts (35, 44) to between 2.21 and 2.70 m.daN (16.30
R and 20.0 lbf.ft.) using notched wrench P/N SL90.374-0.7500.
(8)Install retaining ring (36, 45) using STA-LOK tab washer installation
R tool P/N SL90.313-0.7500.
(9)Install cotter pins (3, 22).

** ON ELEVATOR SERVO CONTROL P/N 30504

(10)Position bonding strap (16), install washer (17) and nut (18). For electrical bonding refer to 20-28-11, P. Block 1.

** ON ELEVATOR SERVO CONTROL P/N 31043

(10)Position bonding strap (16), install washer (17) and screw (18). For electrical bonding refer to 20-28-11, P. Block 1.

** ON ALL ELEVATOR SERVO CONTROLS

(11)Install control bellcrank (Ref. 27-31-22, P. Block 401).
(12)Install servo control actuating spring rod (15) (Ref. 27-31-23, P. Block 401).
(13)Remove caps and plugs from hydraulic hoses (11) and from servo control ports, and connect hoses to servo control.
(14)Remove protective caps from plug and from open line. Position electrical connector (12), install nut (9) and connect jamming detection microswitch to electrical connector (12).
(15)Remove hydraulic fluid container from working area and make certain that all excess fluid is cleaned off all components.
(16)Coat all visible cadmium-plated steel parts with corrosion-preventive compound (Mat. No. 05-005) (Ref. 51-75-10, P. Block 801).

E. Bleeding of Servo Control
(1)Remove rigging pin P/N 98A27307549000.
(2)Remove all safety clips and tags and close circuit breakers 1CB, 2CB, 3CG and 1CT.
(3)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Make certain that electronics racks ventilation is correct.
(5)Connect hydraulic ground power cart and pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(6)Make certain that travel ranges of elevator and servo controls are clear of tools and miscellaneous items of equipment.
(7)Make certain that B/G/Y pushbutton switches on SERVO CTL section of panel 428VU are pressed in (legends OFF).
(8)To bleed servo controls, operate control column to deflect elevator surfaces.
(9)Repeat this operation ten times and return control column to neutral position.
(10)Check that hydraulic connections are free from leaks.

F. Adjustment/Test
NOTE : If three servo controls have been replaced on either side, carry out adjustment of elevator to neutral position (Ref. 27-31-00, P. Block 501).
(1)Install rigging pin P/N 98A27307549000 in bellcrank at RIB9.
(2)Install rigmaster system P/N TR12-18 and rigmaster system protractor P/N TR31 or alternatively protractor P/N 98A27308005000 and set

to zero.

NOTE : Make certain that head piece of protractor is at right angles to stabilizer trailing edge.

(3)Test of servo control

NOTE : Outboard servo contol - B pushbutton switch
Center servo control - G pushbutton switch
Inboard servo control - Y pushbutton switch

NOTE : Only Green hydraulic system replacement servo control test is described. The Yellow and Blue hydraulic system servo control tests are similar.

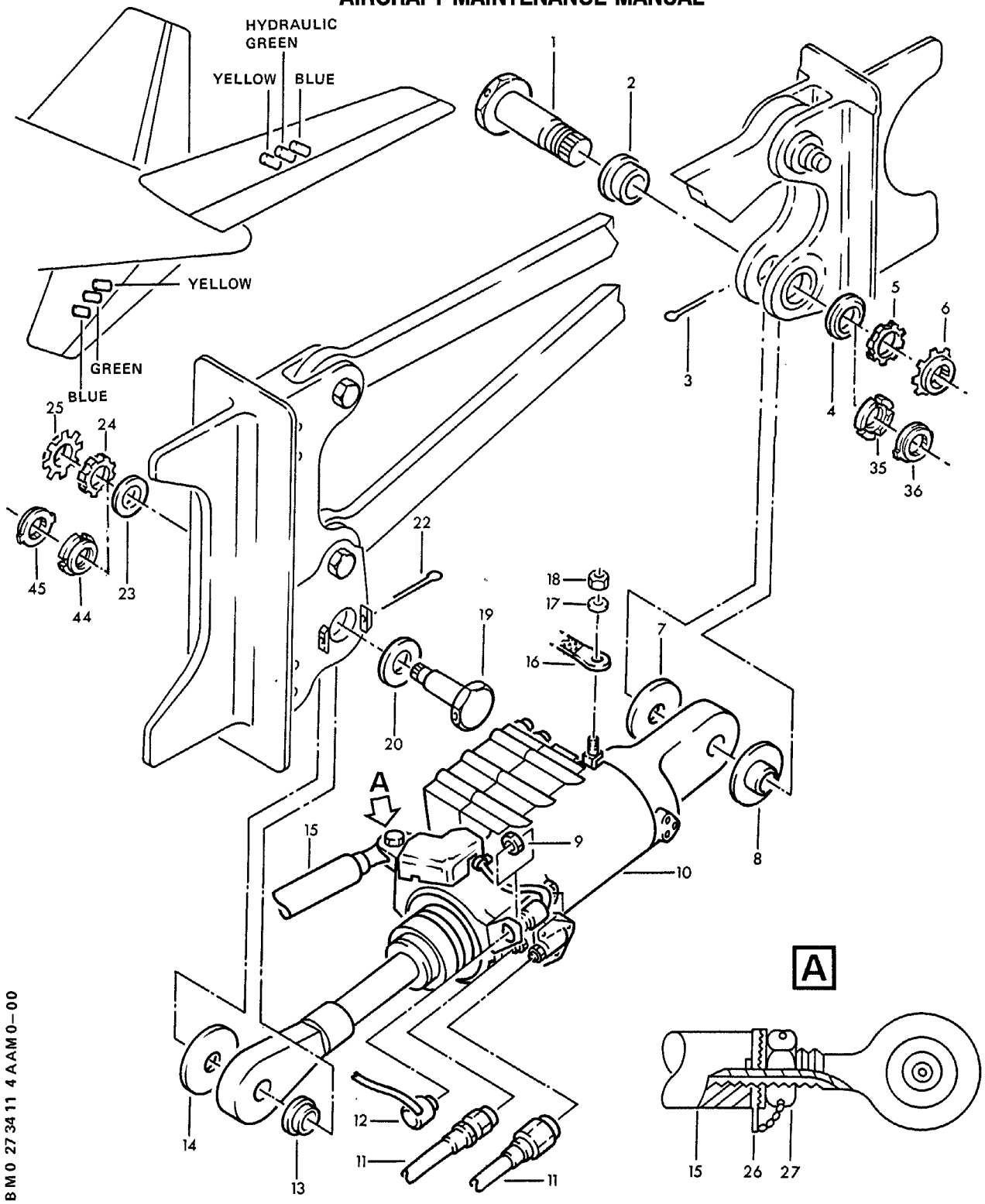
ACTION	RESULT
1. Check that elevator is in neutral as previously recorded.	
2. On SERVO CTL section of panel 428VU: - press pushbutton switch G. - release pushbutton switches B and Y. If elevator has moved adjust actuating spring rod (15) (Ref. Para. F.(5)).	Check that elevator has not moved from neutral.
3. On SERVO CTL section of panel 428VU: - release pushbutton switch G. - press pushbutton switch B. If elevator has moved adjust actuating spring rod (15) (Ref. Para. F.(5)).	Check that elevator has not moved from neutral.
4. On SERVO CTL section of panel 428VU: - release pushbutton switch B. - press pushbutton switch Y. If elevator has moved adjust actuating spring rod (15) (Ref. Para. F.(5)).	Check that elevator has not moved from neutral.
5. Remove rigging pin P/N 98A27307549000.	
6. ON SERVO CTL section of panel 428VU: - release pushbutton switch Y. - press pushbutton switch G.	
7. Move elevator to nose up stop. Should limit be exceeded adjust actuating spring rod (15) (Ref. Para. F.(5)).	Check that angle between elevator full deflection and neutral is 30- ± 1-.
8. Move elevator to nose down stop.	Check that angle between elevator

ACTION	RESULT
	full deflection and neutral is 15- ± 1-. 10' asymmetry maximum.
Should limit be exceeded adjust actuating spring rod (15) (Ref. Para. F.(5)).	

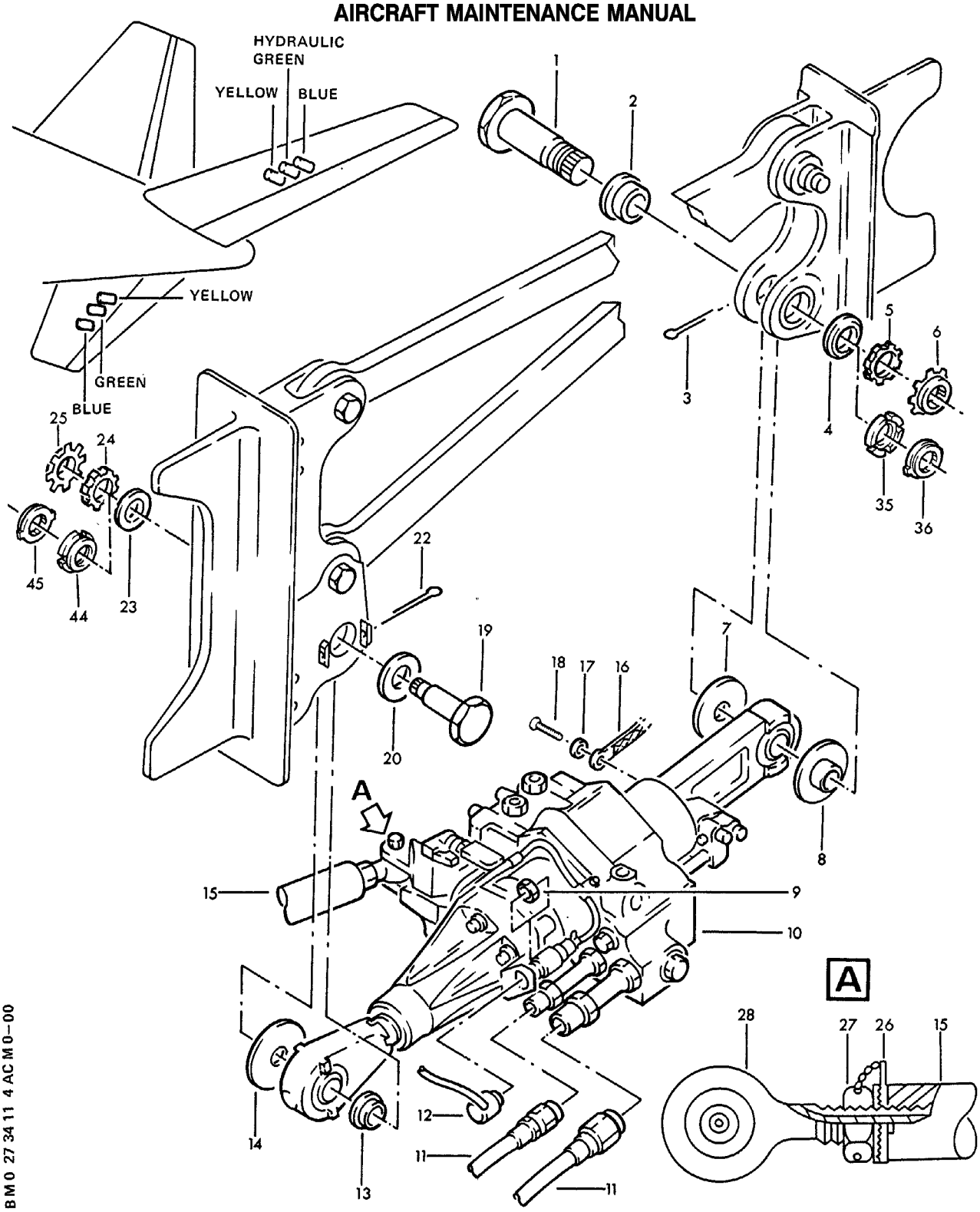
9. Move elevator to neutral.

(4) Check that elevators are in neutral position.
(5) Adjust actuating spring rod (15) on replacement servo control as follows:
(a) Cut and remove lockwire.
(b) Loosen nut (27) and serrated locking device (26).
(c) Adjust length by rotating spring rod body, until elevator is in neutral position.
(d) Engage serrated locking device (26), tighten nut (27).
(e) Make certain rod end threads are visible through inspection holes.
(f) Safety nut (27) with lockwire to serrated locking device (26).
(6) Make certain that hydraulic flexible hoses of elevator servo controls do not chafe on rear spar of horizontal stabilizer spar box.
(7) Remove rigmaster system P/N TR12-18, TR31, or protractor P/N 98A27308005000.
(8) Carry out jamming detection test (Ref. 27-34-12, P. Block 401).
(9) Carry out functional test of position indicating system (Ref. 27-35-00, P. Block 501).

H. Close-Up
(1) Shut down and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 310).
(2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(3) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4) Install access panels
334CB/CT and 344CB/CT (Ref. 55-13-13, P. Block 401)
335BB/BT and 345BB/BT (Ref. 55-22-13, P. Block 401)
(5) Remove warning notices.
(6) Remove access platform.



Elevator Servo Controls P/N 30504
Figure 401



Elevator Servo Controls P/N 31043
Figure 402

ELEVATOR SERVO CONTROL 23CB, 24CB, 28CB, 29CB, 33CB, 34CB
INSPECTION/CHECK

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT TRAVEL RANGES OF CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITIONS OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, up to 8 m (26 ft.).
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-34-11, P. Block 401	Elevator Servo Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 55-13-13, P. Block 401	Trailing Edge Access Panels

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Open access panels 334/344CB (Ref. 55-13-13, P. Block 401).

B. Inspection
(1)Visual Inspection
(a)Make a detail visual inspection of the elevator servo control bearings for evidence of extrusion of the self lubrication coating and for general condition.
- If damage has been found refer Para. 2.B.(2)(k).
- If corrosion and/or extrusion is found refer Para.2.B.(2)(l).

(2)Test
WARNING : MAKE CERTAIN THAT TRAVEL RANGES OF CONTROL SURFACES ARE CLEAR.
(a)Initial conditions:
- Correct electrical power supply.
- Forward services ventilation system in operation.
- Overhead and aft panel circuit breakers closed particularly those associated with FLT CTL and ECAM.
- Aircraft in ground configuration (LDG GEAR PROX DET & RELAYS circuit breakers closed).

(b)Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU.
- Make certain that B, G and Y pushbutton switches are pressed (legends off).

(d)Make certain that all control surfaces are set to zero.
(e)Make certain that flap and slat control lever is in first notch position (slats and flaps retracted).
(f)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.
(g)On ECAM control panel 11VU:
- press F/CTL pushbutton switch to display FLT CTL page on right ECAM display unit.
- adjust brightness on right ECAM display unit using RIGHT DISPLAY knob.

(h)Servo Control Location

HYDRAULIC SYSTEM LOCATION	
BLUE	OUTBOARD SERVO CONTROL
GREEN	CENTER SERVO CONTROL
YELLOW	INBOARD SERVO CONTROL

(j)Test

NOTE : Test, using Green hydraulic system only is described.
Repeat this test using Blue and Yellow hydraulic systems.

ACTION	RESULT
1. On SERVO CTL section of panel 428VU: - release B and Y pushbutton switches.	
2. Move control column fully aft (nose up).	- Elevators move upwards. On right ECAM display unit: - bug reproduces motion.
3. Move control column fully forward (nose down).	- elevators move downwards. On right ECAM display unit: - bug reproduces motion.
4. Return control column to neutral position.	Check that bug returns to zero. - check that LH elevator is in neutral position. If not, check bearings on servo controls for damage.
5. On SERVO CTL section of panel 428VU: - press B and Y pushbutton switches.	

(k)If damage has been found replace bearing with needle bearing (Ref. Air Equipement SB 31043-27-03). For removal/installation of servo control refer to 27-34-11, P. Block 401.

(l)If damage and/or extrusion has been found replace the bearing. For removal/installation of servo control refer to 27-34-11, P. Block 401.

(m)Test completion:
- Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
- De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
- Restore aircraft to normal operating condition.

C. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Close access panels 334/344CB (Ref. 55-13-13 P. Block 401).

(3)Remove access platform.

SERVO CONTROL JAMMING DETECTION MICROSWITCHES - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

A. Removal/replacement of microswitches in situ

2. Equipment and Material

ITEM	DESIGNATION
A.	Access platform, up to 8 m (26 ft.)
B. EMH1569S	Cart - Hydraulic Ground Power Supply, 150 l/min (36.6 USGPM)
C.	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz
D.	Warning Notices
E.	Circuit Breaker Safety Clips
F.	Electrical Connector Protective Caps/Plugs
G.	Corrosion Resistant Steel Lockwire, 0.6 mm (0.024 in.) dia.
H.	Torque Wrench, up to 0.3 m.daN (26.55 lbf.in.)
J. Material No. 11-001	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 55-13-13, P. Block 401	Trailing Edge Access Panels

3. Procedure

A. Job Set-Up

(1)Position access platform.
(2)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(3)Display warning notices prohibiting pressurization of hydraulic systems and operation of flight controls.
(4)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	U64
133VU	FLT CTL/TRIM AIL	3CG	V63

(5)Open access panels associated with the microswitch to be removed:
LH panels 334CT, 334CB (Ref. 55-13-13, P. Block 401).
RH panels 344CT, 344CB (Ref. 55-13-13, P. Block 401).

(6)Jamming detection microswitches to be removed are identified as follows:

HYDRAULIC SYSTEM	JAMMING DETECTION MICROSWITCH		
	LOCATION	ELECTRICAL IDENTIFIER	
BLUE	OUTBOARD SERVO CONTROL	LH: 23CB	RH: 24CB
GREEN	CENTER SERVO CONTROL	29CB	28CB
YELLOW	INBOARD SERVO CONTROL	33CB	34CB

** ON ELEVATOR SERVO CONTROL P/N 30504
(BEFORE AIR EQUIPEMENT SB 27-31-0H)

B. Removal (Ref. Fig. 401)

(1)Disconnect electrical connector (11) and install protective cap/plug.
(2)Cut and remove lockwire from screws (1).
(3)Remove screws (1, 13), washers (2) and clamps (5, 14).
(4)Remove covers (3, 4).
(5)Cut and remove lockwire, remove screws (6) and microswitch assembly (15).

C. Preparation for Installation (Ref. Fig. 401)

NOTE : The jamming detection microswitch is supplied complete with nut (9), support bracket (8) and a factory-adjusted shim (10) thus requiring no further adjustment on installing.

(1)Clean installation area, screws, nuts and covers using cleaning agent (Mat. No. 11-001).
(2)Install attachment clamps (5, 14) to cable loom.

D. Installation (Ref. Fig. 401)

(1)Position microswitch assembly (15) and install screws (6).
(2)TORQUE screws (6) to between 0.071 and 0.087 m.daN (6.2 and 7.6 lbf.in.).
(3)Safety screws (6) with lockwire.
(4)Position covers (3, 4), clamp (5), washers (2) and install screws (1).
(5)Safety screws (1) with lockwire.
(6)Position clamp (14) and install screw (13).
(7)Remove protective cap/plug and connect electrical connector (11) and safety with lockwire.
(8)Remove safety clips and tags and close circuit breakers previously opened in Para. 3. A. (4).

** ON ELEVATOR SERVO CONTROL P/N 30504
(AFTER AIR EQUIPEMENT SB 27-31-0H)

B. Removal (Ref. Fig. 401)

(1)Disconnect electrical connector (11) and install protective cap/plug.
(2)Cut and remove lockwire from screws (1).
(3)Remove screws (1, 13), washers (2) and clamps (5, 14).
(4)Remove covers (3, 4).
(5)Remove boot (12) from nut (9).
(6)Cut and remove lockwire, remove screws (6) and microswitch assembly (16).

C. Preparation for Installation (Ref. Fig. 401)

NOTE : The jamming detection microswitch is supplied complete with nut (9), support bracket (8) and a factory-adjusted shim (10) thus requiring no further adjustment on mounting.

(1)Clean installation area, screws and covers, using cleaning agent (Mat. No. 11-001).
(2)Install clamps (5, 14) to cable loom.

D. Installation (Ref. Fig. 401)

(1)Position microswitch assembly (16) and install screws (6).
(2)Install boot (12) to nut (9).
(3)TORQUE screws (6) to between 0.071 and 0.087 m.daN (6.2 and 7.6 lbf.in.).
(4)Safety screws (6) with lockwire.
(5)Position covers (3, 4), clamp (5), washers (2) and install screws (1).
(6)Safety screws (1) with lockwire.
(7)Position clamp (14) and install screws (13).
(8)Remove protective cap/plug and connect electrical connector (11) and safety with lockwire.
(9)Remove safety clips and tags and close circuit breakers previously opened in Para. 3. A. (4).

** ON ELEVATOR SERVO CONTROL P/N 31043

B. Removal (Ref. Fig. 402)

(1)Disconnect electrical connector (30) and install protective cap/plug.
(2)Remove screw (31) and clamp (32).
(3)Remove boot (23) from nut (24).
(4)Cut and remove lockwire, remove screws (26), clamp (27) and microswitch assembly (33).

C. Preparation for Installation (Ref. Fig. 402)

NOTE : The jamming detection microswitch is supplied complete with

nut (24), support bracket (25) and a factory-adjusted shim (28) thus requiring no further adjustment on mounting.

(1)Clean installation area, screws and clamps, using cleaning agent (Mat. No. 11-001).
(2)Attach clamps (27, 32) to cable loom.

D. Installation (Ref. Fig. 402)

(1)Position microswitch assembly (33), clamp (27) and install screws (26).
(2)Install boot (23) to nut (24).
(3)TORQUE screws (26) to between 0.224 and 0.295 m.daN (19.82 and 26.10 lbf.in.).
(4)Safety screws (26) with lockwire.
(5)Position clamp (32) and install screw (31).
(6)Remove protective cap/plug and connect electrical connector (30) and safety with lockwire.
(7)Remove safety clips and tags and close circuit breakers previously opened in Para. 3. A. (4).

** ON ALL ELEVATOR SERVO CONTROLS

E. Test

(1)Make certain that travel ranges of elevator and servo controls are clear.

(2)Initial conditions :

(a)Hydraulic power available, using electric pumps and power transfer unit (PTU).

(b)Electrical power supply connected.

(c)Forward services ventilation system in operation.

(d)Overhead and rear panel circuit breakers closed, particularly those associated with FLT CTL (133VU).

(e)Aircraft in ground configuration (L/G PROX DET & RELAYS SYS1 and SIS2 circuit breakers closed, on panel 133VU).

(f)All control surfaces set at zero.

(g)No AP engaged.

(3)Carry out the following jamming detection test:

NOTE : Only the Blue hydraulic system jamming detection test is described. The Yellow and Green hydraulic system jamming detection tests are similar.

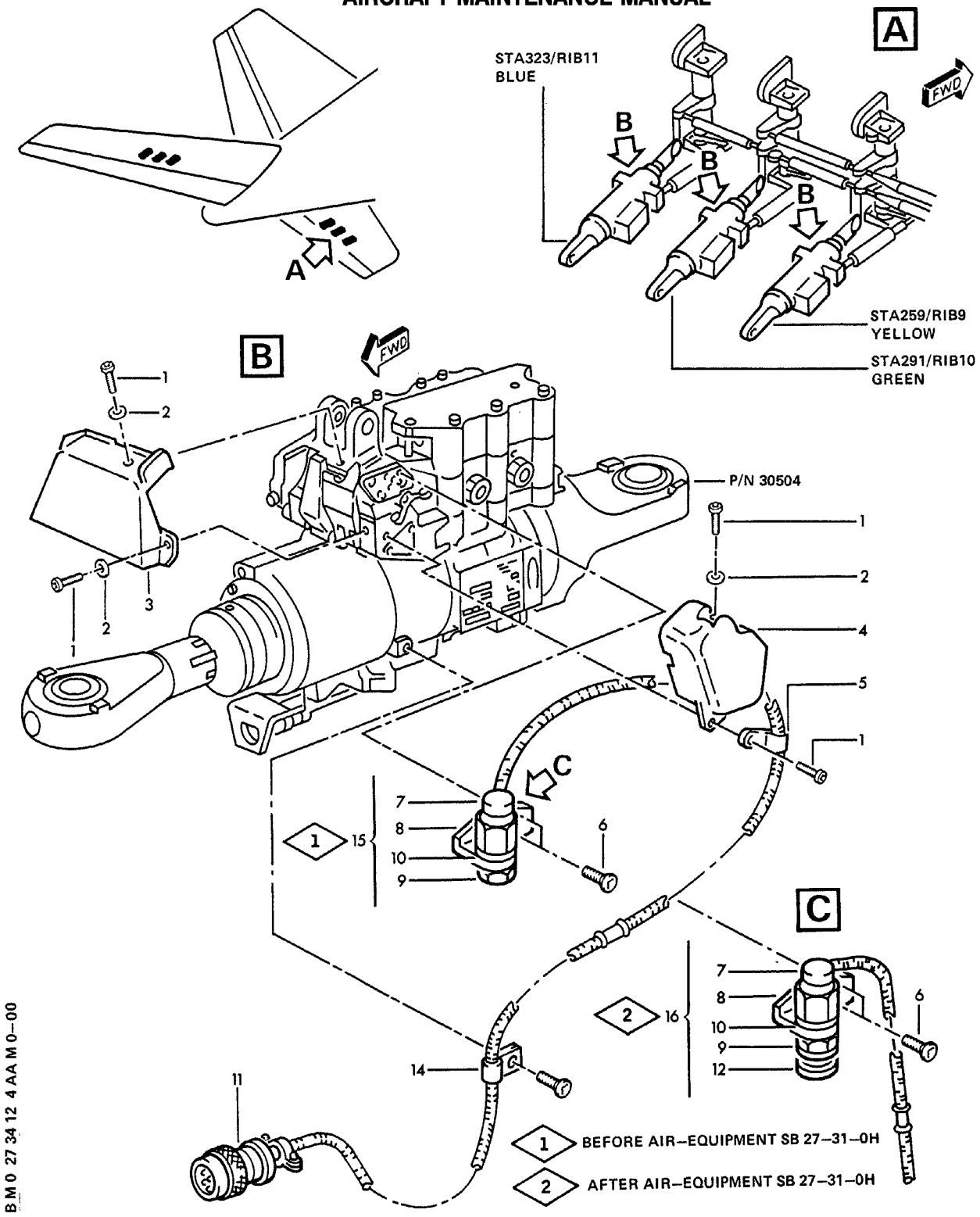
	ACTION	RESULT
	1. On SERVO CTL section of panel 428VU: - release B and Y pushbutton switches	- OFF legends of these switches come on. - corresponding LO PR warning lights come on.
R R R	2. On ECAM section of panel 470VU: - press and hold INHIB OVRD push-button.	On LH ECAM display: - following red message comes on: FLT CTL BLUE + YELLOW SERVO LO PR LAND ASAP
	3. On SERVO CTL section of panel 471VU: - press and release B pushbutton switch.	- TEST legend of this switch comes on and remains on.
	4. Rapidly move control column to either nose up or nose down attitude.	On SERVO CTL section of panel 428VU: - JAM legend of B pushbutton switch come on then go off. On jamming detection control unit 93VU: - blue and white indicator lights come on then go off.
	5. On SERVO CTL section of panel 428VU: - press B and Y pushbutton switches or - press B and G pushbutton switches.	- OFF legend of these switches goes off. On SERVO CTL section of panel

ACTION	RESULT
	471VU: - TEST legend of pushbutton switch goes off.

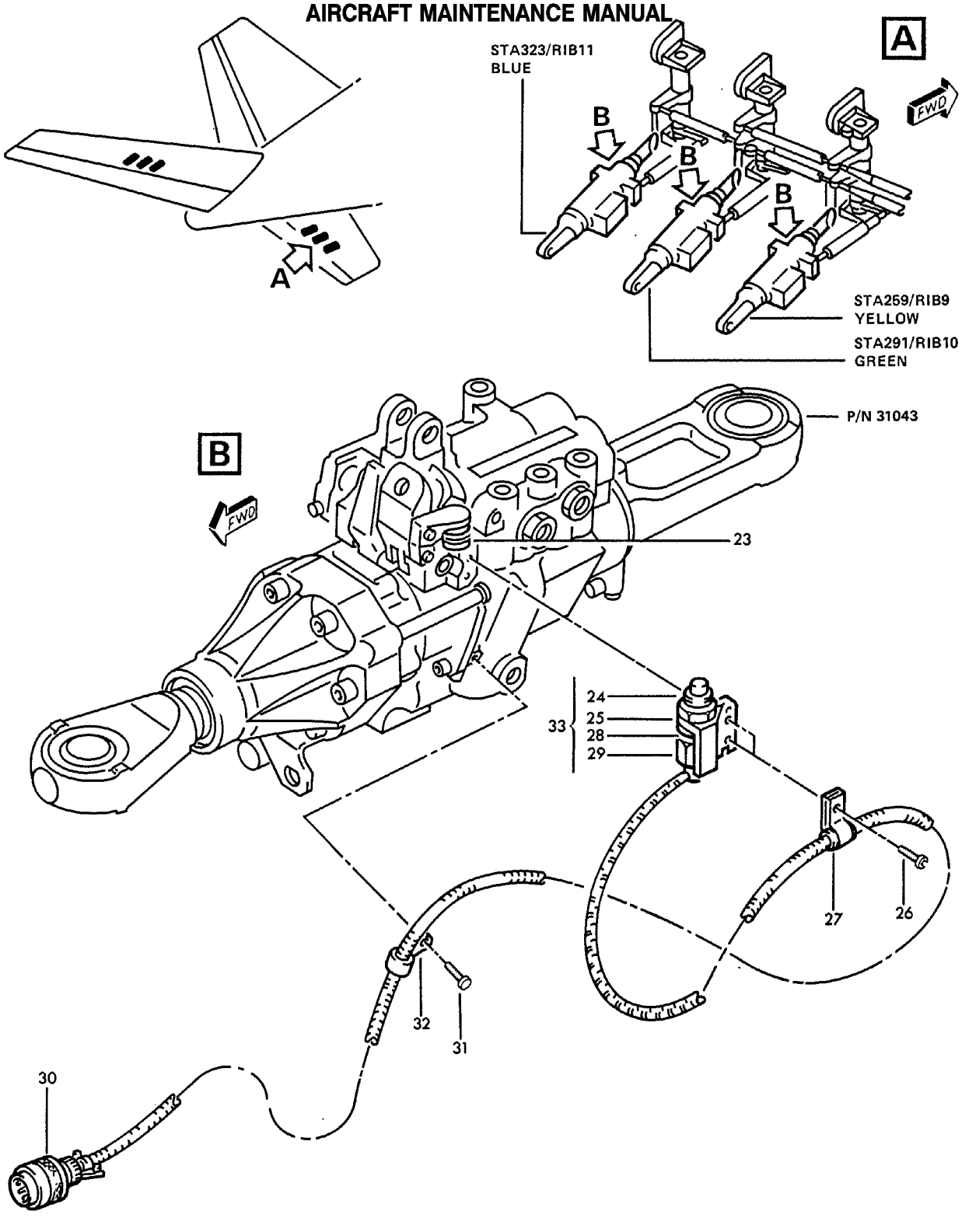
(4)Test completion
(a)Shut down hydraulic power.
(b)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(c)Restore aircraft system to normal operating condition.

F. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access panels.
(3)Remove warning notices.
(4)Remove access platform.



Servo Control Jamming Detection Microswitch
Figure 401



Jamming Detection Microswitch
Figure 402

ELEVATOR SERVO CONTROL JAMMING DETECTION MICROSWITCHES DEACTIVATION/REACTIVATION

Ref.: MMEL Sect. 1-27, Item 3

CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MMEL.

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Deactivation

A. Reason for the Job

(1) One or more detectors on servo controls may be inoperative.

NOTE : All components relative to the THS actuator must be operative.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 8 m (26 ft.)
(2)	Electrical Connector Protective Caps/Plugs
(3)	Circuit Breaker Safety Clips
(4)	Tie-wrap
(5)	Warning Notices
Referenced Procedures	
- 27-14-00, P. Block 501	Hydraulic Actuation (Aileron)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 55-13-13, P. Block 401	Trailing Edge Access Panels

C. Procedure

(1)Job Set-Up

(a)Position access platform.

(b)Depressurize the Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).

(c)Display warning notices prohibiting pressurization of hydraulic systems and operation of elevator controls.

(d)De-energize the aircraft electrical network.

(e)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	32/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(f)Remove trailing edge access panels 334/344CB (Ref. 55-13-13, P. Block 401).

(2)Deactivation (Ref. Fig. 901)

(a)Disconnect electrical connector (1) and install protective plug.
WARNING : MAKE CERTAIN THAT ELECTRICAL PLUG CANNOT CAUSE FOULING OF MOVING PARTS.

(b)Stow electrical connector (1) and secure with tie-wrap at bracket (3).

(c)Install protective cap on receptacle (2).

(d)Remove safety clips and tags and close circuit breakers 1CB and 2CB.

(3)Test

(a)Perform elevator operational test with individual hydraulic system corresponding to deactivated microswitch (Ref. 27-14-00, P. Block 501).

(4)Close-Up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Install trailing edge access panels 334/344CB (Ref. 55-13-13, P. Block 401).

(c)Remove access platform and warning notices.

(d)Install a temporary warning notice in the flight compartment to warn the flight crew that elevator either Green, Blue or Yellow servo control jamming detection microswitch is deactivated.

(e)Make an entry in the aircraft technical log.

2. Reactivation

A. Reason for the Job
Reconnection of the electrical plug of the jamming detection microswitch on the elevator servo controls in order that trouble shooting procedure and the ensuing corrective action be performed.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 8 m (26 ft.)
(2) EMH1569S	Cart - Hydraulic Ground Power Supply, 150 l/min (36.6 USGPM)
(3)	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz
(4)	Electrical Connector Protective Caps/Plugs
(5)	Circuit Breaker Safety Clips
(6)	Warning Notices

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-14-00, P. Block 501	Hydraulic Actuation (Aileron)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 55-13-13, P. Block 401	Trailing Edge Access Panels
- 27-14-00, P. Block 101	Servo Control Jamming - Trouble Shooting Manual (TSM)

C. Procedure
(1)Job Set-Up
(a)Position access platform.
(b)Depressurize the Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(c)Display warning notices prohibiting pressurization of hydraulic systems and operation of elevator controls.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

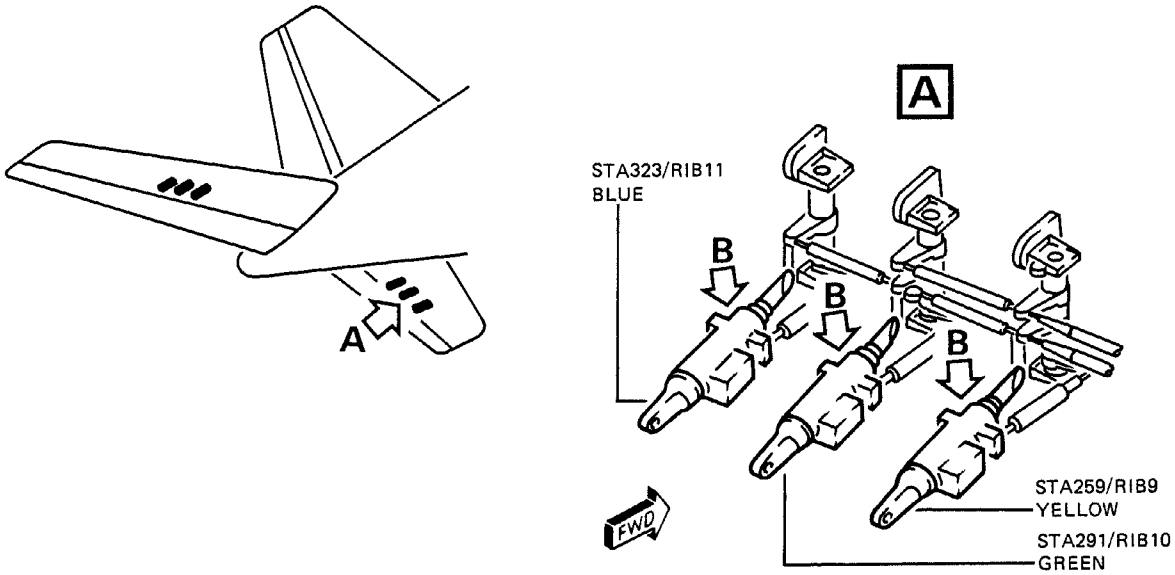
(e)Remove trailing edge access panels 334/344CB (Ref. 55-13-13, P. Block 401).

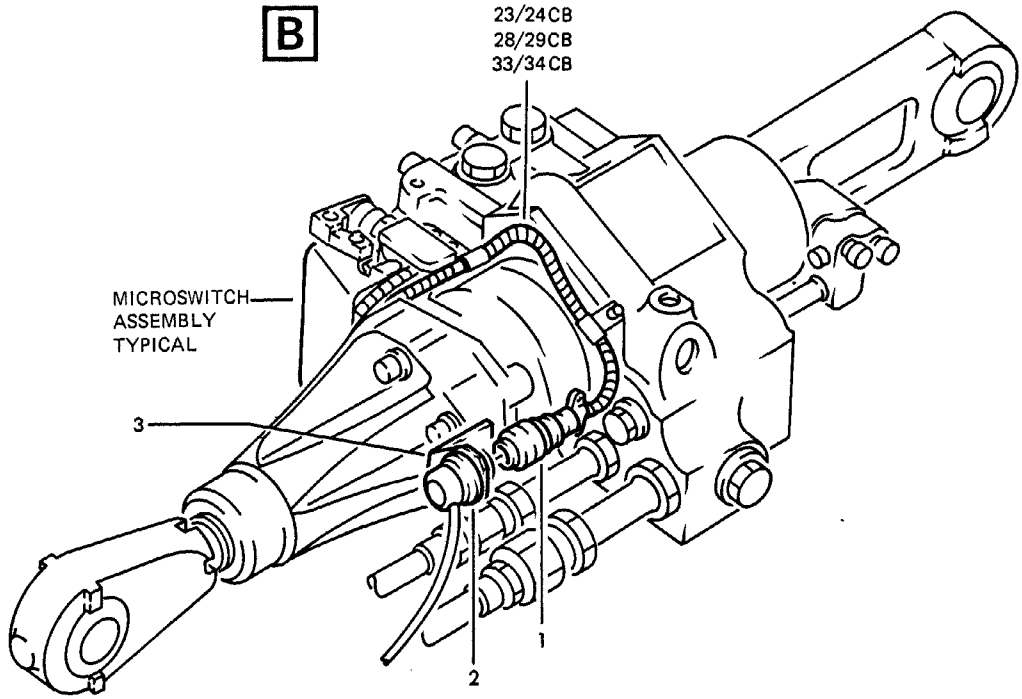
(2)Reactivation (Ref. Fig. 901)
(a)Remove tie-wrap and protective plug/cap.
(b)Connect electrical connector (1) to receptacle (2).
(c)Remove safety clips and tags and close circuit breakers 1CB and 2CB.
(3)Trouble Shooting/Corrective Action

(a)Connect hydraulic ground power cart and pressurize the three hydraulic systems (Ref. 29-10-00, P. Block 301).
(b)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Perform elevator servo control jamming detection microswitch trouble shooting (Ref. TSM 27-14-00, P. Block 101) and carry out the ensuing corrective action.

(4)Test
(a)Carry out functional test of the elevator jamming detection microswitches and of the elevator system (Ref. 27-14-00, P. Block 501).

(5)Close-Up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Shut down and disconnect hydraulic ground power cart.
(c)De-energize the aircraft electrical network and disconnect ground power unit.
(d)Install trailing edge access panels 334/344CB (Ref. 55-13-13, P. Block 401).
(e)Remove access platform and warning notices.
(f)Remove the temporary **DEACTIVATION** warning notice in flight compartment.
(g)Record reactivation in aircraft technical log.





BMO 27 34 12 9 AAMO – 00

Jamming Detection Microswitches
Figure 901

CONTROL SURFACE POSITION INDICATING (ELEVATOR)
DESCRIPTION AND OPERATION

1. General

Position of the right elevator is indicated on the right **ECAM** display unit, with the hydraulic systems available for the servo controls. There is no special reference mark painted on the elevators, but on each side of the **APU** tailcone, there is :

- an engraved reference plate which indicates the neutral position of the corresponding elevator.
- an engraved placard with the following inscription : **VALID WITH THE STABILIZER IN NEUTRAL POSITION.**

CONTROL SURFACE POSITION INDICATING (ELEVATOR) - ADJUSTMENT/TEST

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES ON THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Adjustment of Elevator Position Transmitter with Zeroing Equipment

A. Reason for the Job

(1)Adjustment of elevator position transmitter 12CT.

B. Equipment and Materials

ITEM	DESIGNATION
(1)31-590-100	Zeroing Equipment - Synchro-Resolvers, Synchro - Transmitters and Wiring
(2)98A27307541000	Rigging Pin - Cable Quadrant, Elevator Mechanical Controls
(3)0U131281	Pin - Rigging, Artificial Feel Unit, Elevator Mechanical Controls
(4)	Access Platform Adjustable to 8m. (26ft. 2in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)Connect hydraulic ground power cart and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU

- make certain that G pushbutton switch is pressed (in) and legends are off.

(d)Make certain that pitch trim control system is in neutral.

(e)Make certain that flap and slat control lever is in 1st notch position.

(f)Make certain that SPEED BRAKE control lever is in RET notch position,

ground spoiler function not preselected.

(g)Position access platform and open access door 312AR.

(h)Install rigging pin 98A27307541000 in cable quadrant and rigging pin 0U131281 in pitch artificial feel unit input lever.

(j)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1		Line 103
21VU	FAC2		Line 103
133VU	CTL/SURF/POS	1CT	334/S61

(k)Make certain that selector switch on equipment 31-590-100 is in STAND BY position and that sensitivity selector is in position 0.

(l)Supply equipment with 28 VDC.

(m)Open access door 344DB.

(n)Remove connector of position transmitter to be adjusted and connect wire harness between transmitter and equipment connector, making certain connectors are correctly mated.

(2)Adjustment of position transmitter 12CT with zeroing equipment

(a)Place equipment 31-590-100 control switch in ON position - AIRCRAFT/28VDC and INT/26V, 400 Hz indicator lights come on.

(b)Place selector switch in CONT SURF/POS TRANS position.

(c)Loosen transmitter body attachment nut.

(d)Place sensitivity selector in 30° position.

(e)Rotate transmitter body to position galvanometer pointer to zero.

CAUTION : ROTATE TRANSMITTER GENTLY, USE OF EXCESSIVE FORCE WILL CAUSE BREAKAGE OF THE STOP PIN ON THE SPLINED SHAFT.

(f)Successively increase sensitivity by placing sensitivity selector in positions 15°, 3°, and 15' and adjust transmitter to zero at each position.

At the end of adjustment, pointer must remain in a ± 15' range.

(g)Tighten position transmitter clamp attaching nut.

(h)Return sensitivity selector to zero and selector switch to STAND BY position.

(j)Place zeroing equipment control switch in OFF position.

(k)Disconnect equipment wire harness connector from transmitter and connect aircraft connector.

(3)Close-up

(a)Remove power supply from equipment 31-590-100.

(b)Remove safety clips and tags and close circuit breaker 1CT and line 103 panel 21VU.

(c)Remove all rigging pins and locking tools.

(d)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(e)Close access doors.

(f)Remove safety barriers and access platforms.

(g)Shut down pressurization of hydraulic system and disconnect hydraulic ground power cart.

(h)De-energize the aircraft electrical network

2. Adjustment of Elevator Position Transmitter 12CT Without Zeroing Equipment

A. Reason for the Job
(1)Adjustment of elevator position transmitter 12CT

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27307541000	Rigging Pin - Cable Quadrant, Elevator Mechanical Controls
(2)OU131281	Pin - Rigging, Artificial Feel Unit, Elevator Mechanical Controls
(3)	Access Platform Adjustable to 8 m (26 ft. 2 in)
(4)	Digital Voltmeter
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Connect hydraulic ground power unit and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU
- make certain that G pushbutton switch is pressed(in) and legends are off.
(d)Make certain that pitch trim control system is in neutral.
(e)Make certain that slat and flap control lever is in first notch position.
(f)Make certain that SPEED BRAKE control handle is in RET position, ground spoiler function not preselected.
(g)Position access platform and open doors 312 AR, 344 DB.
(h)Install rigging pin 98A27307541000 in cable quadrant and rigging pin OU131281 in pitch artificial feel unit input lever.
(j)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1		Line 103
21VU	FAC2		Line 103

D. Adjustment
(1)Adjustment of elevator transmitter 12CT without zeroing equipment
NOTE : Before connecting or disconnecting System Data Analog Converter 1WV rack 90VU, open circuit breaker 1CT.

(a)Loosen attaching device and slowly turn transmitter body to set ELEV

pointer on ECAM scale to zero.
(b)Immobilize transmitter by tightening attaching device.
(c)Remove System Data Analog Converter 1WV, Rack 90VU.
(d)Using a 15VAC voltmeter (1/100 reading, measure voltage across contacts of connectors at rear of Rack

TRANSMITTER	CONNECTOR	VAC.A	VAC.B
12CT	AB	9E and 9F	9 D and 9 F

(e)When VAC.A = VAC.B with a difference ≤ 6/100 VAC transmitter is considered as adjusted.
If necessary, adjust position transmitter as follows :
- loosen screw securing transmitter
- gradually turn transmitter until VAC.A = VAC.B with a difference ≤ 6/100 VAC
- tighten screw securing transmitter
- report test to check values.

(f)Connect System Data Analog Converter 1WV, rack 90VU.
(g)Carry out functional test (Ref. Para. 3)
R (h)To avoid incorrect pick off installation (180°), check of the
R adjustment using equipment 31-590-100 must be done at next A-check
R (Ref. Para. 1).

E. Close-Up
(1)Remove all rigging pins and locking equipment.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Close access doors.
(4)Remove safety barriers and access platform.
(5)Shutdown and disconnect hydraulic ground power cart.
(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

3. Functional/Operational Test

A. Reason for the Job
On right ECAM display unit, check that bug on FLT CTL page, ELEV scale operates correctly with respect to elevator deflection

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Pressurize hydraulic systems either :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU, make certain that G, B, and Y pushbutton switches are pressed (in) and legends are off.
(d)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	ADS		line 105/E 6 to 105/E11
22VU	MIN EQPT BAY SUPPLY/ADS/ADC1/26VAC	8FL	208/B20
22VU	MIN EQPT BAY SUPPLY/ADS/ADC1/115VAC	9FL	208/B19
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/2 & 3	5CP	335/R63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/6 & 7	7CP	335/R62
133VU	EFCU/NORM/SUPPLY SPLR 2 & 3	8CP	333/T62
133VU	EFCU/LAND RECOVERY/NORM SUPPLY/SPLR/ 6 & 7	9CP	333/T66
133VU	EFCU/NORM/SUPPLY/SPLR 6 & 7	10CP	332/U62
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/1 & 4	53CP	334/S63
133VU	LAND/RECOVERY/SUPPLY/SPLR/1 & 4 & 6 & 7	54CP	334/S67
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/5	55CP	334/S64
133VU	EFCU/NORM/SUPPLY/SPLR/5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM/SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	EFCU/LAND RECOVERY/SUPPLY/SPLR/1 & 4	72CP	333/T67

(e)On panel 11VU

On ECAM control panel
- press F/CTL pushbutton switch ; FLT CTL page appears on right ECAM display unit.

(f)Make certain that pitch trim control wheel is in zero position

(g)Make certain that flap and slat control lever is in 1st notch position.

(h)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.

(2)Test

ACTION	RESULT
1. Slowly move control column to Nose Down stop.	- On right ECAM display unit, on FLT CTL page, ELEV pointer moves to the lower mark.
2. Return control column to neutral	- On right ECAM display unit, on FLT CTL page ELEV pointer returns to zero.
3. Move control column to Nose Up Stop	- On right ECAM display unit, on FLT CTL page, ELEV pointer moves to the upper mark.
4. Return control column to neutral	- On right ECAM display unit, on FLT CTL page ELEV pointer returns to zero.

(3)Close-up

(a)Shut down hydraulic power supply. Depressurize systems. Where applicable, disconnect hydraulic ground power cart.

(b)Remove all locking tools.

(c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, up to 8 m (26 ft. 3 in.)
B.	Electrical Ground Power Unit - 3-Phase, 115/200 V 400 Hz
C. EMH15695	Cart - Hydraulic Ground Power Supply 150 l/min. (36.6 USGPM)
D. 98A27307549000	Pin - Rigging, Elevator Control Bellcranks
E.	Circuit Breaker Safety Clip
F.	Protective Caps for Electrical Connectors
G.	Warnings Notices
H.	Cotter Pins
J. Material No. 04-004	Common Greases (Ref. 20-31-00)
K. Material No. 05-005	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-35-00, P. Block 501	Control Surface Position Indicating (Elevator)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power (Power Transfer Unit)
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 51-75-10, P. Block 801	Repair of Paint Coatings
- 55-13-13, P. Block 401	Trailing Edge Access Panels

2. Procedure

A. Job Set-Up

(1)Position access platform.
(2)Make certain that pitch trim control wheels and control column are set at zero.
(3)Install rigging pins P/N 98A27307549000 in bellcrank at RIB 9.
(4)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301) and display warning notices in flight compartment prohibiting repressurization.
(5)Display warning notices in flight compartment prohibiting operation of flight controls.
(6)Open, safety and tag the following circuit breaker:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SURF POS	1CT	334/S61

(7)Open access panels 344EB/ET and 344CT (Ref. 55-13-13, P. Block 401).

B. Removal (Ref. Fig. 401)

(1)Disconnect plug 12CT-A (4) from position transmitter (3) and install protective caps.
(2)Remove cotter pin (10), nut (11), washer (12), bolt (14) and washer (13).
(3)Disengage input lever (9) from splined shaft.
(4)Secure input lever (9) and push rod (8) temporarily.
(5)Remove cotter pins (7), nuts (6), washers (5), bolts (1) and washers (2).
(6)Remove position transmitter (3).

C. Installation (Ref. Fig. 401)

(1)Apply grease (Mat. No. 04-004) to all bolts, washers and nuts.
(2)Make certain that index marks on splined shaft and position transmitter body are aligned (electrical zero position).
(3)Engage position transmitter (3) into mounting (15) so that stop dowel is aligned with slot in mounting (15) and facing forward.
(4)Position washers (2), install bolts (1), washers (5) and nuts (6), but do not fully tighten nuts (6), so that position transmitter (3) can be rotated in mounting (15).
(5)Remove protective caps and connect electrical connector 12CT-A (4) to position transmitter (3).
(6)Remove safety clip and tag, close circuit breaker 1CT.
(7)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(8)Make certain that electronics racks ventilation is correct.
(9)Remove rigging pins P/N 98A27307549000.

(10)Pressurize hydraulic systems either:
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(11)On SERVO CTL section of panel 428VU, make certain that G, B and Y pushbutton switches are pressed (in).
(12)On panel 11VU, on ECAM control panel, press F/CTL pushbutton switch; FLT CTL page appears on the right ECAM display.
(13)Make certain that pitch trim control wheels and elevator controls are set at zero.
(14)Install rigging pin P/N 98A27307549000 in bellcrank at RIB 9.
(15)Check that ELEV pointer on right ECAM display unit indicates zero.
- If ELEV pointer does not indicate zero, rotate splined shaft as required.

(16)Maintain splined shaft in this position, and engage input lever (9) to splined shaft (input lever slot aligned with zero index mark on position transmitter body (3). If necessary, adjust push rod (8).
(17)Position washer (13), install bolt (14), washer (12) and nut (11), safety nut (11) with cotter pin (10).
(18)Remove rigging pin P/N 98A27307549000.

D. Adjustment

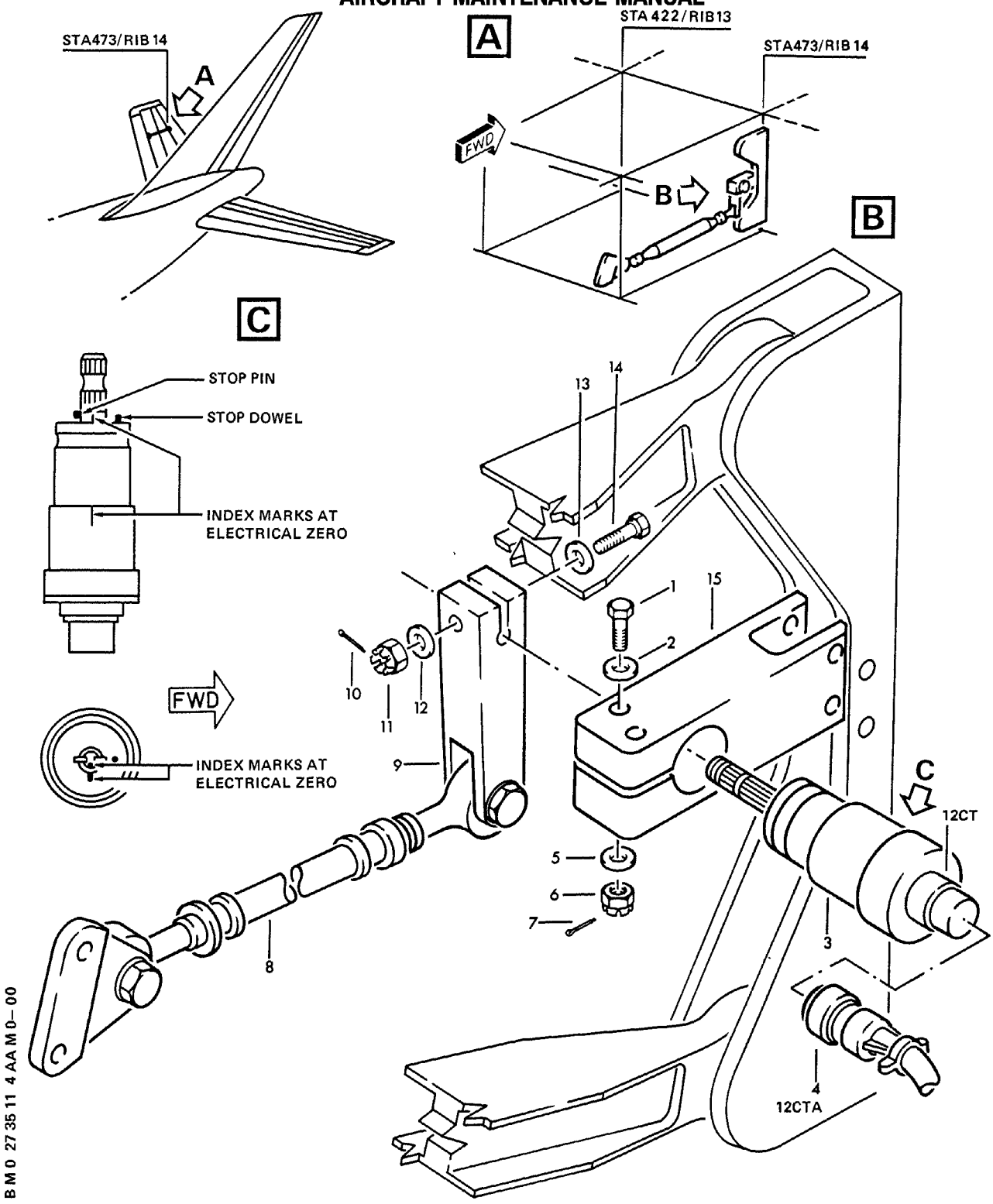
(1)Carry out adjustment of position transmitter (Ref. 27-35-00, P. Block 501).
(2)Fully tighten nuts (6) and safety with cotter pins (7).

E. Test

(1)Carry out functional test of position transmitter (Ref. Block 27-35-00, P. Block 501).

F. Close-Up

(1)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(2)Shut down hydraulic power and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(3)Apply corrosion-preventive compound (Mat. 05-005) to all visible cadmium-plated steel parts (Ref. 51-75-10, P. Block 801).
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(5)Close access panel 344EB/ET and 344CT (Ref. 55-13-13, P. Block 401).
(6)Remove warning notices.
(7)Remove access platform.



Elevator Position Transmitter
Figure 401

STALL WARNING - DESCRIPTION AND OPERATION

1. General

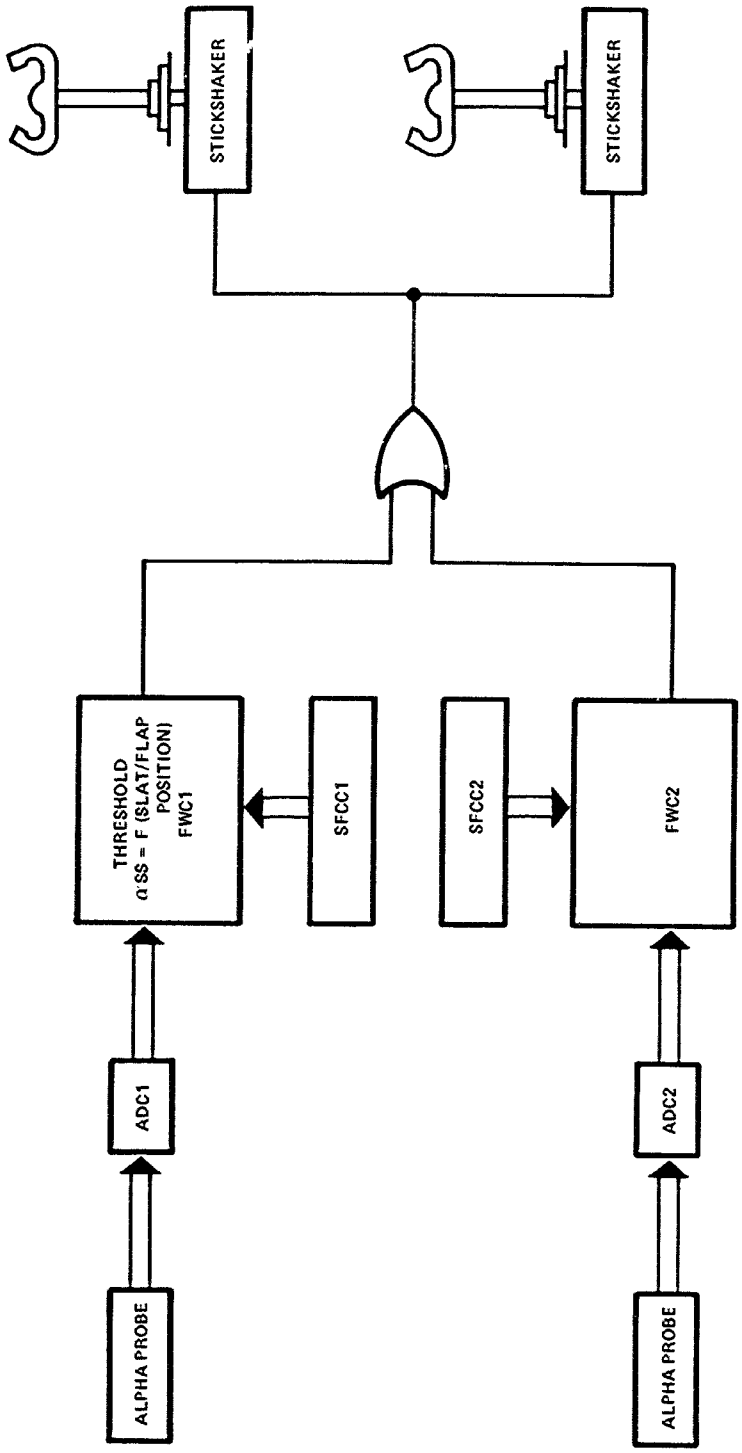
(Ref. Fig. 001)

- The dual stall warning system provides audio (cricket) and tactile (stick shaker) warning in case of impending stall.
- The angle of attack is the governing parameter for stall warning, together with slats extension.
- The angle of attack is given by two alpha probes (one on each side of the forward fuselage) which are electrically heated. Slat position is transmitted by two synchro-transmitters, one for each FWC.
- On each control column, a stick shaker is installed and controlled by the stall warning generator included in FWC 1 or 2.
- Stall warnings are activated when angle of attack exceeds a pre-determined value.
- When angle of attack reaches a pre-determined value :
  . slat retraction is inhibited
  . turn coordination of yaw damper is inhibited.
- Stall warning is inhibited on ground except during ALPHA PROBES test.

2. Component Location

(Ref. Fig. 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
13FU1	STICKSHAKER-CAPT		121	121BL	27-36-12
13FU2	STICKSHAKER-F/O		122	121BL	27-36-12



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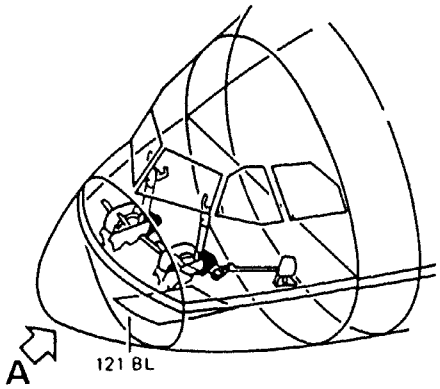
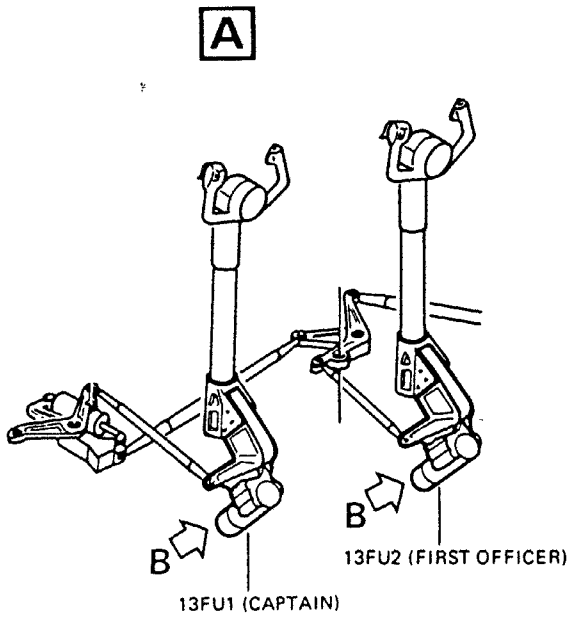
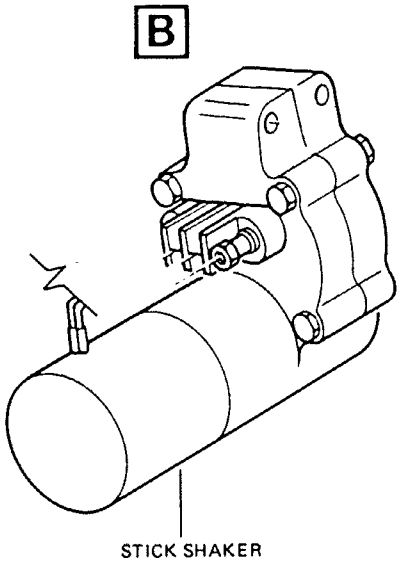
Stall Warning System
Figure 001







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Component Location
Figure 002

3. Interface With Flight Controls

One stick shaker is installed on each control column, and is controlled by the flight warning computer.

1. Operational Test

A. Reason for the Job
(1)To check correct operation of stick shakers.
NOTE : For associated warnings (Ref. 34-10-00, P. Block 501).

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electronics racks ventilation is correct.
(c)Make certain that circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
21VU	STICK SHAKER/CAPT	12FU1	109A9
21VU	STICK SHAKER/F/O	12FU2	109A10
133VU	HYDRAULIC/L/G PROX DET/& RELAYS SYS1/ FLT/GND	119GB	332/U52
133VU	HYDRAULIC/L/G PROX DET/& RELAYS SYS1/ GEAR DN &/CTL PNL/POS IND	3GB	332/U53
133VU	HYDRAULIC/L/G PROX DET/& RELAYS SYS2/ GEAR DOWN &/OVHD PNL/POS IND	83GB	331/V51
133VU	HYDRAULIC/L/G PROX DET/& RELAYS SYS2/ FLT/GND	1GB	331/V52
133VU	HYDRAULIC/L/G PROX DET/& RELAYS SYS1/ RELAYS &/RETRACT/CTL	2GB	332/U51

(2)Test

ACTION	RESULT
1. On ALPHA PROBES section of maintenance panel 47OVU - press CAPT pushbutton switch	On this pushbutton - TEST legend comes on. After 5 seconds : Stickshakers operate on Captain and First Officer control wheels. Aural warning sounds (cricket)
2. Press again CAPT pushbutton switch	- TEST legend goes off. Stickshakers stop operating.

ACTION	RESULT
	Aural warning stops.
3. Repeat steps 1 and 2 with F/O push-button switch.	- Same results

(3)Close-up
(a)Restore aircraft and system to normal operating condition.
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

STICKSHAKER - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Warning Notices Prohibiting Pressurization of Green, Blue and Yellow hydraulic Systems
C.	Warning Notices Prohibiting Operation of Control Columns
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-36-00, P. Block 501	Stall Warning

2. Procedure

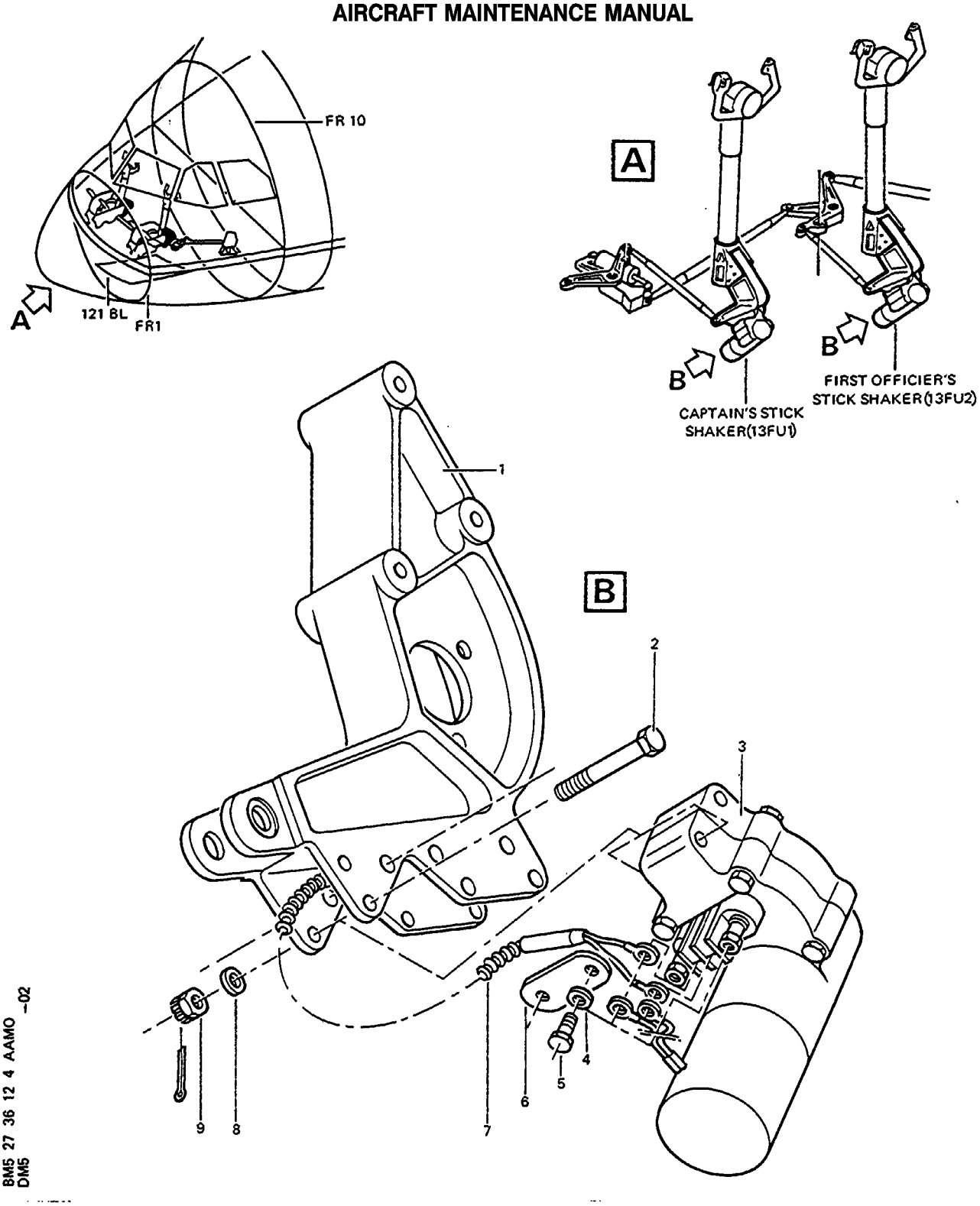
A. Job Set-Up
(1)Open access door 121BL.
(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	STICK SHAKER/CAPT	12FU1	109/A 9
21VU	STICK SHAKER/F/O	12FU2	109/A10

(3)Make certain that Green, Blue and Yellow hydraulic systems are depressurized.
(4)Display warning notices on ground connectors and on HYD PWR panel 427VU in flight compartment prohibiting pressurization of hydraulic systems.
(5)In flight compartment, display warning notices prohibiting operation of control columns.

B. Removal
(Ref. Fig. 401)
(1)Remove screws (5), retain washers (4) and remove plate (6).
(2)Disconnect and identify electrical cables (7). Protect cables ends.
(3)On pitch bellcrank (1), remove cotter pin and nuts (9). Retain washers (8).
(4)Support stickshaker (3).
(5)Remove shoulder bolts (2).
(6)Remove stickshaker (3).

C. Installation
(1)Position stickshaker (3) on pitch bellcrank (1).
(2)Engage shoulder bolts (2).
(3)On shoulder bolts (2) engage washers (8). Tighten nuts (9) and safety with cotter pin.
(4)Remove protections and connect electrical cables (7). Observe cable identification.
(5)Position plate (6), washers (4) and secure on stickshaker (3) with



Stickshaker
Figure 401

screws (5). Tighten screws (5).

(6)Remove safety clips and tags and close circuit breakers : 12FU1 and 12FU2.

D. Test

- Carry out an operational test (Ref. 27-36-00, P. Block 501).

E. Close-Up

(1)Remove warning notices prohibiting pressurization of hydraulic systems.

(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(4)Close access door 121BL.

TRIMMABLE HORIZONTAL STABILIZER - DESCRIPTION AND OPERATION

1. General

(Ref. Fig. 001)

Pitch trim control is achieved by a trimmable horizontal stabilizer (THS) hinged on the rear part of the fuselage.

The two elevators are hinged on the THS. Their control systems are installed so that the elevators are in line with the THS when the control columns are released.

The THS is driven by an actuator including a fail-safe ball screwjack (Ref. 27-44), the structural attachments of which are also fail-safe.

Normal control of the actuator is electrical, via the automatic pitch trim system (Ref. Chap. 22).

Stand-by control is mechanical. The pilots can override electrical control by the mechanical control system, by applying sufficient force to the control wheels. A torque limiter is mounted in each electric pitch trim actuator for that purpose. The torque limiters remain automatically released after their operation.

2. Interface With Automatic Pitch Trim System (Ref. Chap. 22)

Electrical control is achieved by means of two electric pitch trim actuators, installed on the THS actuator. They drive the actuator mechanical input.

The two pitch trim actuators are controlled by two flight augmentation computers (FAC) which deliver manual electric trim, automatic trim, Mach trim and alpha trim signals.

Manual electric trim signals are provided by rocker switches mounted on the Captain's and First Officer's control wheel horns.

Position sensors detect THS end of travel in aircraft nose up and nose down direction. The signals are used in the automatic trim system to avoid automatic disconnection of this system during automatic landings.

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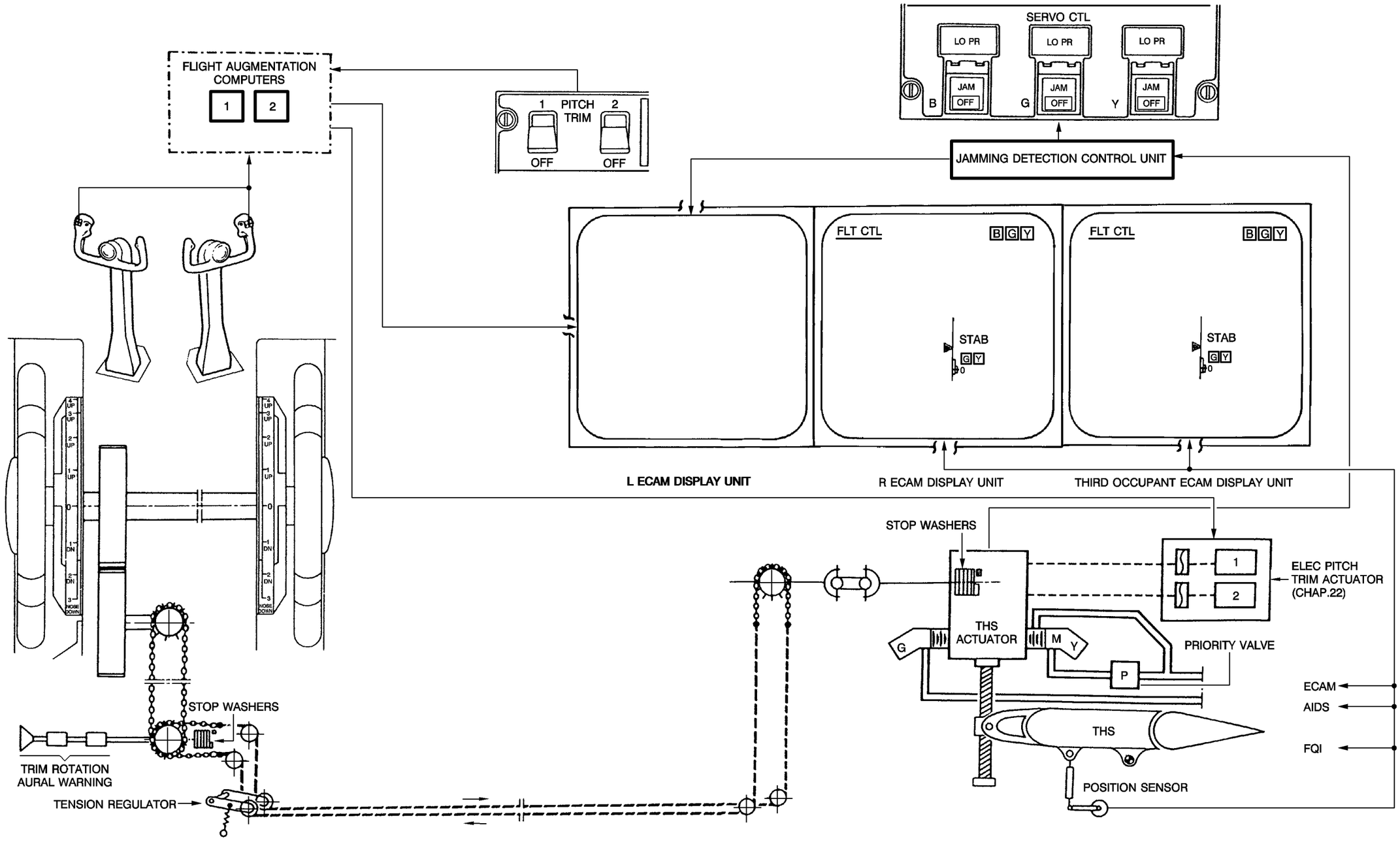

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Trimmable Horizontal Stabilizer
Figure 001

R

R

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Trim Control Cables (THS)

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4 to 8 m. (13 ft. 2 in. to 26 ft. 4 in.)
(2)97A27302009000	Locking Equipment - Pitch Trim Control Wheel
(3)	Circuit Breaker Safety Clips
(4)0U190360	Rigging Pin - THS Actuator Mechanical Input Lever
(5)98A27103001000 or 700023	Wedge - Locking Pitch Trim Control Cable Tension Regulator
(6)	Lockwire Corrosion Resistant Steel Dia. 0. 8 mm (0.032 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 27-40-00, P. Block 501	Trimmable Horizontal Stabilizer
- 27-41-00, P. Block 501	Mechanical Control (THS)

B. Procedure

(1)Job set-up

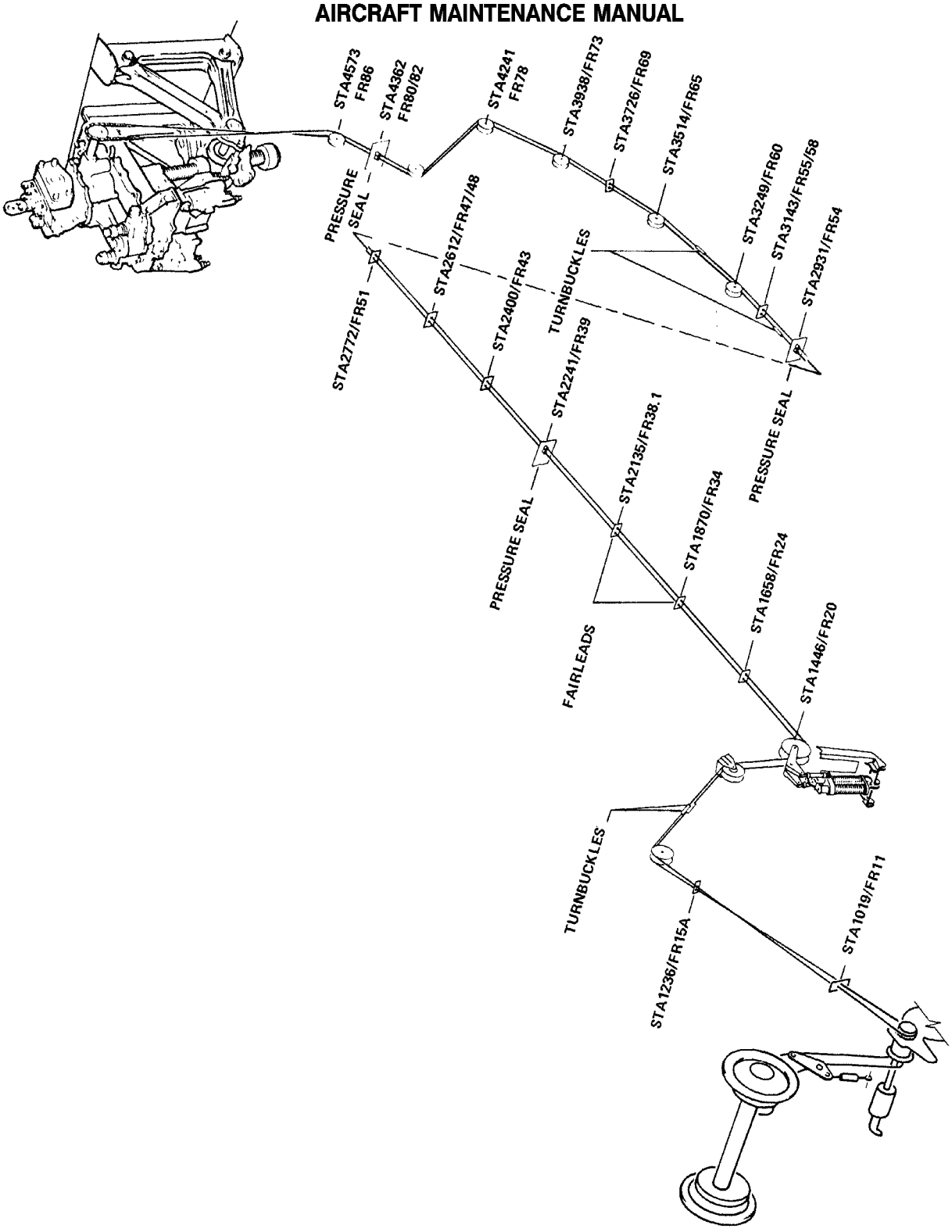
(Ref. Fig. 401)

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)Pressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block 301)

(c)On SERVO CTL section of panel 428VU

- make certain that B, G and Y pushbutton switches are pressed in and legends off.



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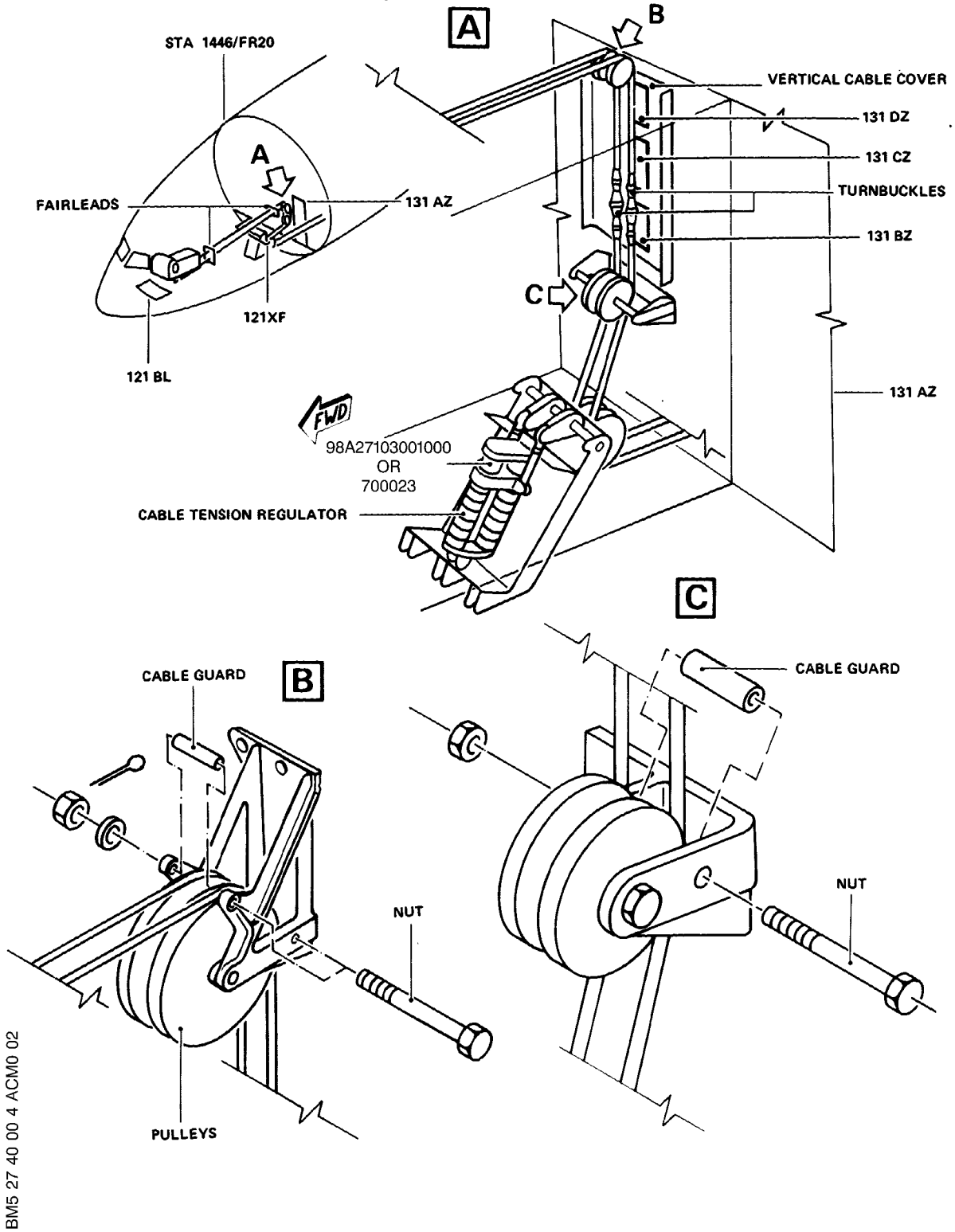
Cable Routing
Figure 401

(d)Install access platform.
Open access door 312AR
CAUTION : THS DEFLECTION SPEED MUST NOT EXCEED 0.5 DEG/S. CHECK ON PITCH TRIM CONTROL WHEELS.
(e)Slowly rotate pitch trim control wheels to zero and immobilize control wheels. Insert rigging pin OU190360 in THS actuator mechanical input lever.
(f)Immobilize Captain's pitch trim control wheel with locking equipment 97A27302009000.
(g)On panel 21VU
Open, safety and tag circuit breakers FAC1 and FAC2, line 103.
(h)Depressurize hydraulic system and de-energize the aircraft electrical system
(j)Open access doors 121BL, 131AZ and floor panel 121XF
(k)At STA1446/FR20, remove access doors 131DZ, 131CZ and 131BZ
(Ref. Fig. 402)
(l)Under center pedestal at lower trim control mechanism, note number of links in X and Y sections.
(Ref. Fig. 403)
(m)Remove turnbuckles safety clips and slacken cables to enable
R installation of wedge 98A27103001000 or 700023 on trim cable tension
R regulator.
(n)Open access doors 812 and 813 and remove cargo compartment floor panels corresponding to cable routing.

(2)Removal of forward cable run
(Ref. Fig. 403)
(a)Remove bolts, washers, chain guard
(b)Remove cable ends from turnbuckle barrel STA1446/FR20.
(c)Remove upper halves of fairleads
(d)Remove cable guards from pulley mounts
(e)Remove cable run

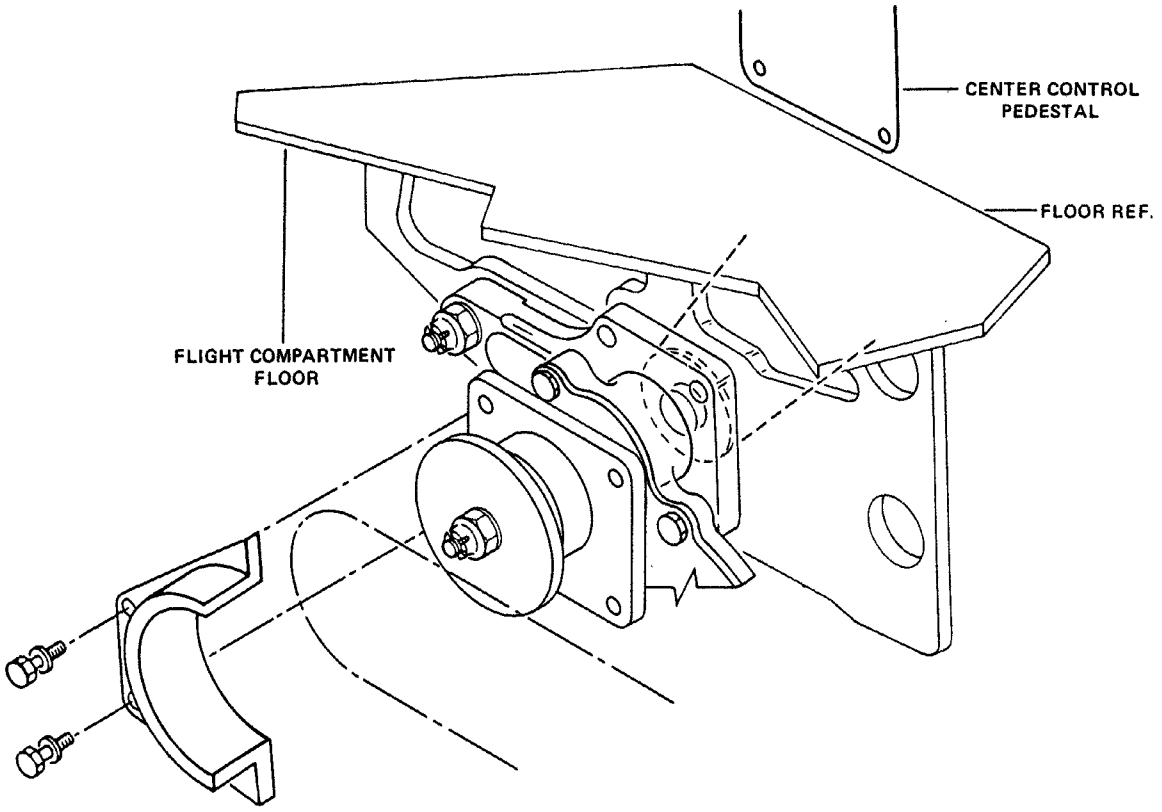
(3)Installation of forward cable run
NOTE : If you cannot adjust the control cables, do a visual inspection on the pulleys and the tension regulator. If they are in good condition, replace the control cables.
(Ref. Fig. 403)
(Ref. Fig. 404)
(a)Install chain section on sprocket of lower trim control mechanism at bottom of control pedestal, making certain that both ends of chain are positioned according to figure (Ref. Fig. 403)
Install forward cable run.
(b)Connect each cable end to turnbuckle barrel
(c)Install upper halves of fairleads. Tighten nuts
(d)Install cable guards on pulley mounts
R (e)Tighten cable turnbuckles to enable removal of wedge 98A27103001000
R or 700023.
(f)On lower trim control mechanism, install chain guard, washers, bolts
(g)Proceed with adjustment of cable tension (Ref. 27-40-00, P. Block 501)

(4)Removal of intermediate cable runs
(a)Remove cable ends from turnbuckle barrel STA1446/FR20
(b)Remove upper halves of fairleads

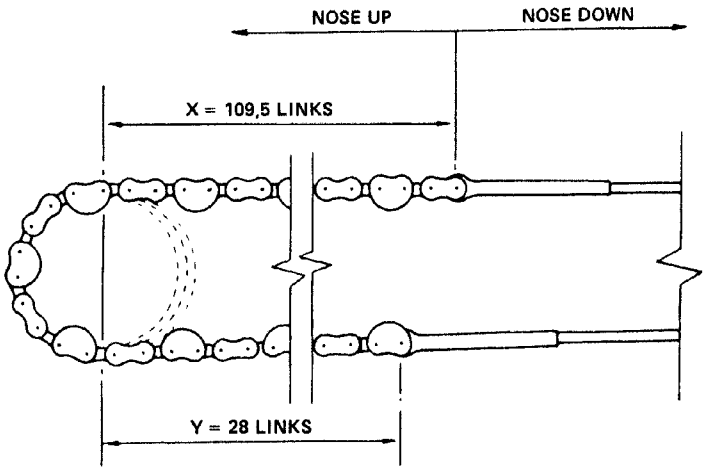


Location of Forward Cable Run
Figure 402

R



CHAIN ADJUSTMENT AT CONTROL PEDESTAL OUTPUT SPROCKET



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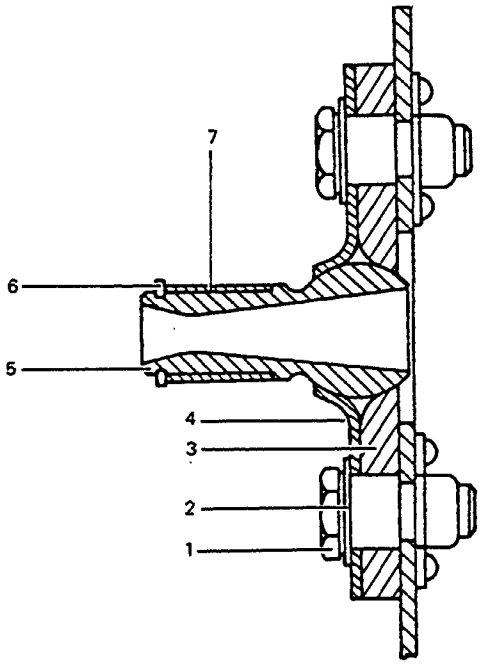
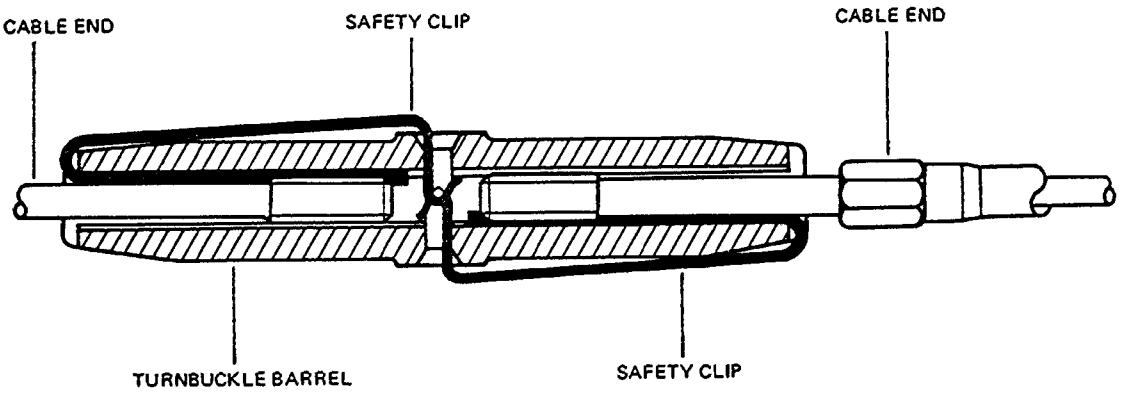
Adjustment of Chain Under Control Pedestal
Figure 403





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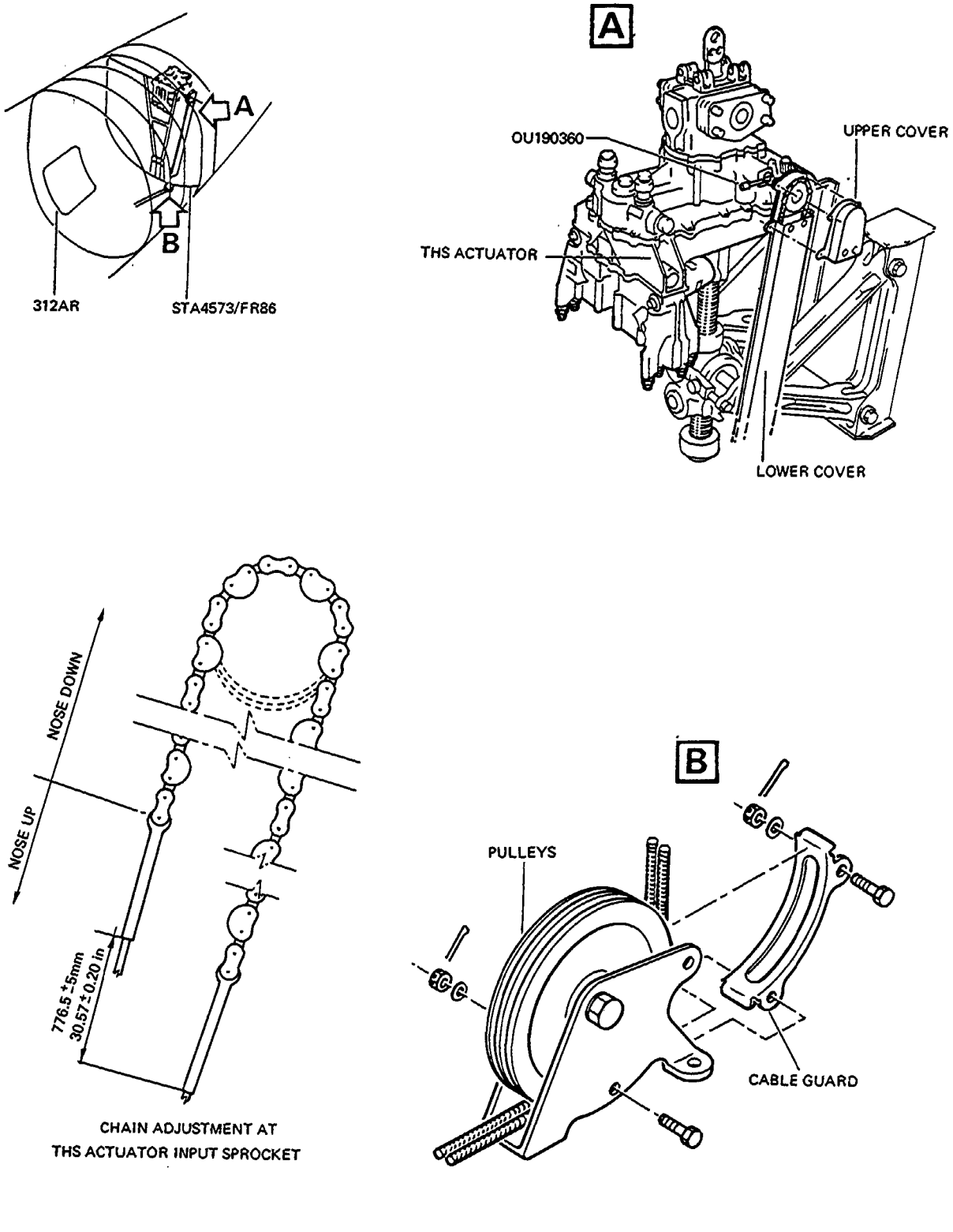
Pressure Seal and Turnbuckle
Figure 404

(c)Remove cable guards from pulley mounts
(d)On pressure seals at STA2135/FR39 then STA2931/FR54
1 Cut and remove lockwire, remove bolts (1), retain washers (2)
2 Separate plates (4)
NOTE : Plate (3) remains on structure
3 Remove circlips (6), sleeves (7) and separate cable guide halves (5)
(e)Aft of STA2984/FR54.1 and STA3408/FR63, remove safety clips from turnbuckles. Unscrew turnbuckle barrels and remove ends of intermediate cable run
(f)Remove intermediate cable run
(5)Installation of intermediate cable run
NOTE : If you cannot adjust the control cables, do a visual inspection on the pulleys and the tension regulator. If they are in good condition, replace the control cables.
(a)Equip cable run with sleeves (7) and plates (4)
CAUTION : MAKE CERTAIN SLEEVES (7) AND PLATES (4) ARE CORRECTLY POSITIONED.
PLATES (3) REMAIN ON STRUCTURE.
(b)Insert cable run through pressure seals at STA2135/FR39 and STA2931/FR54 and connect cable ends to turnbuckles
(c)At STA1446/FR20, route cable on regulator pulleys and in cable guards, then connect cable ends to forward turnbuckles.
(d)Install upper halves of fairleads. Tighten nuts.
(e)Install cable guards on pulley mounts.
R (f)Progressively increase cable tension to enable removal of wedge
R 98A27103001000 or 700023.
(g)On pressure seals at STA2135/FR39 and STA2931/FR54
1 Position guide halves (5) on plate (4). Secure with sleeve (7) and circlips (6)
2 Slide assembly into plate (3). Secure assembly with bolts (1), washers (2). Safety with lockwire.
NOTE : Make certain that fairlead ball ends of pressure seals are free to rotate and that cables freely slide in cable pressure seals. If not replace pressure seal by a new one.
(h)Proceed with cable tension adjustment (Ref. 27-40-00, P. Block 501).
(6)Removal of aft cable run
(Ref. Fig. 405)
(a)Aft of STA2984/FR54.1 and STA3408/FR63, remove safety clips from cable turnbuckles.
Unscrew turnbuckle barrels and remove ends of intermediate cable run to be removed
(b)On pressure seals at STA4362/FR80/82
1 Cut and remove lockwire, remove bolts (1), retain washers (2)
2 Separate plate (4)
NOTE : Plate (3) remains on structure
3 Remove circlips (6), sleeve (7), then separate cable guide halves (5)
(c)Remove cable guards from pulley mounts
(d)Remove chain protective covers at level of THS actuator
(e)Remove cable run
(f)Retain sleeve (7) and plate (4)
(7)Installation of aft cable run



Chain Adjustment at Level of THS Actuator Mechanical Input Lever
Figure 405

NOTE : If you cannot adjust the control cables, do a visual inspection on the pulleys and the tension regulator. If they are in good condition, replace the control cables.

(a)Position aft cable run and engage chain over actuator input sprocket. Make certain that both ends of the chain are positioned according to figure (Ref. Fig. 405)

(b)Engage cable on pulleys and cable guard. Make certain that plate (4) and sleeve (7) are correctly positioned at pressure seal STA4362/ FR80/82.

(c)Install upper halves of fairleads. Tighten nuts.

(d)Install cable guards on pulley mounts.

NOTE : If you install a new aft cable, cut the aft control cable of the THS (Ref. 27-40-00, P. Block 501, Para. 3.), before you continue this procedure.

(e)Connect cable ends to turnbuckles

(f)At pressure seals STA4362/FR80/82

1 Position guide halves (5) on plate (4). Secure halves with sleeves (7) and circlips (6). Slide assembly into plate (3). Secure assembly with bolts (1) and washers (2). Safety with lockwire.

(g)Make certain that cable runs properly (Ref. Fig. 406).

R (h)Progressively increase cable tension to enable removal of wedge
R 98A27103001000 or 700023.

NOTE : Make certain that fairlead ball ends of pressure seals are free to rotate and that cables freely slide in cable pressure seals. If not replace pressure seal by a new one.

(j)Proceed with cable tension adjustment (Ref. 27-40-00, P. Block 501)

(k)Install chain protective covers at level of THS actuator

(l)Make certain that the cable is in the proper position before closing the cover assembly.

- Make certain that the cable is correctly installed.
- The cable chain assembly must run inside the U-Form of the guide blocks.

(m)Make certain that the THS actuator operates over the full range by using the electrical trim (ZERO - FULL NOSE-UP - FULL NOSE-DOWN - ZERO) after the cover assembly has been closed (Ref. 27-41-00, P. Block 501).

(8)Close-up

(a)Remove rigging pin 0U190360 from THS actuator

(b)Make certain that working area is clean and clear of tools and miscellaneous items of equipment

(c)Install floor panels

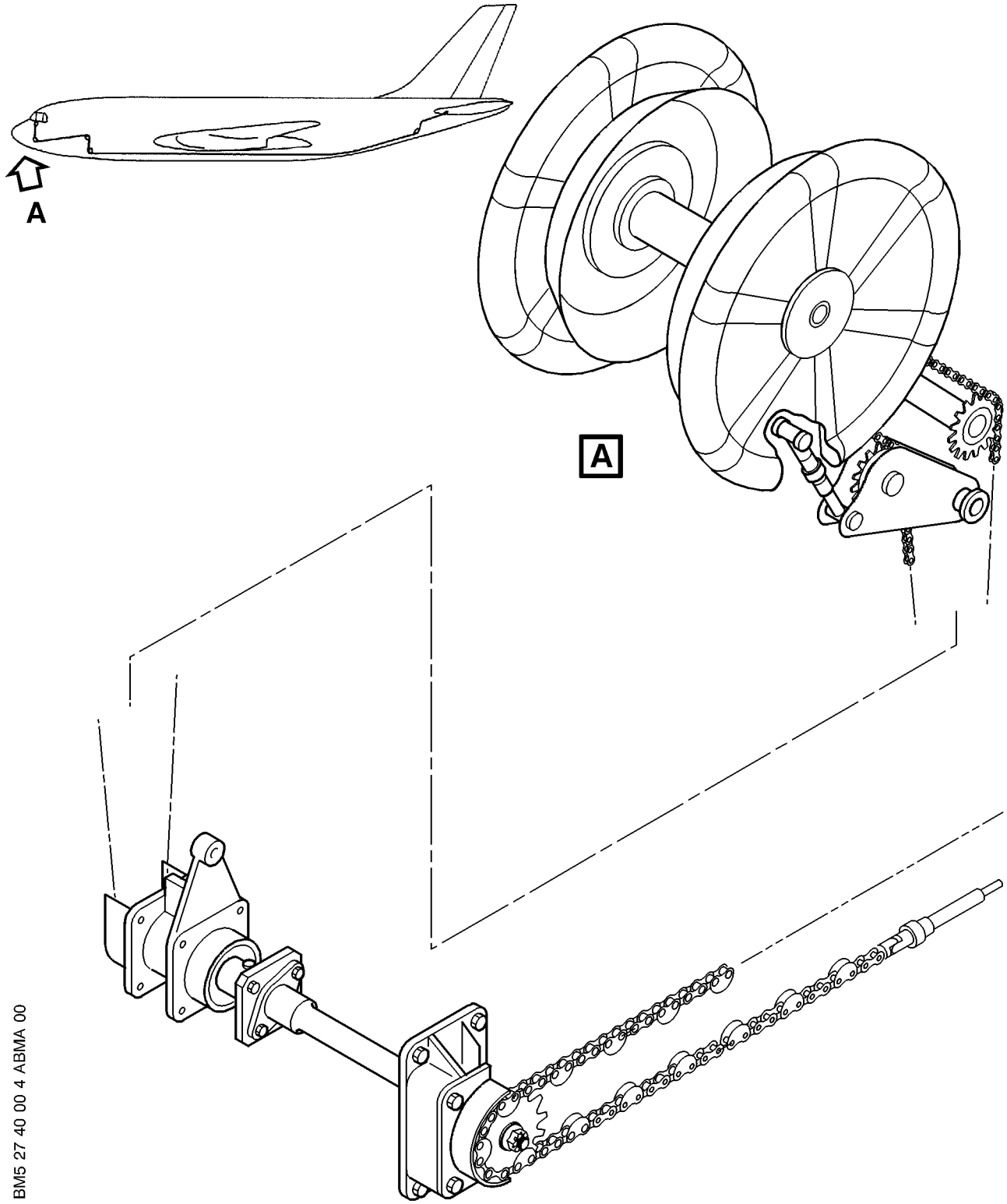
(d)Remove access platforms

(e)Remove safety clips and tags and close circuit breakers FAC1 and FAC2 line 103, on panel 21VU.

(f)Remove equipment 97A27302009000.

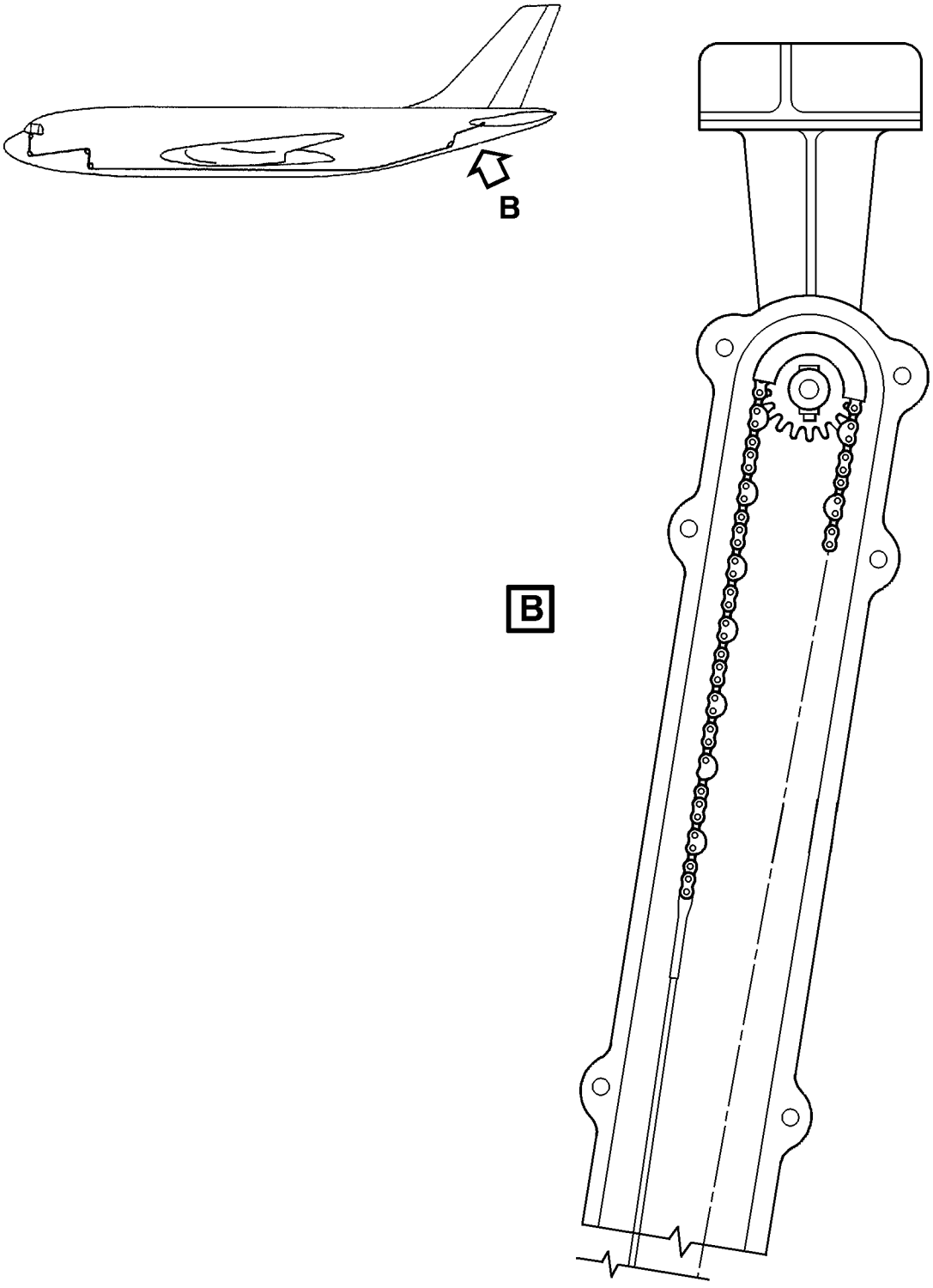
(g)Close access doors.

(h)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



Control Chains (Sheet 1/2)
Figure 406

R



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Control Chains (Sheet 2/2)
Figure 406

R

R CAUTION : THIS PROCEDURE MUST BE PERFORMED IN A HANGAR.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Adjustment of Cable Tension on Pitch Trim Control Linkage

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
(2)97A27302009000	Locking Equipment - Pitch Trim Control Wheel
(3)0U190360	Rigging Pin - THS Actuator Mechanical Input Lever
(4)	Tensiometer
(5)	Thermometer
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
R - 27-40-00, P. Block 401	Trimmable Horizontal Stabilizer
- 27-41-00, P. Block 501	Mechanical Control (THS)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurisation/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power

B. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. BLock 301). Make certain that electronics racks ventilation is correct.

(b)Pressurize Green hydraulic system :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green electric pumps (Ref. 29-21-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU
- make certain that B, G and Y pushbutton switches are pressed (in) and legends are off.

CAUTION : IF GREEN HYDRAULIC SYSTEM IS PRESSURIZED BY MEANS OF GREEN ELECTRIC PUMPS, THS DEFLECTION SPEED MUST NOT EXCEED

0.5 DEG/S. CHECK ON PITCH TRIM CONTROL WHEELS.

(d)Slowly turn pitch trim control wheels to zero position.
(e)Display warning notices prohibiting operation of pitch controls.
(f)Immobilize pitch trim control wheels with locking equipment 97A27302009000
(g)Position access platform. Open access door 312AR. Insert rigging pin 0U190360 in THS actuator input lever.
(h)Depressurize Green hydraulic system
(j)Open access door 121BL, 132AZ
- 121XF to gain access to cable tension regulator
- 131CZ to gain access to cable turnbuckles located at FR20.
- Open access door 812 and remove floor panels in cargo compartment between FR54.1 and FR54.2 and between FR63 and FR64 to gain access to aft cable turnbuckles.

(k)Remove safety clips from cable turnbuckles.

(2)Adjustment (Ref. Fig. 503)
(Ref. Fig. 501)
(Ref. Fig. 502)
(a)Record ambient temperature

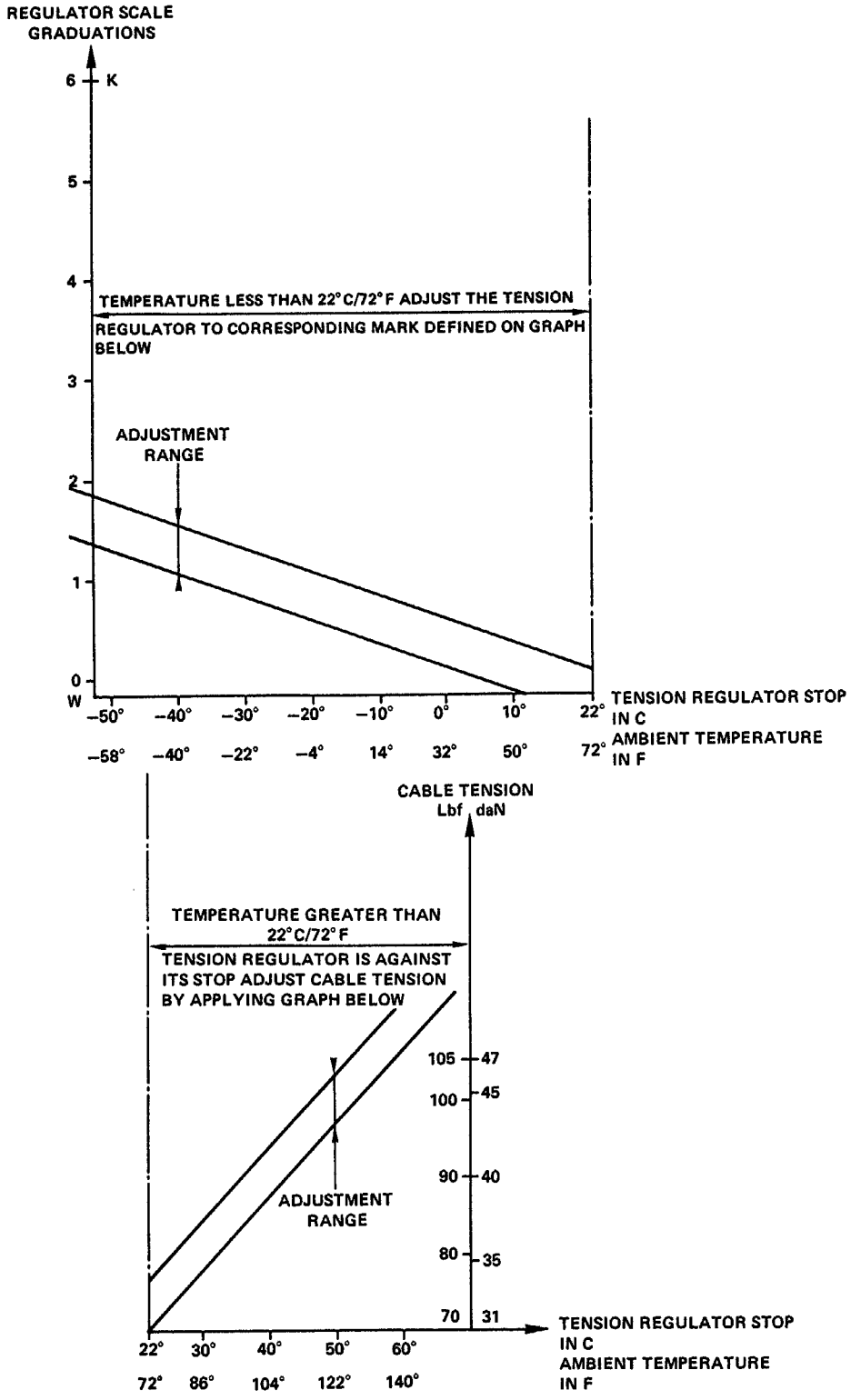
R NOTE : Prior to taking readings, make sure that the cable area
R temperature and the external temperature are the same at
R ± 2 deg. C (± 3.6 deg. F).

(b)Check that cable ends in each turnbuckle are engaged by an equal number of threads.
(c)If ambient temperature is below 22°C (72°F)
- adjust cable tension until top of cable tension regulator locking crossbeam is opposite slide rod graduation given on upper graph.

(d)If ambient temperature is above 22°C (72°F), cable tension regulator locking crossbeam is against stop.
- adjust cable tension as per values of lower graph.

(e)If adjustment range cannot be achieved with turnbuckles at FR20, adjust using turnbuckles at FR54.1 and at FR54.2 and between FR63 and FR64.

R (f)If you cannot adjust control cables, do a visual inspection of the
R THS mechanical control for correct cable routing.
R 1 If the visual inspection is correct :
R a Make a mark on each front cable.
R b Pull cables to the rear until the position of the index agrees
R with the value found on the graph.
R c Keep cables pulled and make a new mark on each front cable
R then release cables.
R d Measure the length between the two marks of each cable :
R - if the length is more than 33 mm (1.2992 in.), shorten control
R cables (Ref. Paragraph 2.).
R - if the length is less than 33 mm (1.2992 in.), replace control
R cables (Ref. 27-40-00, P. Block 401).
R (g)Check that rigging pin 0U190360 can be inserted and removed freely.
R (h)During and after tension adjustment, pull cables equally and release sharply. When releasing cables, check that tension regulator locking crossbeam slides freely.
R (j)Remove rigging pin 0U190360 and equipment 97A27302009000.


REGULATOR SCALE GRADUATIONS
6 K
5
4
TEMPERATURE LESS THAN 22°C/72°F ADJUST THE TENSION REGULATOR TO CORRESPONDING MARK DEFINED ON GRAPH BELOW
3
ADJUSTMENT RANGE
2
1
0 W
−50° −40° −30° −20° −10° 0° 10° 22° TENSION REGULATOR STOP IN C
−58° −40° −22° −4° 14° 32° 50° 72° AMBIENT TEMPERATURE IN F
CABLE TENSION Lbf daN
TEMPERATURE GREATER THAN 22°C/72°F
TENSION REGULATOR IS AGAINST ITS STOP ADJUST CABLE TENSION BY APPLYING GRAPH BELOW
105 47
100 45
90 40
ADJUSTMENT RANGE
80 35
70 31
22° 30° 40° 50° 60° TENSION REGULATOR STOP IN C
72° 86° 104° 122° 140° AMBIENT TEMPERATURE IN F

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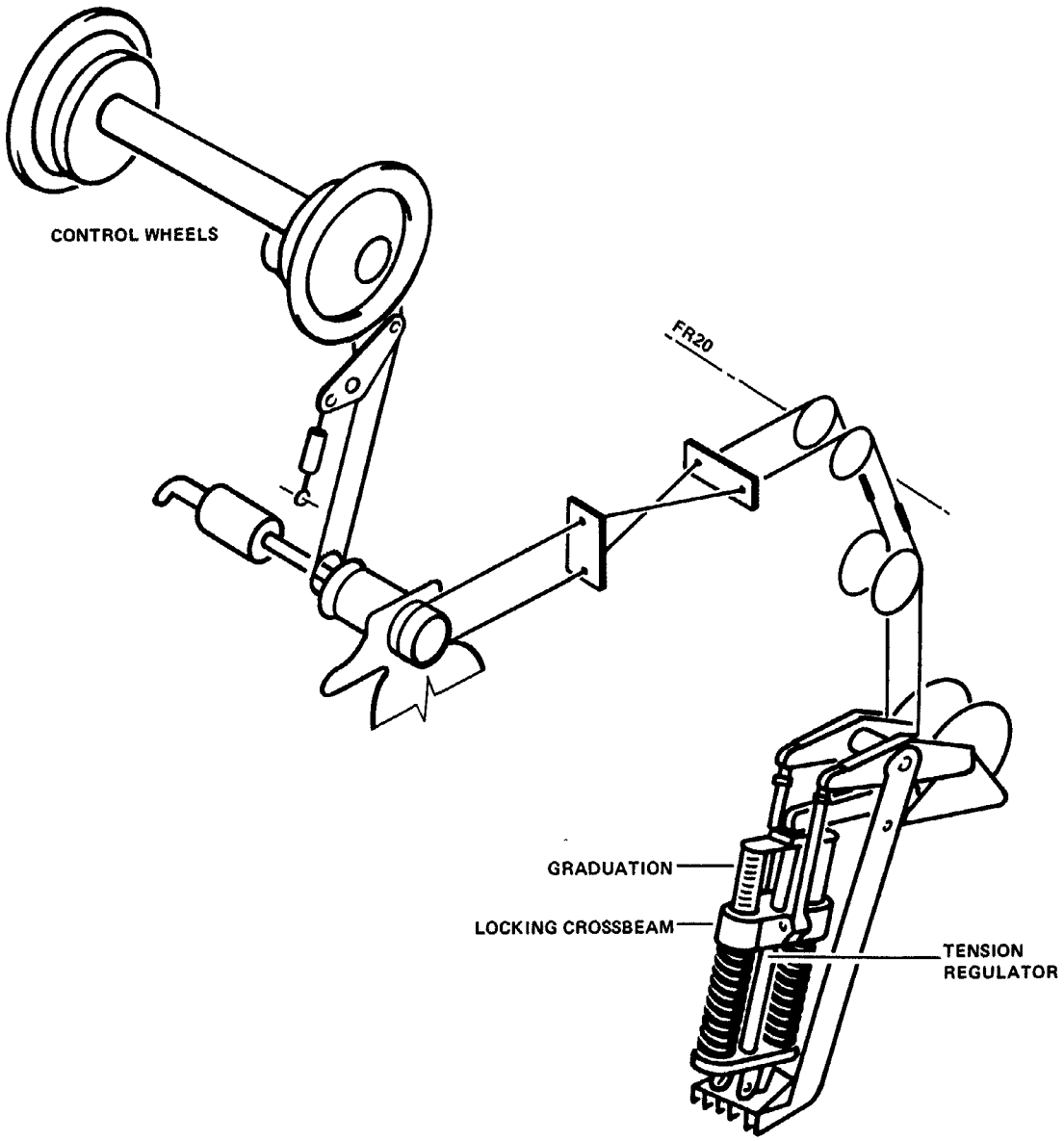
Pitch Trim Control Cable Tension Adjustment Graph
Figure 501



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Pitch Trim Control Wheels - Tension Regulator
Figure 502

R (k)Pressurize Green hydraulic system.
R (l)Do the functional test of the THS (Ref. 27-41-00, P. Block 501 (para. 3 and 4)).
R (m)With pitch trim control wheels in zero position, check that rigging pin 0U190360 can be inserted and removed freely.
R (n)Depressurize Green hydraulic system.

(3)Close-up
(a)Lock turnbuckles with safety clips and check that clip installation is correct by pulling on clip.
(b)Remove rigging pins and equipment.
(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(d)Remove access platform.
(e)Close access doors.

2. Shortening of the THS Cable Length

R CAUTION : THIS PROCEDURE MUST BE PERFORMED IN A HANGAR.

WARNING : MAKE SURE THAT THE SAFETY DEVICES AND THE WARNING NOTICES ARE IN POSITION BEFORE YOU START A TASK ON OR NEAR :
- THE FLIGHT CONTROLS
- THE FLIGHT CONTROL SURFACES
- THE LANDING GEAR AND THE RELATED DOORS
- COMPONENTS THAT MOVE.
MOVEMENT OF COMPONENTS CAN KILL OR INJURE PERSONS.

CAUTION : MAKE SURE THAT THE AIRCRAFT IS IN THE TEMPERATURE CONDITIONS (STABLE AMBIENT TEMPERATURE) SPECIFIED IN THE MAINTENANCE CONFIGURATION PARAGRAPH.
CHANGES IN THE TEMPERATURE CAN CAUSE INCORRECT MEASUREMENTS.

A. Reason for the Job
R To adjust the length of the control cables for the THS
R (turnbuckles on the stops).

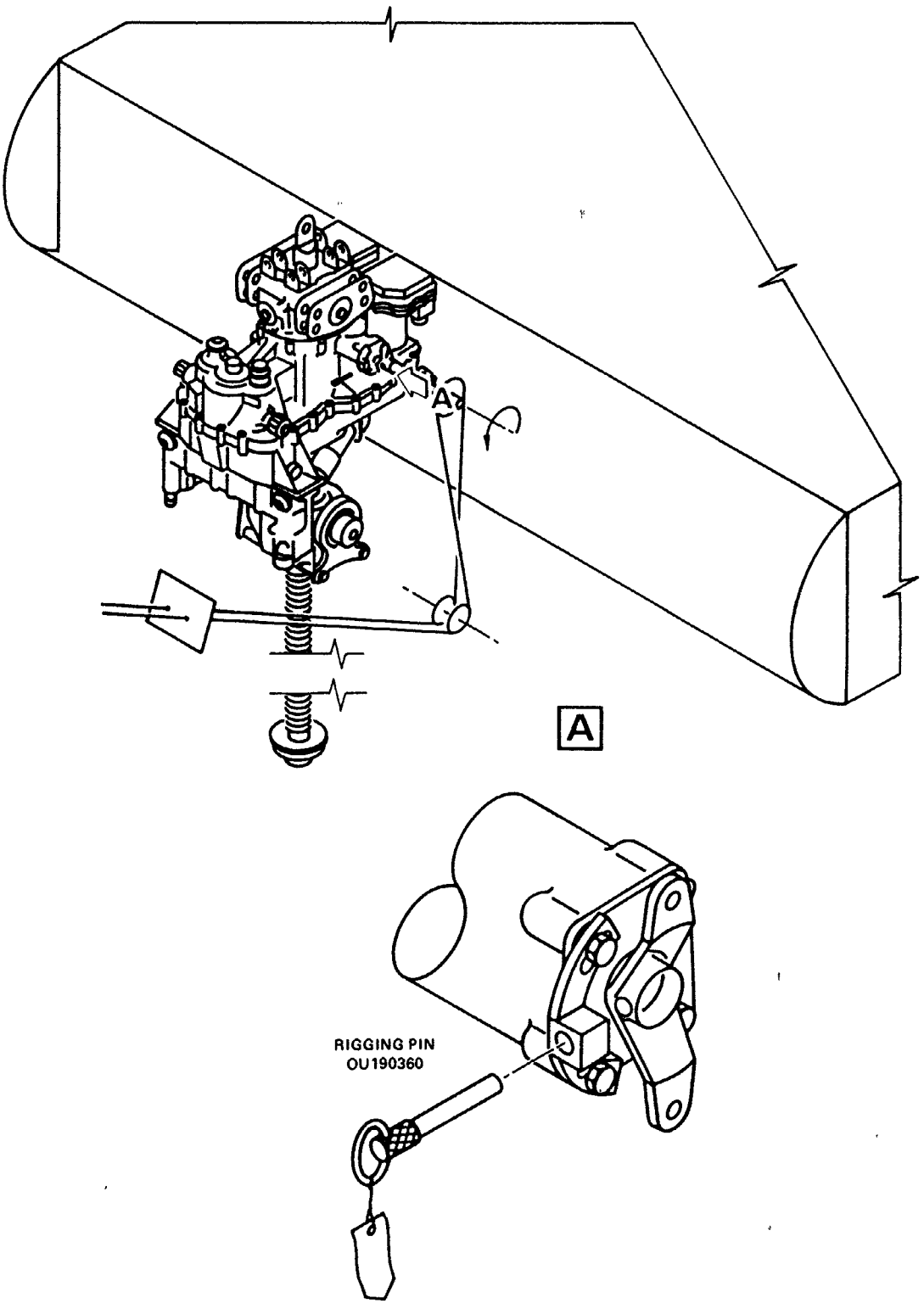
B. Job Set-up Information
(1)Equipment and Materials

ITEM	DESIGNATION
(a)	Thermometer
(b)	Warning notice
(c)	Access platform 2.5 m (8 ft. 2 in.)
(d)	Access platform 5.0 m (16 ft. 5 in.)
(e)0U190360	Rigging Pin-THS Actuator Mechanical Input Lever
R (f)97A27302009000	Locking Equipment - Pitch Trim Control Wheel
R (g)98A27103001000 R or R 700 000 23	Wedge - Locking Pitch Trim Control Cable Tension Regultr

Referenced Procedures

ITEM	DESIGNATION
- 12-33-21, P. Block 001	Ground Air Pre-conditioning
- 24-41-00, P. Block 301	AC External Power Control
- 27-40-00, P. Block 501	THS
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-23-00, P. Block 301	Yellow Auxiliary Power
- 52-30-00, P. Block 301	Cargo-Compartment Doors
	Cable Fabrication Manual

C. Job Set-up
(1)Get access
(a)Put the access platform in position below the access door 811.
(b)Open the access door 811.
(c)Put the access platform in position below the access door 312AR.
(d)Open the access door 312AR.
(e)Open the FWD and AFT cargo-compartment doors (Ref. 52-30-00, P. Block 301).
(f)Put the access platform in position at the FWD and AFT cargo-compartment doors.
(g)In the zone 121, remove floor panel 121XF to gain access to cable tension regulator.
(h)In the zone 151, remove the cargo-compartment floor panel 151AF.
(j)In the zone 161, remove the cargo-compartment floor panel 161BF.
(k)At frame 20, remove access doors 131BZ, 131CZ, 131DZ.
(2)Aircraft maintenance configuration
(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b)Make sure that the air conditioning is de-energized (Ref. 12-33-21, P. Block 001).
(c)The aircraft must stay in a hangar for 3 hours at least with all its doors open.
(d)The ambient temperature should be withing a range of between 0 deg. C (32.00 deg. F) and 30 deg. C (86.00 deg. F).
NOTE : The cable routing area must not be lit by neon located close to the cable itself.
(e)Energize the aircraft electrical circuits (Ref. 24-41-00, P. Block 301).
(f)Pressurize the Green and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301) and (Ref. 29-23-00, P. Block 301).
(g)Move the THS to the nose down stop and measure and record the clearances between the 4 turnbuckles and their static fairleads.
(h)Move the THS to the nose up stop and measure and record the clearances between the 4 turnbuckles and their static fairleads.
(j)Operate the THS fully more than ten times and set it to the zero position.
R (k)Make sure that the pitch-trim control wheels are in the '0' position,
R held in position by the locking equipment 97A27302009000.
(l)Put the warning notice in position in the flight compartment to tell



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THS Actuator Input Lever
Figure 503

persons not to operate the pitch trim.

(m)Install the rigging pin 0U190360 in the mechanical input of the THS actuator.

(n)Make sure that the wedge 98A27103001000 or 700 000 23 is not installed on the tension regulator.

(o)Depressurize the Green and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301) and (Ref. 29-23-00, P. Block 301).

(p)De-energize the aircraft electrical circuits (Ref. 24-41-00, P. Block 301).

D. Procedure

(Ref. Fig. 504)

(Ref. Fig. 505)

(1)Shortening of the THS cable length

(a)Measure and record the cable zone temperature and the external temperature with a thermometer. Make sure that the temperature is the same at +/- 2 deg. C (+/- 3.6 deg. F).

(b)Adjust all four turnbuckles to the dimension 'Z' = 30 mm (1.1811 in.).

(c)Define the value to shorten the cable length.

NOTE : Cut both cables by the same value.

1 In zone 161, put marks on both cables where the cable routing is straight and nearby the structure.

2 In the fuselage between two static fairleads, pull simultaneously on both cables until the index of the tension regulator reaches the position related to the recorded ambient temperature.

NOTE : Pull the cables to the rear to get the necessary force and measure the cable stroke 'Y' on the aircraft axis.

3 Measure with the marks (on the cables and on the structure) the cable stroke 'Y' on each cable to get the necessary cable length.

4 Subtract 33 mm (1.2992 in.) for each cable side from the value measured before.

NOTE : 33 mm (1.2992 in.) is the cable penetration into the terminal stud of one turnbuckle.

5 The value 'X' (to shorten the cable length) = 'Y' (cable stroke) - 33 mm (1.2992 in.).

Example : Measured cable stroke 'Y' for each cable = 110 mm
Cable penetration into the terminal stud = 33 mm
Value 'X' to shorten the cable length = 110 mm - 33 mm
= 77 mm

Cut both cables by 77 mm (3.0314 in.).

(d)Use the measured clearance between the turnbuckles and the static fairleads to decide to cut the front or the rear cable junction by the calculated value.

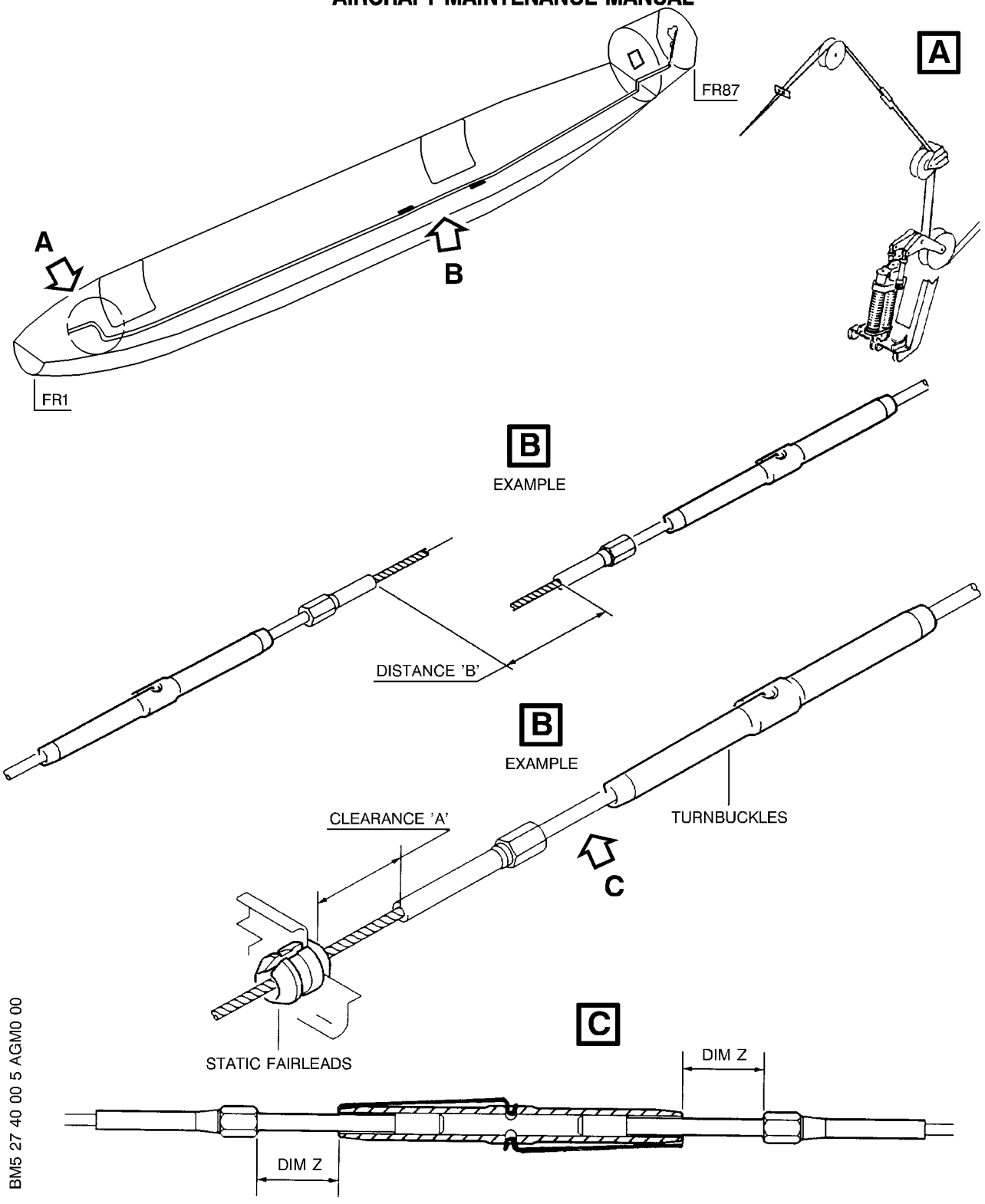
NOTE : Cut both cables by the same value.

(e)Install the wedge 98A27103001000 or 700 000 23 on the tension regulator.

(f)Install the new turnbuckles on the cable (Ref. Cable Fabrication Manual).

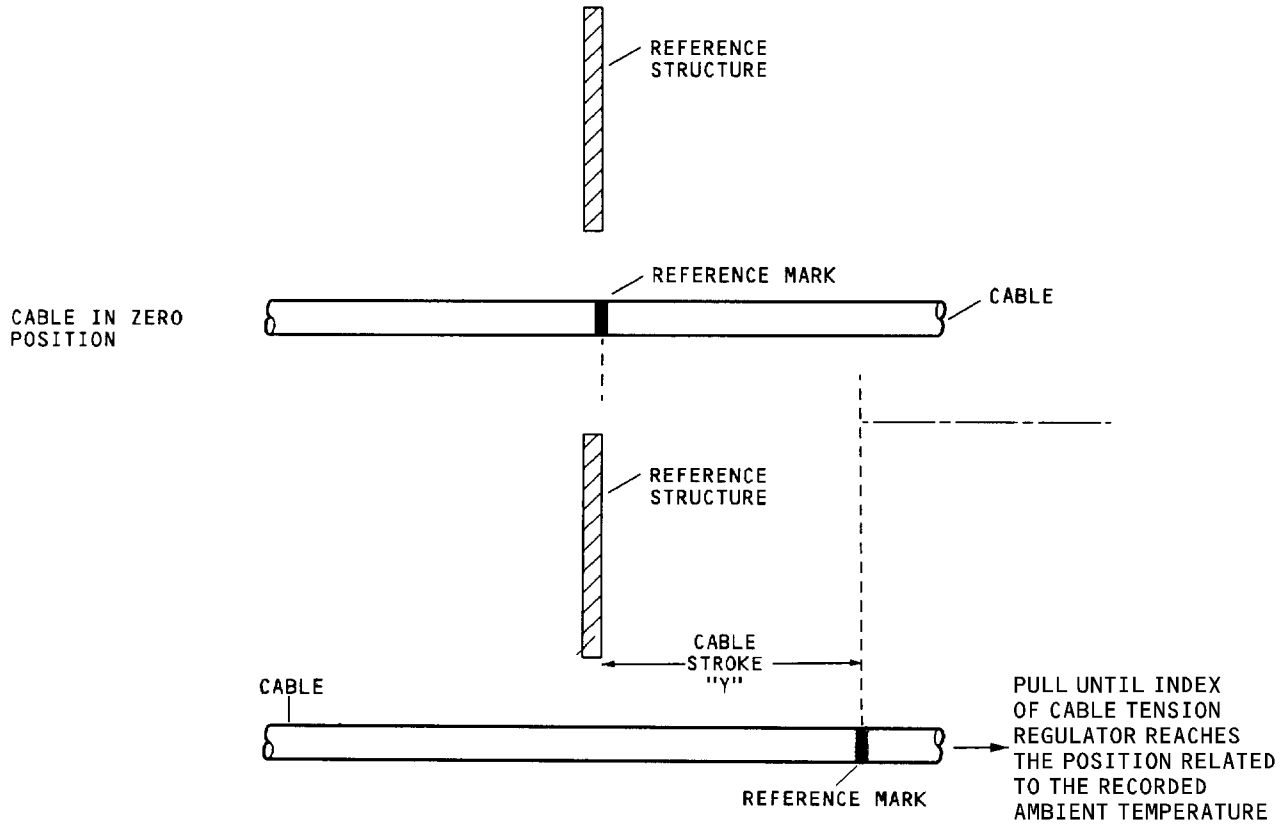
(g)Do the adjustment of the THS cable tension (Ref. 27-40-00, P. Block 501).

R (h)Make sure that the clearance 'A' between the four turnbuckles

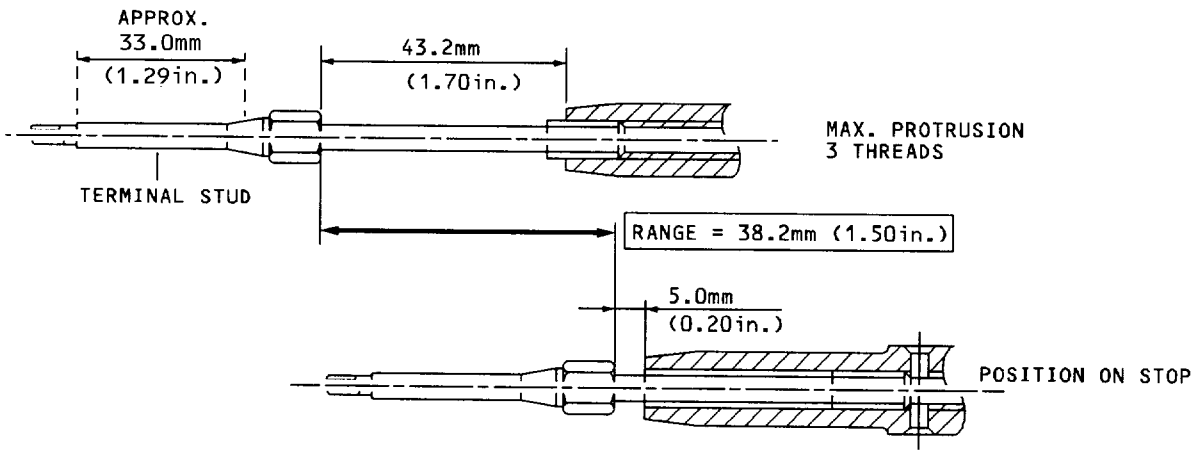


THS Cable Turnbuckles
Figure 504

MEASUREMENT OF CABLE STROKE "Y"



ADJUSTMENT RANGE OF TURNBUCKLE



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Cable Stroke 'Y'
Figure 505

R

R and the fairleads minimum is 40 mm (1.5748 in.) over the full travel
R range of the THS control
R (Ref. Fig. 504).
R (j)Make sure that the distance 'B' between the ends of the turnbuckles
R in each THS control cable is more than 0 mm (0. in) in any position
R (Ref. Fig. 504).
R (k)Make sure that the turnbuckles are in the adjustment range of 38.2 mm
(1.5039 in.)
(Ref. Fig. 505).

E. Close-up
(1)Close access
(a)Make sure that the work area is clean and clear of tools and other items.
(b)Close the access door 312AR.
(c)Close the access door 811.
(d)Remove the access platform(s).
(e)In the zone 121, install floor panel 121XF.
(f)In the zone 151, install the cargo-compartment floor panel 151AF.
(g)In the zone 161, install the cargo-compartment floor panel 161BF.
(h)Close the FWD and AFT cargo-compartment doors (Ref. 52-30-00, P. Block 301).
(j)At frame 20, install access doors 131BZ, 131CZ, 131DZ.
(k)Remove the ground support and maintenance equipment, the special and standard tools and all other items.
(2)Put the aircraft back to its initial configuration
(a)Remove the rigging pin 0U190360 from the mechanical input.
(b)Remove the wedge 98A27103001000 or 700 000 23 from the tension regulator.
(c)Remove the locking equipment 97A27302009000 from the control wheel.
(d)Remove the warning notice(s).

3. Cutting of a New Aft Control THS Cable

CAUTION : THIS PROCEDURE MUST BE PERFORMED IN A HANGAR.

WARNING : MAKE SURE THAT THE SAFETY DEVICES AND THE WARNING NOTICES ARE IN POSITION BEFORE YOU START A TASK ON OR NEAR :
- THE FLIGHT CONTROLS
- THE FLIGHT CONTROL SURFACES
- THE LANDING GEAR AND THE RELATED DOORS
- COMPONENTS THAT MOVE.

WARNING : MAKE SURE THAT THE TRAVEL RANGES OF THE FLIGHT CONTROLS ARE CLEAR. MOVEMENT OF FLIGHT CONTROLS CAN CAUSE INJURY TO PERSONS AND/OR DAMAGE.

CAUTION : MAKE SURE THAT THE AIRCRAFT IS IN THE TEMPERATURE CONDITIONS (STABLE AMBIENT TEMPERATURE) SPECIFIED IN THE MAINTENANCE CONFIGURATION PARAGRAPH.
CHANGES IN THE TEMPERATURE CAN CAUSE INCORRECT MEASUREMENTS.

A. Reason for the Job

Do this procedure when you install a new aft control cable of the THS.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Thermometer
(2)	Warning Notice
(3)	Access Platform 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
(4)OU190360	Rigging, Pin-THS Actuator Mechanical Input Lever
(5)97A27302009000	Locking Equipment - Pitch Trim Control Wheel
(6)98A27103001000 or 700 000 23	Wedge - Locking Pitch Trim Control Cable Tension Regultr
Referenced Procedures	
- 12-33-21, P. Block 001	Ground Air Pre-conditioning
- 24-41-00, P. Block 301	AC External Power Control
- 27-40-00, P. Block 401	Trimmable Horizontal Stabilizer
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	Cable Fabrication Manual

C. Procedure

(1)Job set-up

(a)Get access

1 Make sure that access platform is in position below the access door 812.

2 Make sure that the access door 812 is open.

3 Make sure that, in zone 151, cargo-compartment floor panel 151AF is removed.

4 Make sure that, in zone 161, cargo-compartment floor panel 161BF is removed.

(b)Aircraft maintenance configuration

NOTE : Let the temperature in the aircraft become stable for three hours before you start this procedure.

1 Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

2 Make sure that the air conditioning is de-energized (Ref. 12-33-21, P. Block 001).

3 Make sure that the Green, Blue and Yellow hydraulic systems are depressurized (Ref. 29-10-00, P Block 301).

4 The ambient temperature should be within a range of between 0 deg. C (32 deg. F) and 30 deg. C (86 deg. F).

NOTE : The cable routing area must not be lit by neon located close to the cable itself.

5 Make sure that the pitch/trim control wheels are in the '0' position, and secure with locking equipment 97A27302009000.

6 Put the warning notice in position in the flight compartment to

tell persons not to operate the pitch trim.

7 Make sure that rigging pin 0U190360 is in position in the mechanical input of the THS actuator.

8 Make sure that wedge 98A27103001000 or 700 000 23 is in position on the cable tension regulator.

(2)Measurement

(a)Measure and record the cable zone temperature and the external temperature with a thermometer. Make sure that the temperature is the same at ± 2 deg. C (± 3.6 deg. F).

(3)Cutting of the aft control cable of the THS
(Ref. Fig. 506)

(a)Pre-stretch cable to a value of 25 daN (56.20 lbf) using tensiometer.

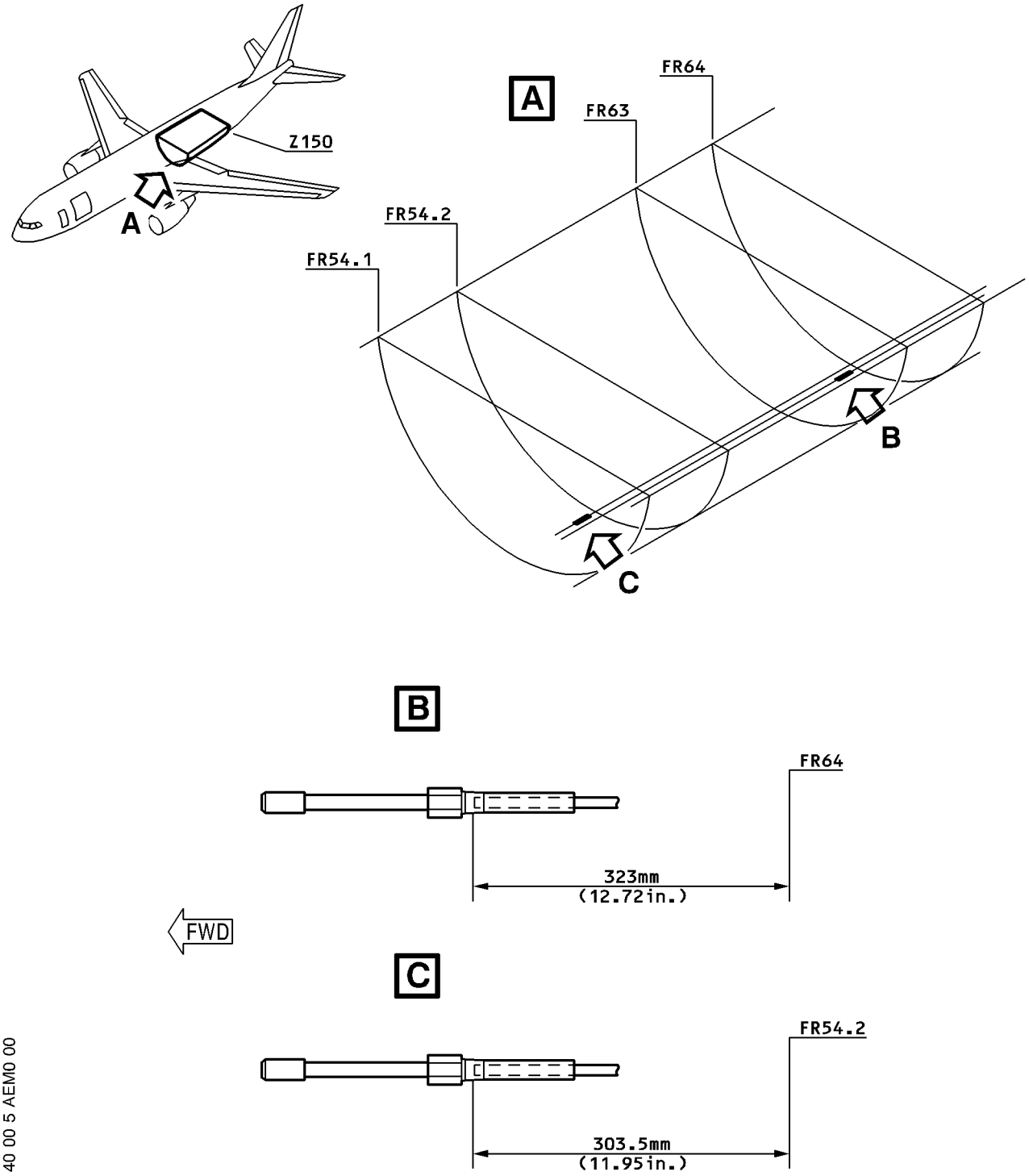
(b)Measure the distance between FR54.2 (FR64) and the right (left) aft control cable of the THS.

(c)Make a mark on each cable :
- for the right cable : at 303.5 mm (11.95 in.).
- for the left cable : at 323 mm (12.72 in.).

(d)Cut the cables at the marks you did before.

(e)Install a new stud terminal on the cable (Ref. CFM Cable Fabrication Manual).

(f)Continue installation of cables (Ref. 27-40-00, P. Block 401).



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THS Cable Cutting Measurement
Figure 506

R

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

R 1. Reason for the Job

R A. Check of Cable Tension on Pitch Trim Control Linkage
R B. Check of Control Cables

R 2. Check of Cable Tension on Pitch Trim Control Linkage

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Tensiometer
(2)	Thermometer
Referenced Procedure - 27-40-00, P. Block 501	Trimmable Horizontal Stabilizer

B. Procedure

(1)Job set-up

(a)Open access door 121BL, 121XF

(b)Record ambient temperature.

NOTE : Prior to taking readings, allow cable tension regulator area temperature to equalize outside temperature.

(c)If temperature is below 22°C (72°F)

- Make certain that on trim control cable tension regulator the top of the locking crossbeam is opposite the relevant compensation scale graduation on the slide rod, determined against the ambient temperature by means of the upper cable tension adjustment graph (Ref. 27-40-00, P. Block 501).

NOTE : Cable tension must be between 16.6 daN (37.3 lbf) and 32.25 daN (72.5 lbf).

(d)If temperature is above 22°C (72°F), cable tension regulator locking crossbeam is against stop.

- position a tensiometer on each of the two cables of the trim control

cable tension regulator (STA972/FR10 and STA1019/FR11).
Check that tensions read on tensiometer correspond to temperature, as shown on relevant lower graph (Ref. 27-40-00, P. Block 501).

(2)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Close access doors.

R 3. Check of Control Cables

R A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2 to 5,50 m (6 ft. to 18 ft.)
Referenced Procedures	
- 20-29-12,P. Block 1	Control Cable Check
- 20-29-13, P. Block 1	Cable Cleaning and Application of Protective Finishes on Cables
- 20-29-14, P. Block 1	Control Cable Rejection Criteria
- 24-41-00, P. Block 301	AC External Power Control
- 27-40-00, P. Block 401	Trimmable Horizontal Stabilizer - Removal/ Installation
- 29-21-00, P. Block 301	Green Auxiliary Hydraulic Power

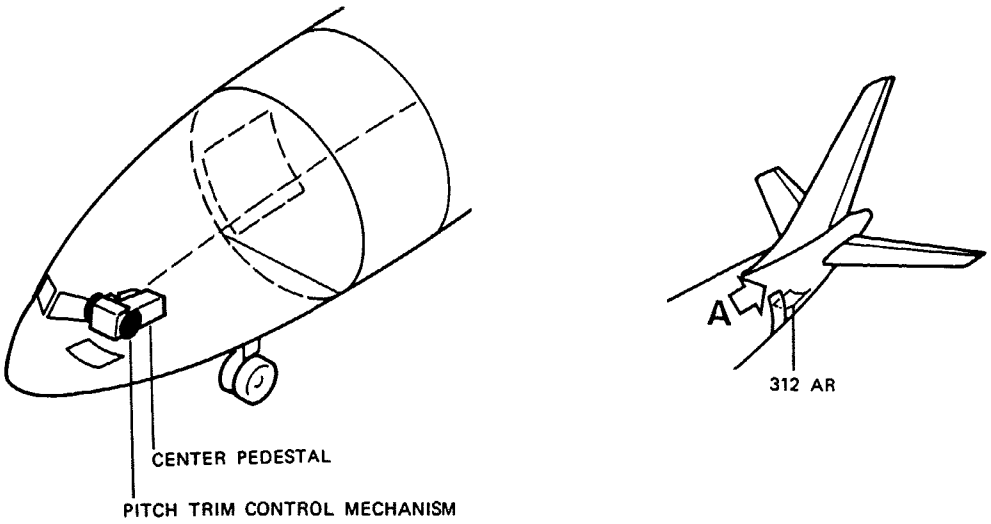
R B. Procedure

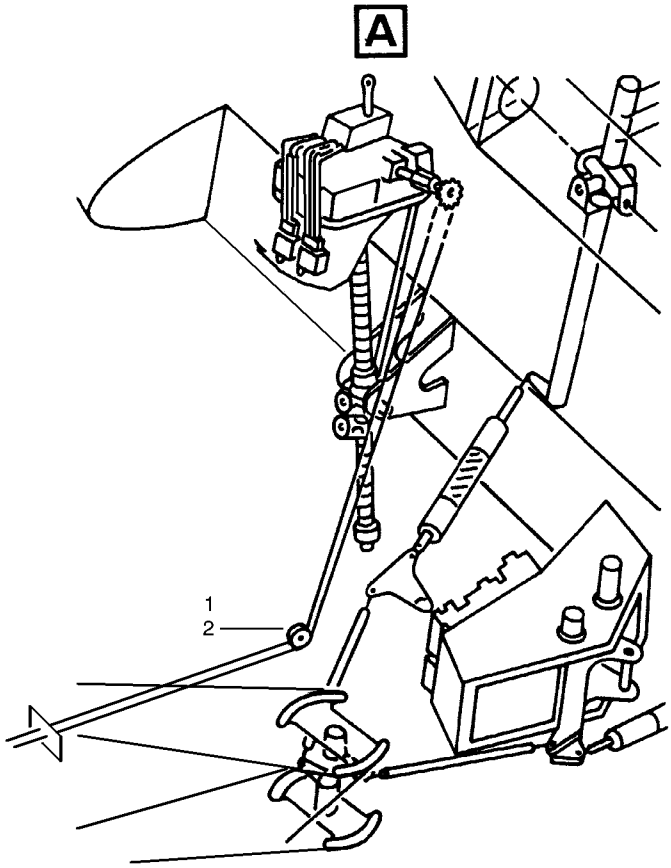
(1)Job set-up
(Ref. Fig. 601)
(a)Position access platform.
(b)Open access door 312AR.
(c)Remove the control cable protective cover to get access to pulleys (1) and (2).
(d)Make certain that pitch trim control wheels are at zero position.

(2)Inspection of cables and pulleys
(a)Check condition of pulleys (1) and (2) (Ref. 20-29-14, P. Block 1).
(b)Clean control cables (Ref. 20-29-13, P. Block 1).
(c)Check cables for wear and corrosion (Ref. 20-29-12, P. Block 1).

(d)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics racks ventilation is correct.
(e)Pressurize Green hydraulic system using Green electric pumps (Ref. 29-21-00, P. Block 301).

WARNING : MAKE SURE THAT THE PULLEYS AND CONTROL CABLES ARE CLEAR. MOVEMENT OF THE PITCH TRIM CONTROL WHEELS CAN CAUSE INJURY TO PERSONS.





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Location of Cables and Pulleys
Figure 601

(f)Rotate pitch trim control wheels to nose up position.
(g)Check condition of pulleys (1) and (2) (Ref. 20-29-14, P. Block 1).
(h)Clean control cables (Ref. 20-29-13, P. Block 1).
(j)Check cables for wear and corrosion (Ref. 20-29-12, P. Block 1).

WARNING : MAKE SURE THAT THE PULLEYS AND CONTROL CABLES ARE CLEAR. MOVEMENT OF THE PITCH TRIM CONTROL WHEELS CAN CAUSE INJURY TO PERSONS.

(k)Rotate pitch trim control wheels to nose down position.
(l)Check condition of pulleys (1) and (2) (Ref. 20-29-14, P. Block 1).
(m)Clean control cables (Ref. 20-29-13, P. Block 1).
(n)Check cables for wear and corrosion (Ref. 20-29-12, P. Block 1).

WARNING : MAKE SURE THAT THE PULLEYS AND CONTROL CABLES ARE CLEAR. MOVEMENT OF THE PITCH TRIM CONTROL WHEELS CAN CAUSE INJURY TO PERSONS.

(p)Return pitch trim control wheels to zero position.

(q)If the corroded and/or broken wires are found to be outside the limit, replace the control cables (Ref. 27-40-00, P. Block 401).
(r)Protect the control cables (Ref. 20-29-13, P. Block 1).

R01 (3)Close-Up
(a)Shut off Green hydraulic power supply (Ref. 29-21-00, P. Block 301).
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(d)Install the removed control cable protective cover.
(e)Close access door 312AR.
(f)Remove access platform.

MECHANICAL CONTROL (THS) - DESCRIPTION AND OPERATION

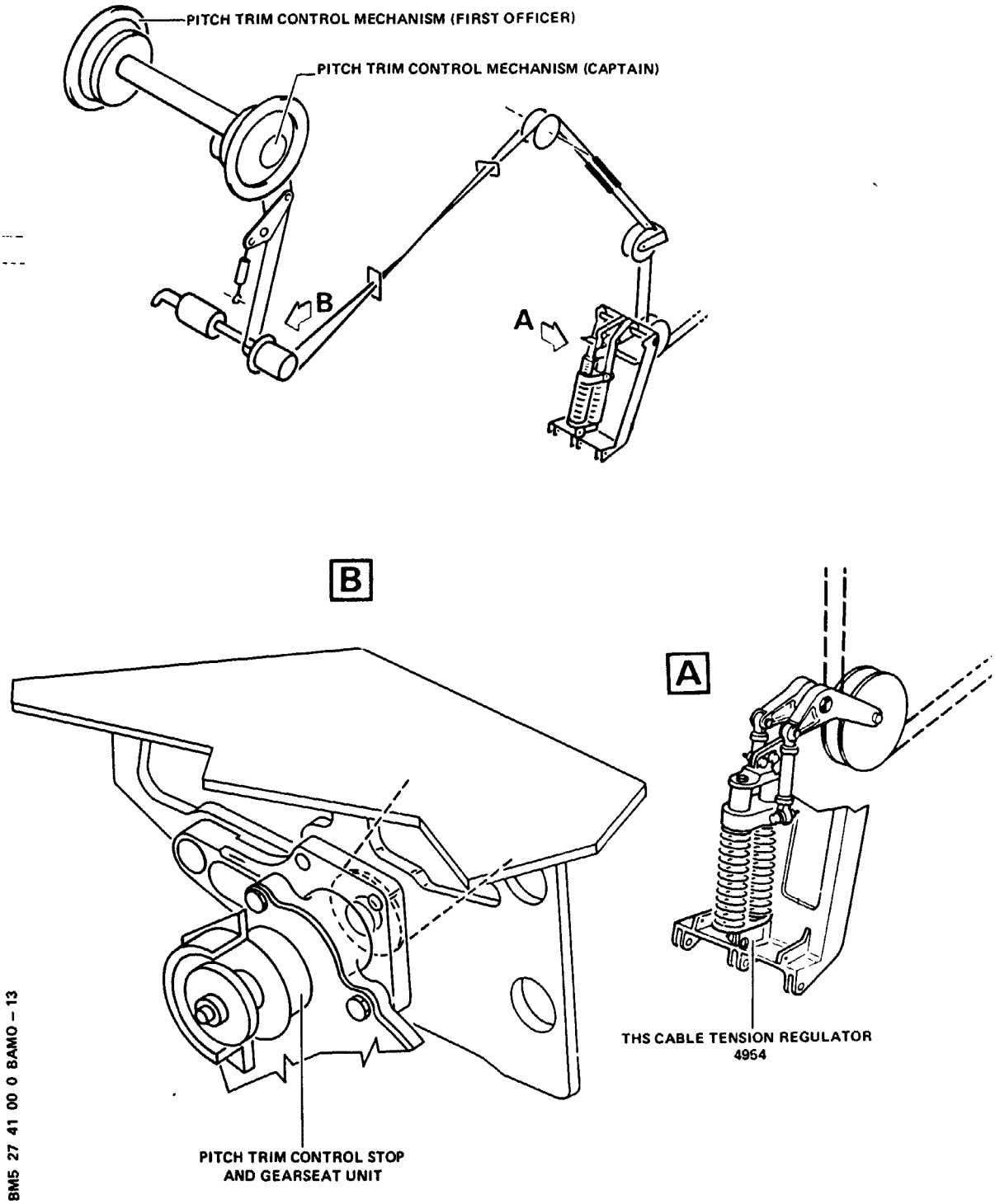
1. General

The trimmable horizontal stabilizer is operated by an actuator.
The mechanical control system consists of two rotating control wheels mounted one on each side of the center pedestal, driving a chain and cable loop up to the mechanical input of the actuator.

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
4954	TENSION REG-THS CABLE		121	121BL	27-41-12
	CONTROL MECHANISM-PITCH TRIM, CAPT		211		27-41-11
	CONTROL MECHANISM-PITCH TRIM, F/O		212		27-41-11
	STOP AND GEARSET UNIT-PITCH TRIM CONTROL		121	121BL	27-41-15



Component Location
Figure 001

3. Component Description

A. Cable Tension Regulator
Cable tension is maintained constant by a cable tension regulator.

B. Stops and Rigging Facilities
Control wheel travel is limited by a non adjustable rotation stop installed in the center pedestal.
Another mechanical rotation stop is installed in the THS actuator, at the input shaft.
THS structural stops are provided by the end of stroke stops of the actuator ball screwjack.
Rigging pins : Rigging pin holes are provided to facilitate rigging.
(Ref. Fig. 002)

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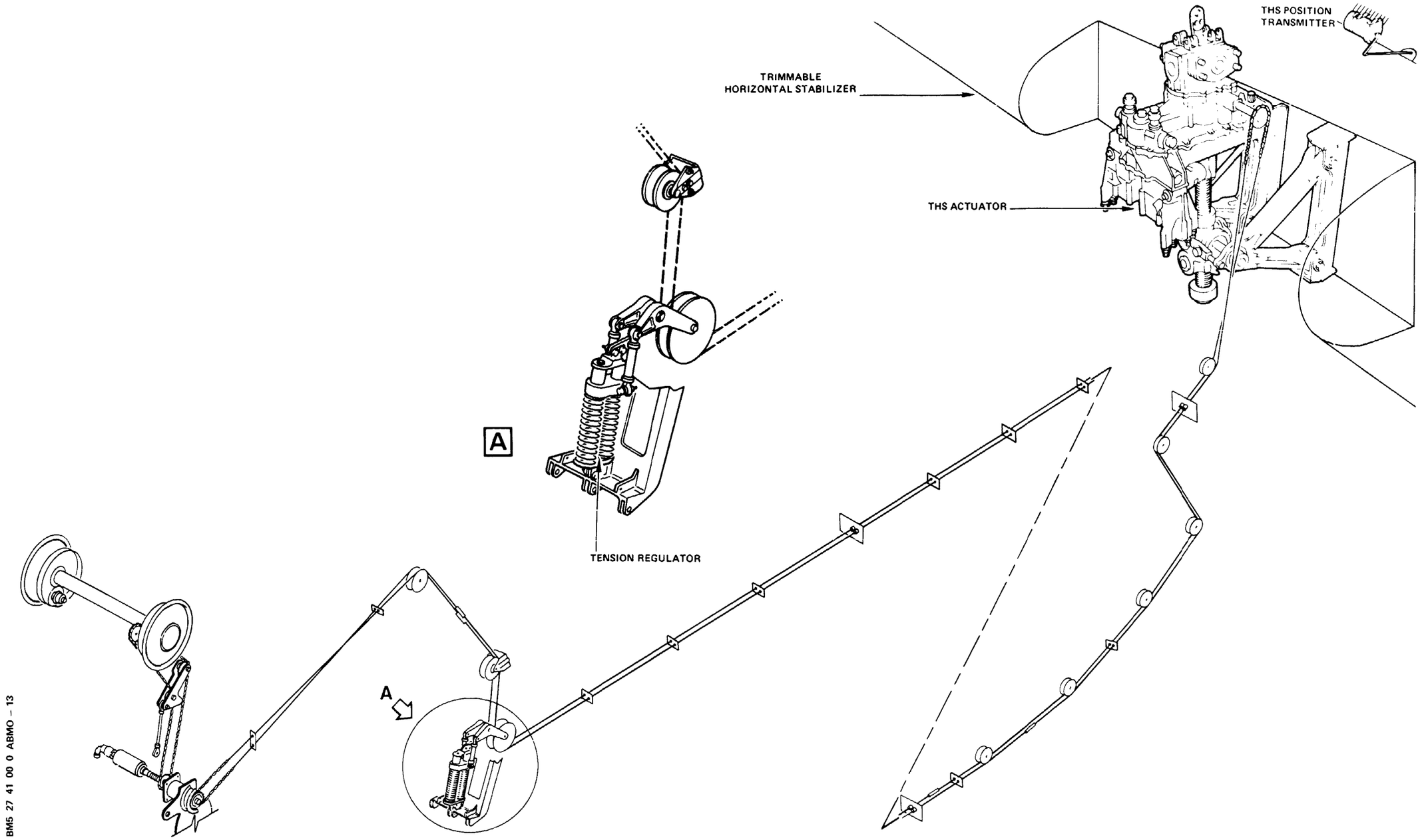


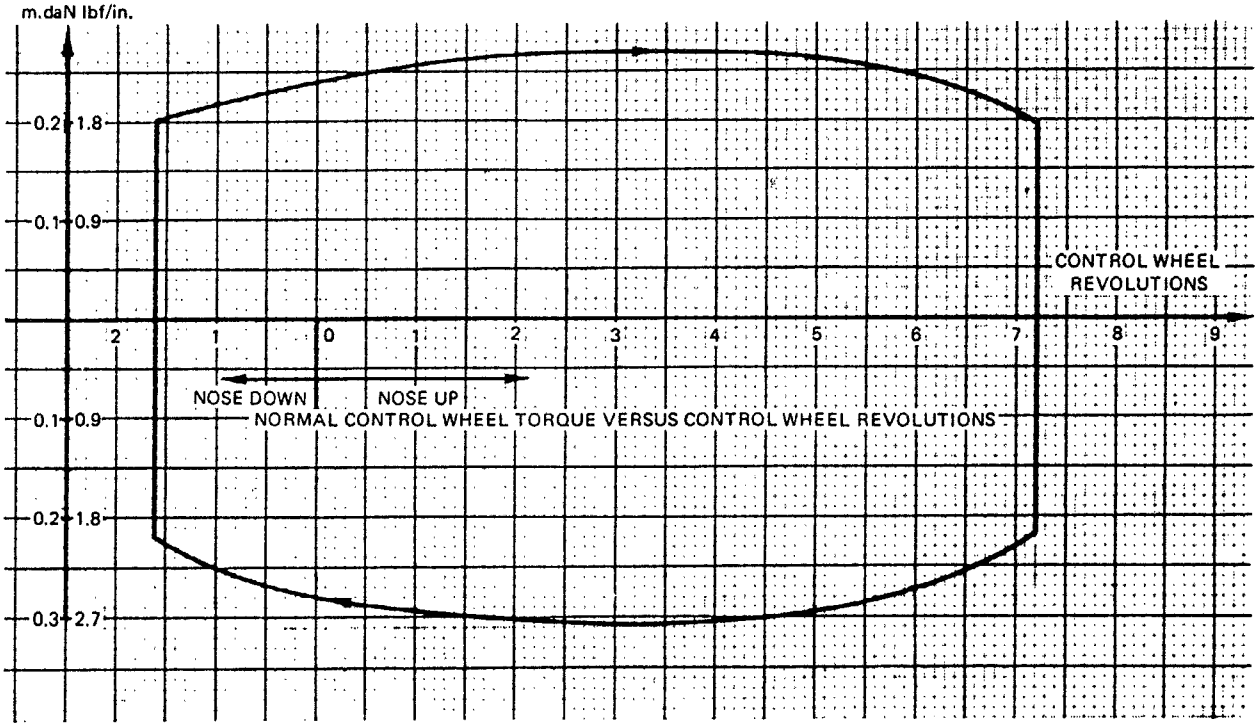
Trimmable Horizontal Stabilizer - Mechanical Control
Figure 002

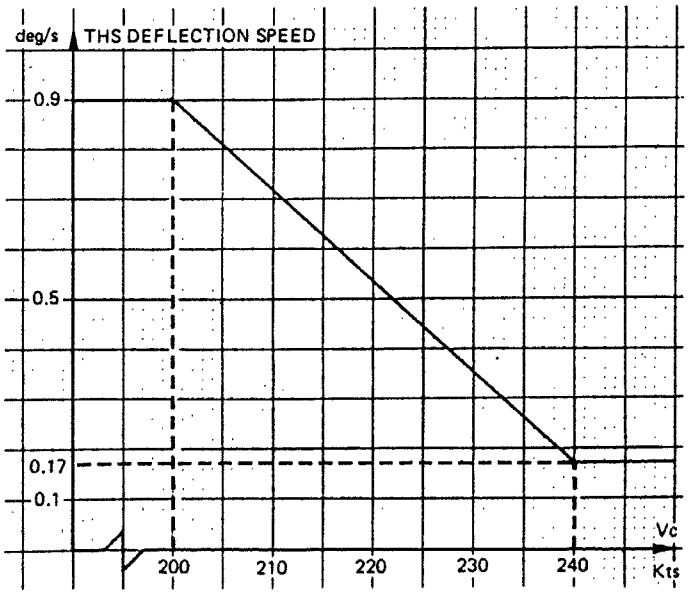
4. Leading Particulars

- THS maximum authority : 3° A/C nose down ; 14° A/C nose up
- Normal control wheel torque (Ref. Fig. 003)
- Electric pitch trim actuator override force (by trim control wheel)
  - with electric actuator jam : 1 m.daN
  - with electric actuator runaway : 0.45 m.daN
- Stops

	THS deflection	
	A/C Nose down	A/C Nose up
Center pedestal stops	3 ° + 0.31 ° - 0°	14 ° + 0.31 ° - 0°
THS actuator input shaft stops	3 ° + 0.15° - 0.17°	14 ° + 0.15° - 0.17°
Actuator ball screwjack stops	3.35 °	14.35 °
THS limit position sensor	2.5° + 0° + 0.17°	13.50° +0° +0.17°

- Pitch trim control wheel :
  . Radius : 100 mm (3.94 in.)
  . Travel : + 1.58 revolution
  - 7.25 revolutions
- Rates of travel :
  . Normal electrical mode : (Ref. Fig. 003)
  . Mechanical mode : (Ref. 27-44)





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THS Deflection Speed in Normal Electrical Mode
Figure 003

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENTS, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

CAUTION : FOR THS ACTUATOR MANUAL ACTUATION THE MECHANICAL INPUT MUST NOT BE RIGGED. THE PRESSURE OFF BRAKE MUST FIRST BE RELEASED AND THE ACTUATOR SCREW STROKE MUST BE LIMITED.

CAUTION : POWER TOOLS ARE NOT TO BE USED FOR MANUAL ACTUATION.

1. Reason for the Job

A. Actuation of THS Actuator using manual drive input.

2. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 5.5 m (18 ft.)
	B. OU143742	Tool - Claw Stop Extension (Qty. 2)
	C. OU190362	Tool - Brake Release, THS Actuator
R	D.	Torque Wrench up to 2.2 mdaN (16.22 lbf.ft)
R	E.	Standard Socket Wrenches
R	F.	Standard Ratchet Handle
R	G.	Warning Notices
R	H.	Circuit Breaker Safety Clips
R	J.	Corrosion-Resistant Steel Lockwire, 0.8 mm (0.032 in.) dia.

3. Procedure

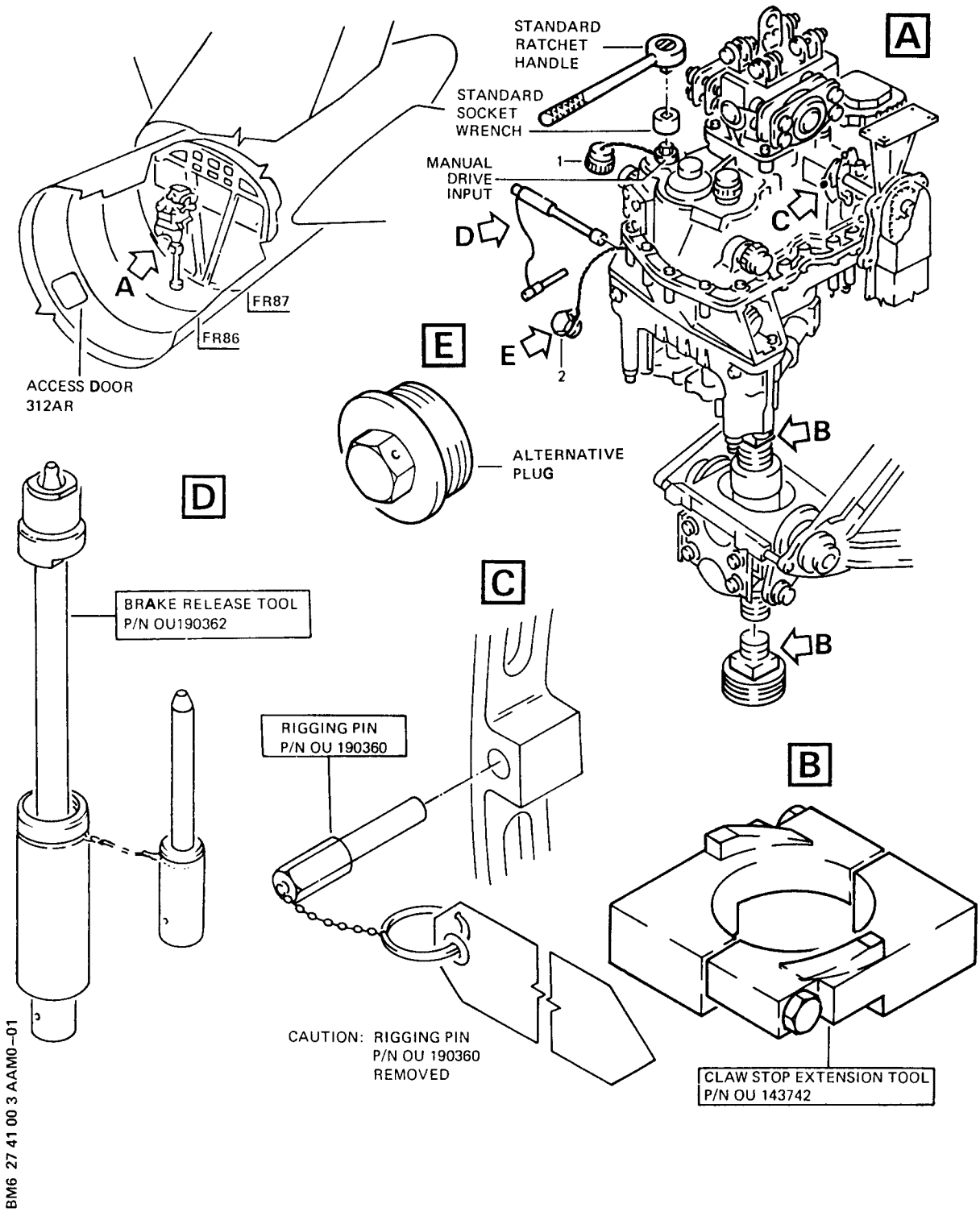
A. Job Set-Up (Ref. Fig. 301)
(1)Position access platform.
(2)Open access door 312AR.
(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC 1		103/G 3 to G 7
21VU	FAC 2		103/G 8 to G12
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(4)Display warning notice in flight compartment prohibiting operation of pitch controls.
(5)Display warning notices, prohibiting repressurization of hydraulic systems.
(6)Make certain that locking equipment P/N 97A27302009000 is not installed on pitch trim control wheel in flight compartment.
(7)Make certain that THS travel range is clear.

B. Actuation (Ref. Fig. 301)
CAUTION : THE MECHANICAL INPUT MUST NOT BE RIGGED.
(1)Make certain that rigging pin P/N 0U190360 is not installed in THS actuator mechanical input.
CAUTION : THE ACTUATOR SCREW STROKE MUST BE LIMITED.
(2)Install claw stop extension tool P/N 0U143742 (Qty. 2) on upper and lower claw stops.
(3)Cut and remove lockwire from RH plug (2).
R (4)Remove RH plug (2) with 30 mm socket wrench.
R NOTE : Alternative plug (2) for 3/8 inch wrench may be installed.
R (5)Install brake release tool P/N 0U190362.
R (6)Release RH brake and safety with attached pin.
R (7)Disconnect cap (1) from manual drive input.
CAUTION : POWER TOOLS ARE NOT TO BE USED.
R (8)Using ratchet handle and 3/8 in. socket wrench, manually operate THS actuator screw by turning RH motor shaft.
NOTE : Manual actuation is to be limited to an actuator screw stroke of 612 +2 -4 mm (24.1 +0.08 -0.16 in.)

C. Completion (Ref. Fig. 301)
(1)Restore THS actuator to normal operating condition as follows:
(a)Connect cap (1).
(b)Remove brake release tool P/N 0U190362 and claw stop extension tool P/N 0U143742 (Qty. 2).
R (c)Install plug (2) and Torque to between 1.8 and 2.2 mdaN (13.27 and
R 16.22 lbf.ft).
R (d)Safety plug (2) with lockwire.
(2)Remove safety clips and tags, and close circuit breakers previously opened in para 3.A.(3).



THS Actuator Manual Actuation
Figure 301

R

D. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)Close access door 312AR.
(3)Remove warning notices.
(4)Remove access platform.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

CAUTION : IF GREEN HYDRAULIC SYSTEM IS PRESSURIZED BY MEANS OF GREEN ELECTRIC PUMPS, THS DEFLECTION SPEED MUST NOT EXCEED 0.5 DEG/S. CHECK ON PITCH TRIM CONTROL WHEELS.

1. Adjustment of Pitch Trim Mechanical control

A. Reason for the Job
To check pitch trim adjustment.
To set to zero trimmable horizontal stabilizer and mechanical control if incorrectly installed.
(1)Checking of trim mechanical control.
R (2)Checking of cable control.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)OU190360	Rigging Pin - THS Actuator Mechanical Input Lever
	(2)	Circuit Breaker Safety Clips
	(3)	Safety Barriers
	(4)	Access Platform, 4 to 8 m (13 ft. 2 in. to 26 ft. 4 in.)
R	(5)	Clinometer
R	(6)97A27302009000	Locking Equipment - Pitch Trim Control Wheel
R	(7)OU190358	Tool - 0° Location, THS Actuator
R	(8)OU190359	Screw - Fixing, 0° Tool P/N OU190358
R	(9)	Double Sided Adhesive Tape
	Referenced Procedures	
	- 24-41-00, P. Block 301	AC External Power Control
R	- 27-44-11, P. Block 401	THS Actuator 35CB
R	- 27-45-00, P. Block 501	Control Surface Position Indicating (THS)
	- 27-40-00, P. Block 501	Trimmable Horizontal Stabilizer
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 27-41-11, P. Block 401	Pitch Trim Control Mechanism
	- 27-41-15, P. Block 401	Pitch Trim Control Stop and Gearbox Unit

ITEM	DESIGNATION
- 27-40-00, P. Block 401	Trimmable Horizontal Stabilizer
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(b)Pressurize Green and Yellow hydraulic systems either :

- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), and
- Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU

- make certain that G and Y pushbutton switches are pressed (in) and legends are off.

(d)Position access platform and safety barriers.

(e)Open access doors 312AR and 121BL.

(f)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1		line 103
21VU	FAC2		line 103

D. Adjustment

(1)Checking of trim mechanical control
(Ref. Fig. 501)

(a)Turn pitch trim control wheel towards zero until rigging pin 0U190360 can be inserted into rigging hole of THS actuator mechanical input lever.

(b)After rigging, check that X = 548mm ± 3mm (21.57 in. ± 0.118 in.). This dimension X defines the neutral position of the THS surface.

NOTE : As an alternative, tools 0U190358 and 0U190359 can be used to check the zero position of the THS actuator.

NOTE : If the dimension X is not correct, replace THS actuator (Ref. 27-44-11, P. Block 401).

(c)Make certain that Captain's pitch trim control wheel is at zero. If it is not the case, adjust the mechanical control as follows :

1 Using the turnbuckles of pitch trim control cables, slightly lengthen one cable and shorten the opposite cable by the same value so that the length of the cable is maintained.

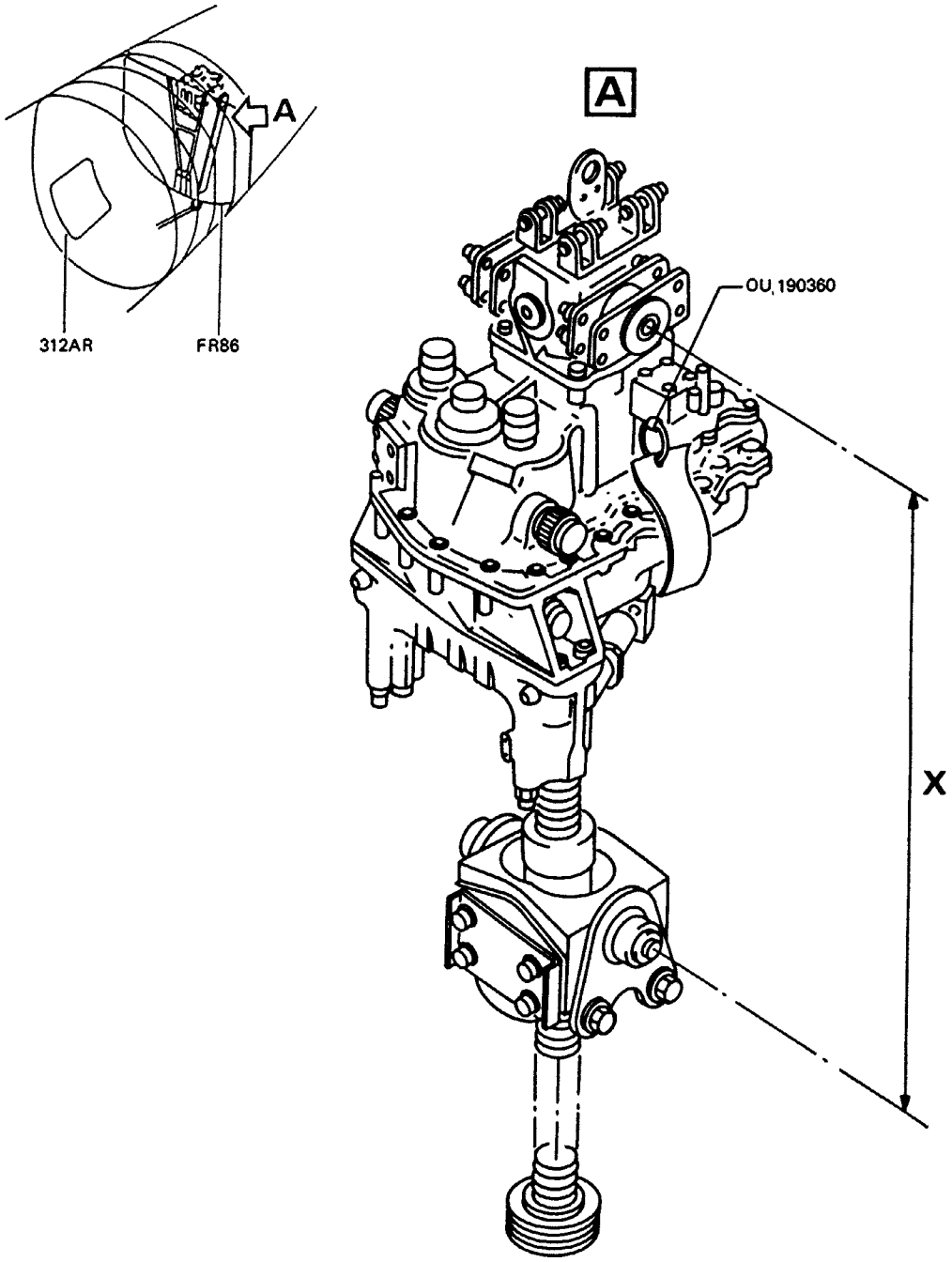
2 Perform this operation until the 0 deg. of the pitch trim control wheel comes next to the pointer.

3 Check the adjustment of the chains in the rear section and under center pedestal (Ref. Para. (2)).

NOTE : This procedure is applicable only for minor corrections.

R (d)Not applicable.

(e)Do a check of the adjustment of the THS position sensor 11CT



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R

THS Actuator Rigging Point
Figure 501

(Ref. 27-45-00, P. Block 501).

(f) Place clinometer attached with double sided adhesive tape, outside the tail cone on the THS upper surface, along the aircraft centerline. Record alpha angle that will be used as a reference. Remove rigging pin 0U190360.

(g) Turn Captain's pitch trim control wheel to nose up stop. Using clinometer, make certain that recorded angle corrected with respect to alpha angle is 14° + 10' - 15'

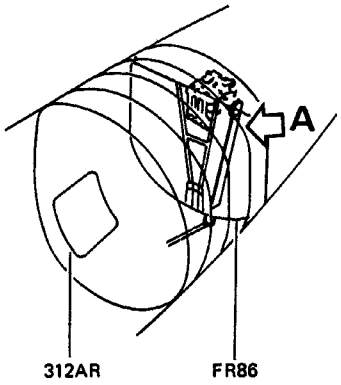
(h) Turn Captain's pitch trim control wheel to aircraft nose down stop. Using clinometer, make certain that recorded angle corrected with respect to alpha angle is 3° + 10' - 15'

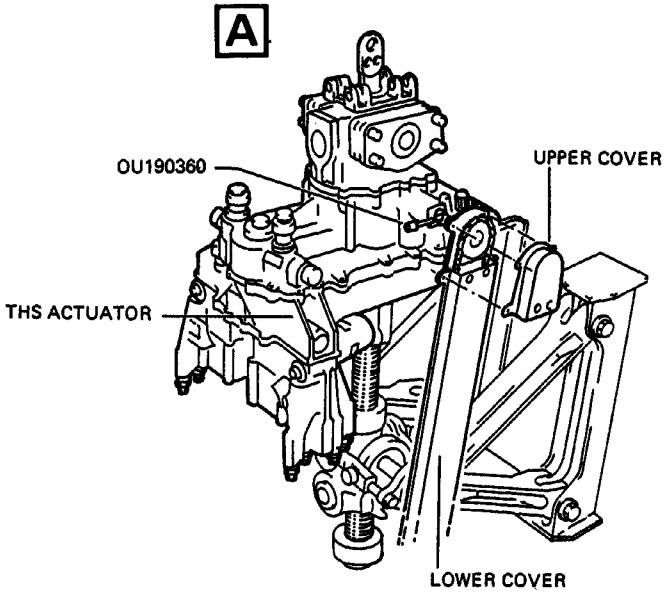
(i) Return Captain's trim control wheel to zero.

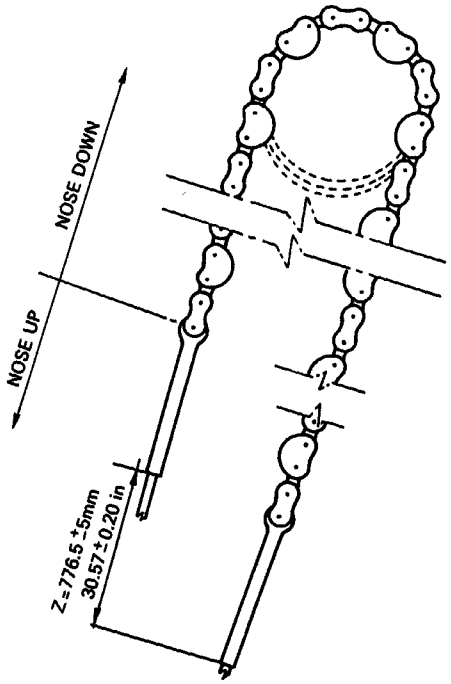
(j) When above conditions are met, pitch trim mechanical control adjustment is completed.

R (2)Checking of cable control
(Ref. Fig. 502)
(Ref. Fig. 503)
(a)Remove covers protecting THS actuator input chain (access door 312AR) (Ref. 27-40-00, P. Block 401).
Connect THS actuator input lever to input sprocket.
(b)Make certain that dimension between cable ends connected to THS actuator input sprocket chain is Z = 776.5 ± 5 mm(30.57 ± 0.20 in.)
(c)Make certain that numbers of links X and Y of chain located under center pedestal correspond to values shown (Ref. Fig. 503).
(d)Check tension of cables (Ref. 27-40-00, P. Block 501).
(e)When above conditions are met, cable control adjustment is completed.
If above conditions are not met, repeat adjustment until given values X, Y and Z are obtained, proceeding as follows :
- remove cables
- install cables and obtain given values (Ref. 27-40-00, P. Block 401).

E. Close-up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close door 312AR and remove access platforms and safety barriers.
(3)On panel 21VU, close circuit breakers FAC1 and FAC2 line 103.
(4)Shut down hydraulic power supply.
Depressurize systems. Where applicable, disconnect hydraulic ground power cart.
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).







CHAIN ADJUSTEMENT AT
THS ACTUATOR INPUT SPROCKET

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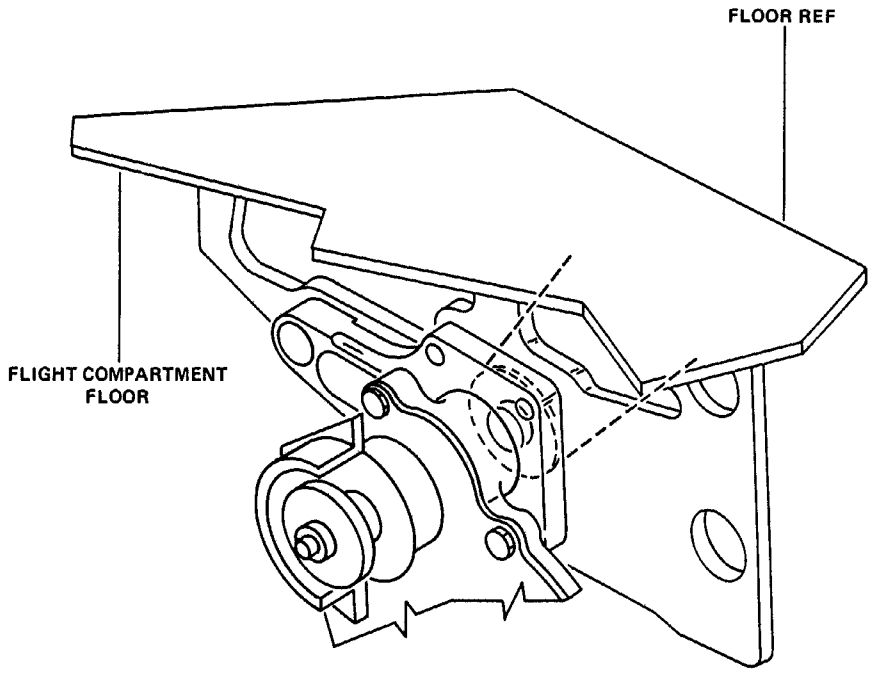
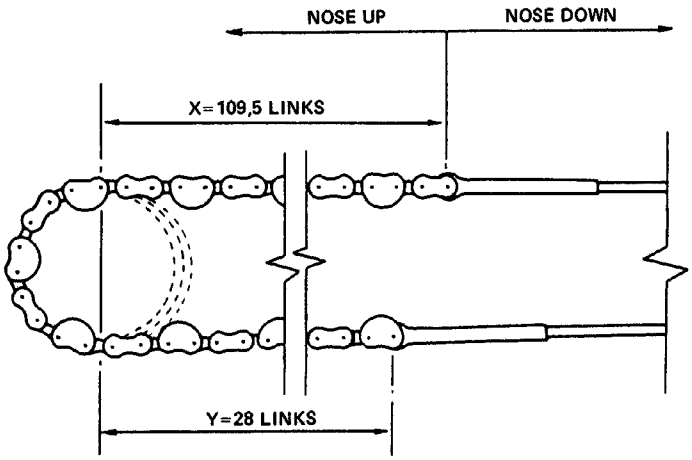
R

Adjustment in Rear Section
Figure 502



CHAIN ADJUSTMENT AT CONTROL PEDESTAL OUTPUT SPROCKET



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Adjustment Under Center Pedestal
Figure 503

2. Operational Test, TO CONFIG warning

R For this test, refer to 27-00-00, P. Block 501.

3. Functional Test of THS Actuator Overfull Travel Range by Reference to Mechanical Indicator

A. Reason for the Job
To make certain that THS electrical and mechanical indications are in accordance and THS stops at full travel range.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization.
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUIT UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEMS UNDER MAINTENANCE HAVE BEEN ISOLATED.

(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Pressurize Green and Yellow hydraulic systems either :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301),
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU
- make certain that G and Y pushbutton switches are pressed (in) and legends are off.
(d)On ECAM control panel 11VU
- press F/CTL pushbutton switch to display FLT CTL page on right ECAM display unit.
(e)Make certain that circuit breakers on overhead panel are closed, particulary those associated with AFS (panel 21VU, lines 102 and 103, and panel 22VU, line 207) and ADS (panel 21VU, line 105, and panel 22VU, lines 204 and 208).
(f)Make certain that flap and slat control lever is in first notch position.
(g)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler funciton not preselected.
- aircraft in ground configuration (L/G PROX DET & RELAYS SYS1 and SYS2 circuit breakers on panel 133VU closed).
- ADS operating
- pitch trim control wheel in neutral position.
(h)Position warning notices and safety barriers.

D. Test

ACTION	RESULT
1. On overhead panel, on FAC/ATS unit - engage PITCH TRIM 1 lever.	Lever remains engaged.
2. On Captain's control wheel - place pitch trim control switch in nose up position.	Check that pitch trim control wheel starts rotating and stops at 13° - 0.3° +0.5° nose up. On right ECAM display unit, FLT CTL page. Make certain that pitch trim position is in accordance with the mechanical indication at the scale at the pitch trim control wheel.
3. Release pitch trim control switch.	
4. On Captain's control wheel - place pitch trim control switch in nose down position.	Check that pitch trim control wheel starts rotating and stops at 2.5° -0.3° + 0.5° nose down. On right ECAM display unit, FLT CTL page. Make certain that pitch trim position is in accordance with the mechanical indication at the scale at the pitch trim control wheeel.
5. On Captain's control wheel - place pitch trim control switch in nose up position and return to zero.	Check that pitch trim control wheel is in zero position.

E. Close-Up
(1)Shut down and disconnect hydraulic ground power cart.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Restore aircraft and system to normal operating condition.

4. THS Functional Test

A. Reason for the Job
To make certain that THS operates correctly by manually acting on Captain's or First Officer's pitch trim control wheel.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Pressurize Green and Yellow hydraulic systems either :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU
- make certain that G and Y pushbutton switches are pressed (in) and legends are off.
(d)On ECAM control panel 11VU
- press F/CTL pushbutton switch to display FLT CTL page on right ECAM display unit.
(e)Make certain that circuit breakers on overhead panel are closed, particularly those associated with FAC1 and FAC2 (panel 21VU, line 103).
(f)Make certain that flap and slat control lever is in first notch position.
(g)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.

D. Function Test

ACTION	RESULT
1. Turn pitch trim control wheel to nose up stop.	On right ECAM display unit, FLT CTL page. - On STAB scale, bug moves upwards. - THS deflects downards to nose up stop.
2. Turn pitch trim control wheel to nose down stop.	On right ECAM display unit, FLT CTL page. - On STAB scale, bug moves downwards. - THS deflects upwards to nose down stop.
3. Return pitch trim control wheel to zero.	- THS returns to zero On right ECAM display unit, FLT CTL page. On STAB scale, bug returns to zero.

E. Close-Up

(1) Shut down hydraulic power supply. Depressurize systems. Where applicable, disconnect hydraulic ground cart.

(2) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

5. System Test

A. Reason for the Job
To measure the angles obtained by THS when it is against either nose up stop or nose down stop by acting on Captain's or First Officer's pitch trim control wheel.

ITEM	DESIGNATION
(1)OU190360	Rigging Pin - THS Actuator Mechanical Input Lever
(2)98A27403000000	Measuring Equipment - Pitch Trin Control Operating Load
(3)97A27902016000	Spring Scale Assy
(4)	Clinometer
(5)	Access Platform, 4 to 8 m (13 ft. 2 in. to 26 ft. 4 in.)
(6)	Safety Barriers
(7)	Double Sided Adhesive Tape
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
(1)Job set-up
(a)Energize the aircraft network (Ref. 24-41-00, P. Block 301).
Make certain that electronics racks ventilation is correct.
(b)Pressurize Green and Yellow hydraulic systems either :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU
- make certain that G and Y pushbutton switches are pressed (in) and legends are off.
(d)Make certain that flap and slat control lever is in first notch position.
(e)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.
(f)Make certain that Captain's pitch trim control wheel is at zero.
(g)Make certain that circuit breaker on overhead panel are closed, particularly those associated with FAC1 and FAC2 (panel 21VU, line 103).
(h)Position access platform and safety barriers.
(j)Open access door 312AR.
(k)Immobilize THS actuator input lever with rigging pin OU190360.
(l)Place double sided adhesive tape outside the tail cone on the THS upper surface.
(m)Place clinometer on double sided adhesive tape and record alpha angle

that will be used as reference for measuring the max. nose up and max. nose down angles.

(n)Remove rigging pin 0U190360 from THS actuator input lever.

D. Test

(1)Deflection measurement

ACTION	RESULT
1. Turn Captain's or First Officer's pitch trim control wheel to nose up stop (graduation -14°).	THS deflects downwards. On right ECAM display unit. - On STAB scale bug reproduces THS deflection.
2. Using clinometer, measure deflection angle. Correct as per reference alpha angle	Value of angle must be 14° +10' -15'.
3. Turn Captain's or First Officer's pitch trim control wheel to nose down stop (graduation 3°)	THS deflects upwards. On right ECAM DISPLAY UNIT. - On STAB scale bug reproduces THS deflection.
4. Using clinometer, measure deflection angle. Correct as per reference alpha angle.	Value of angle must be 3° +10' -15'.
5. Return Captain's or First Officer's pitch trim control wheel to zero.	THS returns to zero. On right ECAM display unit. - On STAB scale bug returns to zero.

(2)Operating load measurement

ACTION	RESULT
1. Install equipment 98A27403000000 on one pitch trim control wheel.	
2. Using a spring scale turn pitch trim control wheel from zero to nose down stop.	- maximum load to rotate pitch trim wheel is less than or equal to 2.5 daN (5.5 lbf.)
3. Using a spring scale, turn pitch trim control wheel from nose down stop to nose up stop.	- maximum load to rotate pitch trim wheel is less than or equal to 2.5 daN (5.5 lbf)
4. Using a spring scale, turn pitch trim control wheel from nose up stop to neutral.	- maximum load to rotate pitch trim wheel is less than or equal to 2.5 daN (5.5 lbf).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 312AR.
(3)Remove access platform and safety barriers
(4)Shut down hydraulic power supply. Depressurize systems. Where applicable, disconnect hydraulic ground power cart.
(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

PITCH TRIM CONTROL MECHANISM - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

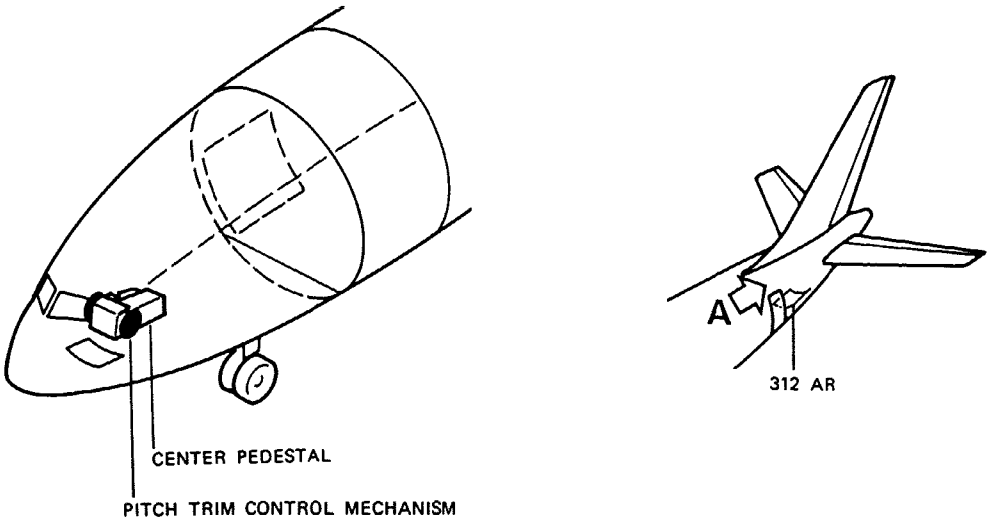
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

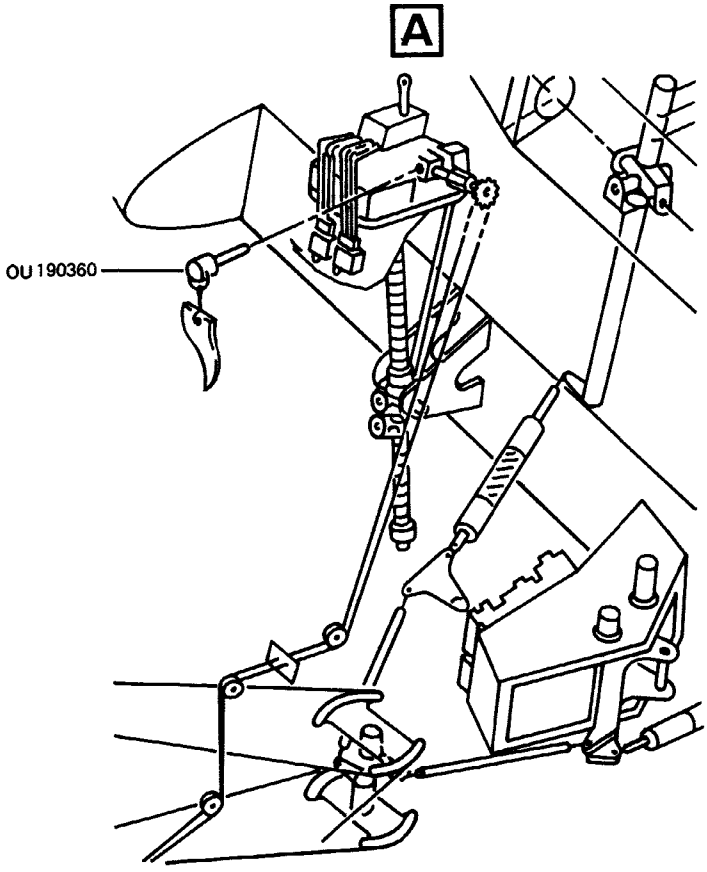
1. Equipment and Materials

ITEM	DESIGNATION
A. 82004A27912600	Checking Tool
B.	Weight, 0.250 kg (0.55 lb.)
C. 0U190360	Rigging Pin - THS Actuator Mechanical Input Lever
D.	Circuit Breaker Safety Clips
E. Material No. 04-004	Common Greases (Ref. 20-31-00)
F.	Warning Notice Prohibiting Flight Controls Operation
G.	Lockwire - Corrosion-Resistant Steel, Dia 0.8 mm (0.032 in.)
H.	Access Platform, 1.5 m to 7 m (5 ft to 23 ft)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-40-00, P. Block 401	Trimmable Horizontal Stabilizer
- 27-41-00, P. Block 501	Mechanical Control (THS)
- 29-21-00, P. Block 301	Green Auxiliary Power

2. Procedure

A. Job Set-up
(Ref. Fig. 401)
(1) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(2) Position access platform.
Pressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block 301).
(3) On SERVO CTL section of panel 428VU
- make certain that B, G and Y pushbutton switches are pressed and legends off.





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Location of Rigging Points
Figure 401

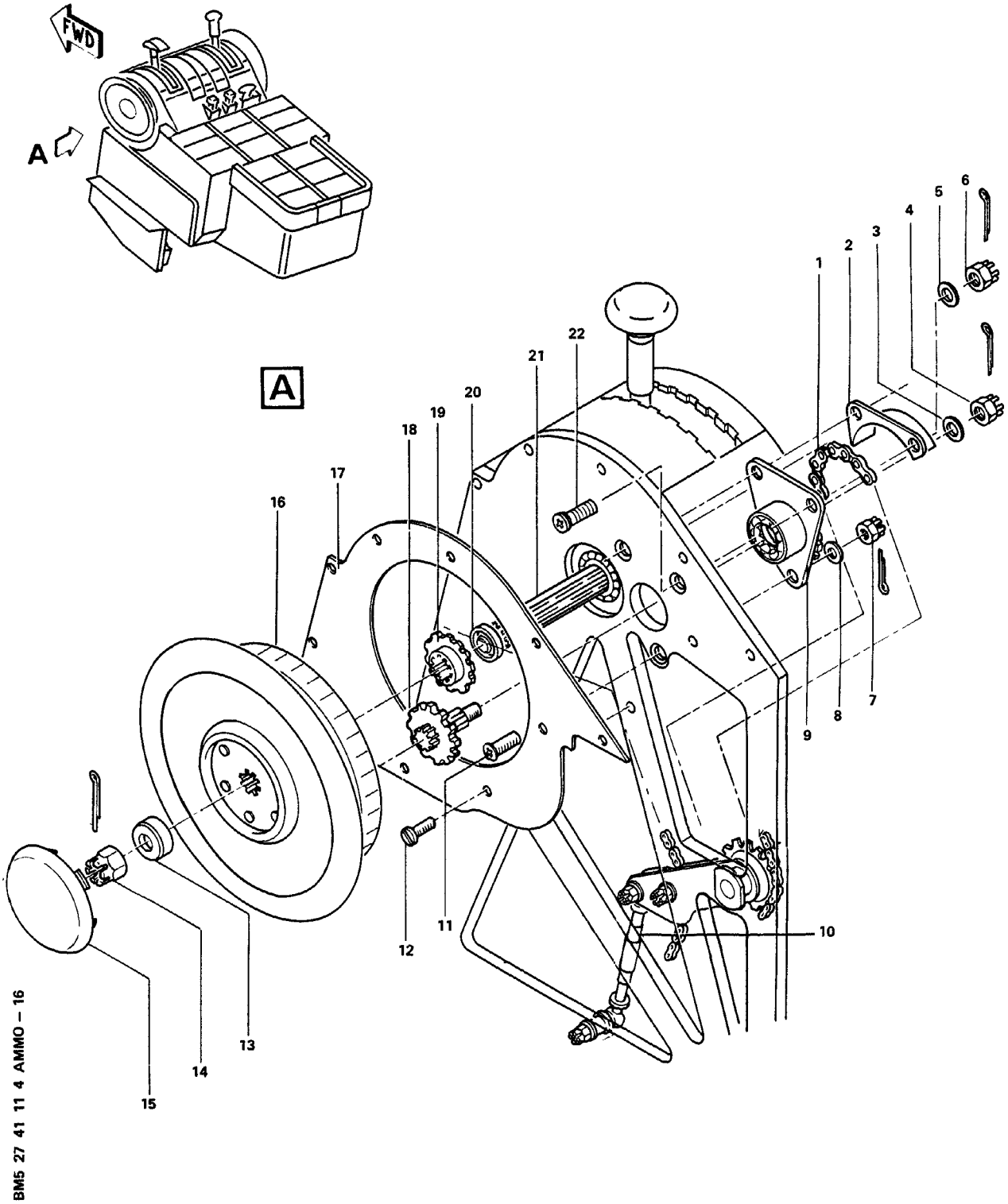
(4)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1		Line 103
21VU	FAC2		Line 103

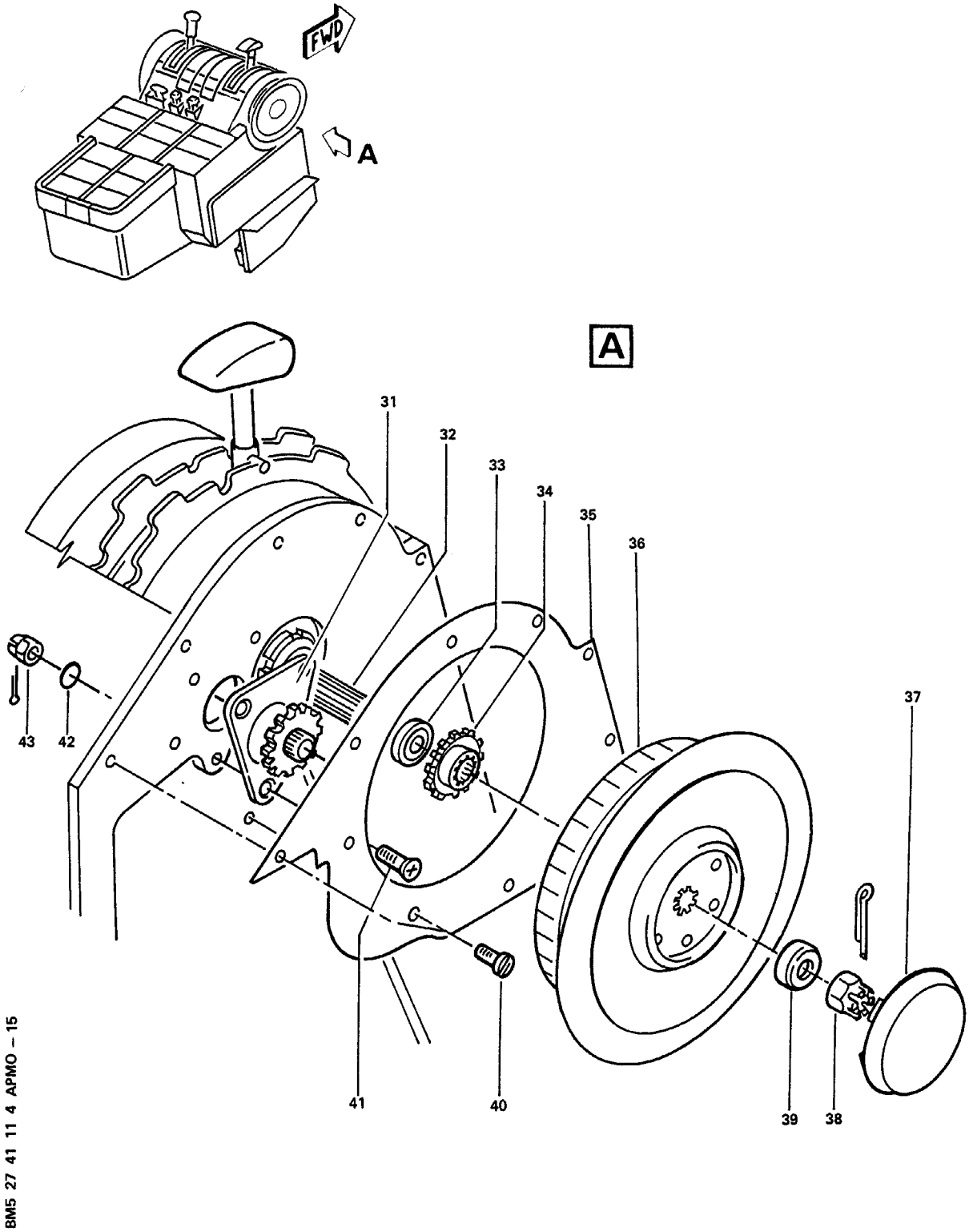
(5)At fuselage aft section, open door 312AR to gain access to trimmable horizontal stabilizer actuator.
CAUTION : THS DEFLECTION SPEED MUST NOT EXCEED 0.5 DEG/S.
(6)Slowly rotate pitch trim control wheel to zero and immobilize THS actuator mechanical input lever using rigging pin 0U190360.
(7)In flight compartment display a warning notice prohibiting operation of pitch control.
(8)Depressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).
(9)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

B. Removal
(Ref. Fig. 402)
(Ref. Fig. 403)
(1)Remove cover (37) from right pitch trim control wheel.
(2)Remove cotter pin and nut (38) attaching the pitch trim control wheel. Remove washer (39).
(3)Remove right pitch trim control wheel and its indicator (36).
(4)Remove drive gear (34) and adjusting spacer (33).
(5)Remove attaching screws (40) from protective plate (35).
NOTE : As lengths of screws (40) vary, record position before removal.
(6)Remove protective plate (35).
(7)Remove cotter pins and nuts (43), remove washers (42) and screws (41).
(8)Disengage and remove first officer upper bearing assembly (31).
(9)Remove cover (15) from left pitch trim control wheel.
(10)Remove cotter pin and nut (14) attaching pitch trim control wheel. Remove washer (13).
(11)Remove pitch trim control wheel and its indicator (16).
(12)Remove drive gear (19) and adjusting spacer (20).
(13)Remove attaching screws (12) from protective plate (17).
NOTE : As lengths of screws (12) vary, record position before removal.
(14)Remove protective plate (17).
(15)Remove lockwire from adjuster (10) and sufficiently slacken chain (1) tension.
(16)Remove cotter pins and nuts (6), retain washers (5).
(17)Remove screws (22) and remove chain casing (2).
(18)Remove cotter pin and nut (4), retain washer (3).
(19)Remove output gear (18).
(20)Free chain (1) from drive sprocket (9). Remove chain (1).
(21)Remove cotter pin and nut (7), retain washer (8) and remove screw (11).
(22)Remove bearing (9).

C. Installation
NOTE : Lubricate threads of nuts, screws and parts, splines and bearing



Captain Pitch Trim Control Mechanism
Figure 402



First Officer Pitch Trim Control Mechanism
Figure 403

contact surfaces with material No. 04-004.

(1)Position bearing (9).
(2)Install chain (1) on bearing (9).
(3)Engage output gear (18) into bearing (9).
(4)Secure bearing (9) and output gear (18) with screws (11) and (22).
(5)Engage chain casing (2) on screws (22).
(6)Engage washers (5) and (8). Tighten nuts (6) and (7) and safety with cotter pins.
(7)On output gear (18), engage washer (3). Tighten nut (4) and safety with cotter pin. Torque value : 1 m.daN (7.39 lbf. ft.)
(8)Check that chain (1) is correctly positioned on guide sprockets of bearing (9).
(9)On splined shaft (21), engage adjusting spacer (20) and drive gear (19).
(10)Remove both pitch trim front cables (Ref. 27-40-00, P. Block 401).
(11)On splined shaft (21) secure checking tool 82004A27912600 and install a 0.250 kg (0.55 lb.) weight.
(12)Adjust tension of chain (1) by acting on adjuster (10) so as to obtain uniform rotation of splined shaft (21). Rotation torque must be constant from nose down to nose up stop.
(13)Remove checking tool.
(14)Wirelock adjuster (10).
(15)Install both pitch trim front cables (Ref. 27-40-00, P. Block 401).
(16)Position left protective plate (17) and secure with screws (12).
(17)Install pitch trim control wheel and indicator (16). Check that indicator displays zero.
(18)Engage washer (13). Tighten nut (14) and safety with cotter pin. Torque value : 0.8 m.daN (5.9 lbf. ft.)
(19)Install cover (15) on left pitch trim control wheel.
(20)Position First Officer upper bearing assembly (31) and secure with screws (41), washers (42). Tighten nuts (43) and safety with cotter pins. Torque value : 0.8 m.daN (5.9 lbf. ft.)
(21)Position protective plate (35). Secure with screws (40).
(22)On splined shaft (32), engage adjusting spacer (33) and drive gear (34).

(23)Install pitch trim control wheel and indicator (36). Check that indicator displays zero.
(24)Engage washer (39). Tighten nut (38) and safety with cotter pin. Torque value : 0.8 m.daN (5.9 lbf. ft.)
(25)Install cover (37) on right pitch trim control wheel.
(26)Remove rigging pin 0U190360 from THS actuator mechanical input lever.
(27)Close door 312AR.
(28)On panel 21VU remove safety clips and tags and close circuit breakers FAC1, FAC2 line 103.
(29)Remove warning notices prohibiting operation of flight controls.

D. Test

(1)Perform functional test described in 27-41-00, P. Block 501.
(2)Check that maximum force to be applied to control wheel does not exceed 2.5 daN (5.5 lbf.) (Ref. 27-41-00, P. Block 501).

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.

CABLE TENSION REGULATOR 274954 - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

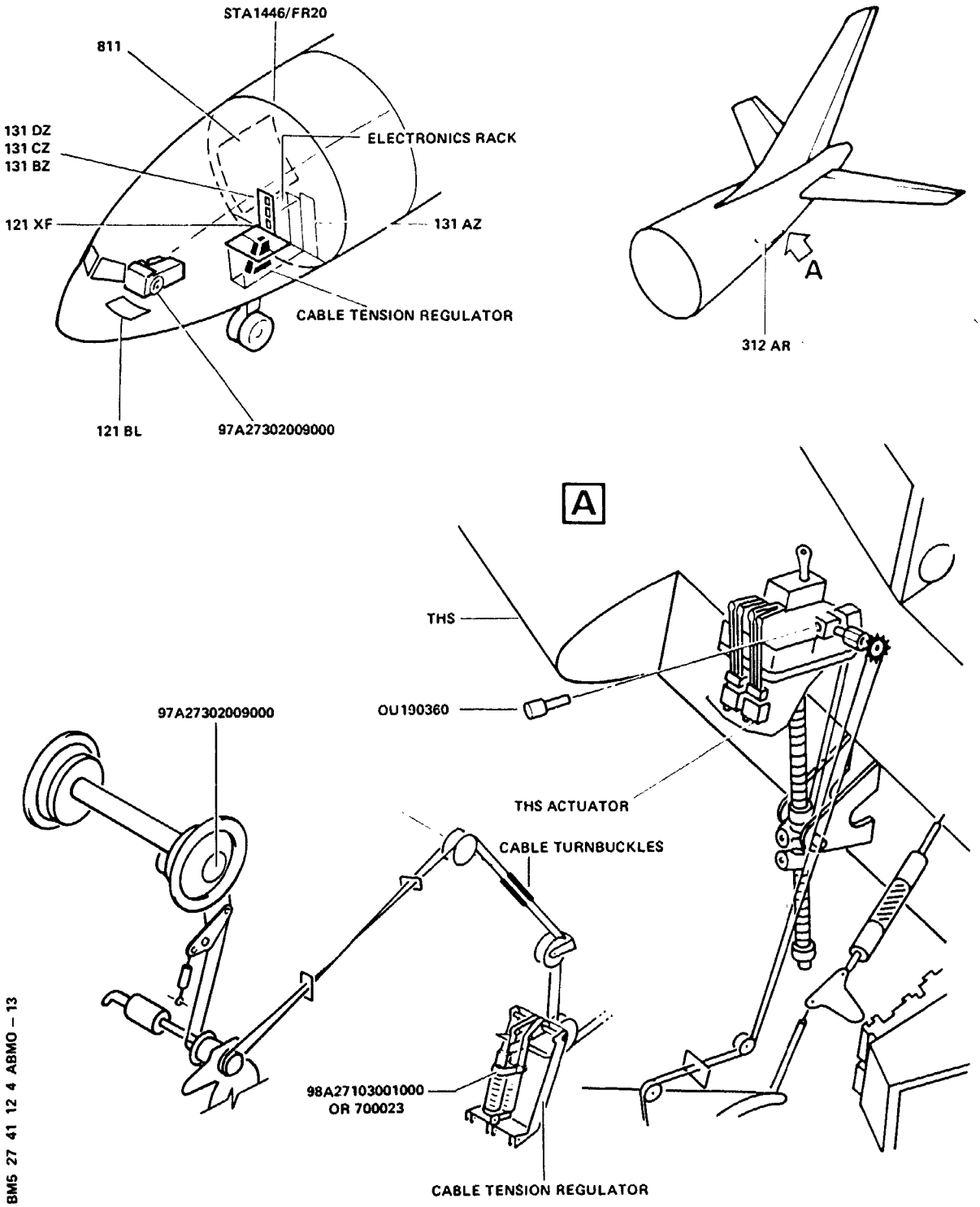
ITEM	DESIGNATION
A. 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
B. 98A27103001000	Wedge - Locking Pitch Trim Control Cable Tension Regulator
C. OU190360	Rigging Pin - THS Actuator Mechanical Input Lever
D.	Circuit Breaker Safety Clips
E. Material No. 04-004	Common Greases (Ref. 20-31-00)
F.	Warning Notices - Prohibition of Pitch Trim Control Operation
G.	Access Platform, 1.5 to 7 m (5 ft. to 23 ft.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 27-40-00, P. Block 501	Trimmable Horizontal Stabilizer
- 27-41-00, P. Block 501	Mechanical Control (THS)

2. Procedure

A. Job Set-Up
(Ref. Fig. 401)
(1) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(2) Connect hydraulic ground power cart and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(3) On SERVO CTL section of panel 428VU
- make certain that B, G and Y pushbutton switches are pressed and legends off.

CAUTION : THS DEFLECTION SPEED MUST NOT EXCEED 0.5 DEG/S.

(4) Move pitch trim control wheels to zero. Immobilize control wheels with locking equipment 97A27302009000.
(5) Open, safety and tag the following circuit breakers :



Location of Rigging Points
Figure 401

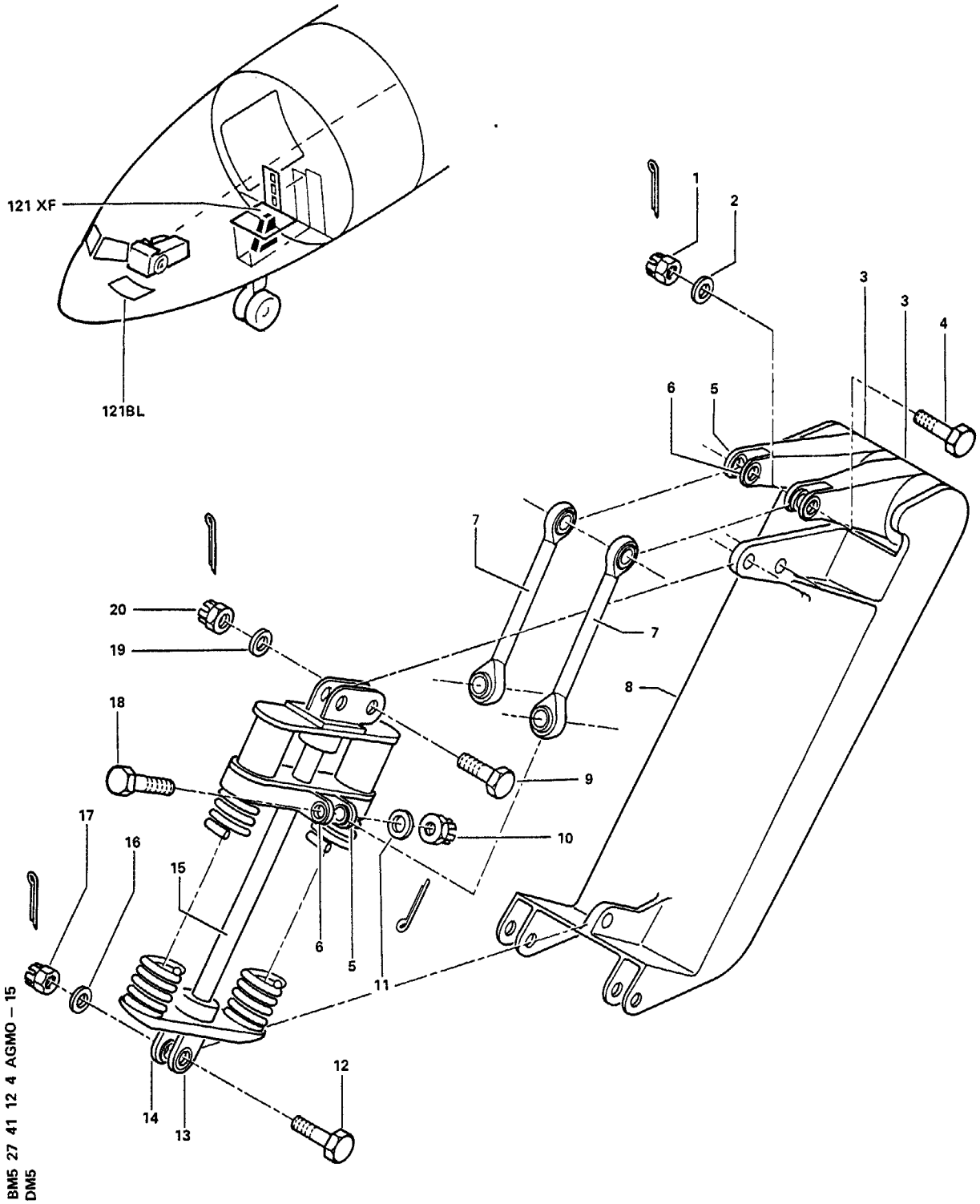
PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1		Line 103
21VU	FAC2		Line 103

(6)In flight compartment, install warning notice to prohibit operation of pitch control.
(7)Install access platform and open cargo compartment door 811.
(8)Open access doors 131AZ and 121BL.
(9)Remove floor panel 121 XF to gain access to tension regulator.
(10)At STA1446/FR20, remove doors 131DZ, 131CZ and 131BZ to gain access to turnbuckles.
(11)At rear of fuselage, open access door 312AR to gain access to trimmable horizontal stabilizer actuator.
(12)Install rigging pin 0U190360 in THS actuator mechanical input lever.
(13)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(14)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(15)At STA1446/FR20, remove turnbuckle safety clips and release progressively cable tension to enable insertion of Tool 98A27103001000 or 700023. Insert this tool.
(16)Fully release cable tension.

B. Removal
(Ref. Fig. 402)
(1)Remove cotter pins, nuts (1), washers (2) and screws (4).
(2)Remove cotter pins, nuts (10), washers (11) and screws (18).
(3)Remove rods (7).
(4)Remove cotter pins, nuts (20) and washers (19).
(5)Remove cotter pin, nut (17) and washer (16).
(6)Support tension regulator (15).
(7)Remove screws (9) and (12).
(8)Remove tension regulator (15).

C. Preparation of Replacement Component
Check that replacement tension regulator is fitted with rings (13) and (14) and locking equipment.
Check that rocker arms (3) are fitted with rings (5) and (6).

D. Installation
NOTE : Lubricate threads of nuts, screws and parts with Material No. 04-004.
(1)Position tension regulator (15) on its support (8).
(2)Install screws (12) and (9).
(3)Install washer (16) on screw (12), tighten and safety nut (17) with cotter pin.
(4)Install washers (19) on screws (9), tighten and safety nuts (20) with cotter pins.
(5)Install the two rods (7) linking tension regulator (15) to rocker arm (3).



Cable Tension Regulator - Removal/Installation
Figure 402

(6)Secure rods (7) on regulator (15) with screws (18) and on rocker arm with screws (4).
(7)Install washers (11) in screws (18) tighten and safety nuts (10) with cotter pins.
(8)Install washers (2) on screws (4), tighten and safety nuts (1) with cotter pins.

E. Adjustment
(1)Check that cables are correctly installed in pulley grooves.
(2)Progressively tighten cables using turnbuckles located at STA1446/FR20 until tension regulator locking tool 98A27103001000 or 700023 can be removed.
(3)Remove locking tool.
(4)Remove pitch control wheel locking tools.
(5)Remove rigging pin OU190360 from THS actuator mechanical input lever.
(6)Perform cable tension adjustment (Ref. 27-40-00, P. Block 501).

F. Test
(1)On panel 21VU, remove safety clips and tags and close circuit breakers FAC1 and FAC2, line 103.
(2)Remove warning notices.
(3)Perform functional test (Ref. 27-41-00, P. Block 501).

G. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install floor panels and access panels to turnbuckles.
(3)Close access doors.
(4)Remove access platform.

PITCH TRIM CONTROL DRIVE SHAFT
REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

R CAUTION : TO PREVENT MALFUNCTION OF THE THS ACTUATOR MOVEMENT:
R - MAKE SURE THAT THE CABLE IS IN THE PROPER POSITION AND CORRECTLY
R INSTALLED BEFORE YOU CLOSE THE COVER ASSY OF THE CABLE AND CHAIN
R ASSAMBLY:
R - MAKE SURE THAT THE CABLE CHAIN ASSEMBLY RUNS INSIDE THE U-FORM OF
R THE GUIDE BLOCKS.
R - MAKE SURE THAT THE THSA OPERATES OVER THE FULL RANGE BY USING THE
R ELECTRICAL TRIM (ZERO - FULL NOSE-UP - FULL NOSE-DOWN - ZERO) AFTER
R THE COVER HAS BEEN CLOSED (REF. 27-41-00, P. Block 501).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18 ft.)
B. 0U190360	Rigging Pin - THS Actuator Mechanical Input Lever
C. 97A27302009000	Locking Tool - Pitch Trim Control Wheel
D. 98A27103001000	Wedge - Locking Pitch Trim Control Cable Tension Regulator
E.	Waxed Paper
F.	Circuit Breaker Safety Clips
G.	Standard Locking Bolt
H.	Electrical Connector Blanking Caps
J.	Turnbuckle Safety Clips
K.	Warning Notices
L.	Torque Wrench, up to 0.84 m.daN (74.3 lbf.in.)
M.	Corrosion-Resistant Steel Lockwire, 0.63 mm (0.025 in.) dia.
N.	Cotter Pins
P. Material No. 04-004	Common Greases (Ref. 20-31-00)
Q. Material No. 05-002	Special Materials (Ref. 20-31-00)
R. Material No. 05-027	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 27-40-00, P. Block 501	Trimmable Horizontal Stabilizer

- 27-41-00, P. Block 501 Mechanical Control (THS)
- 51-75-10, P. Block 801 Repair of Paint Coatings

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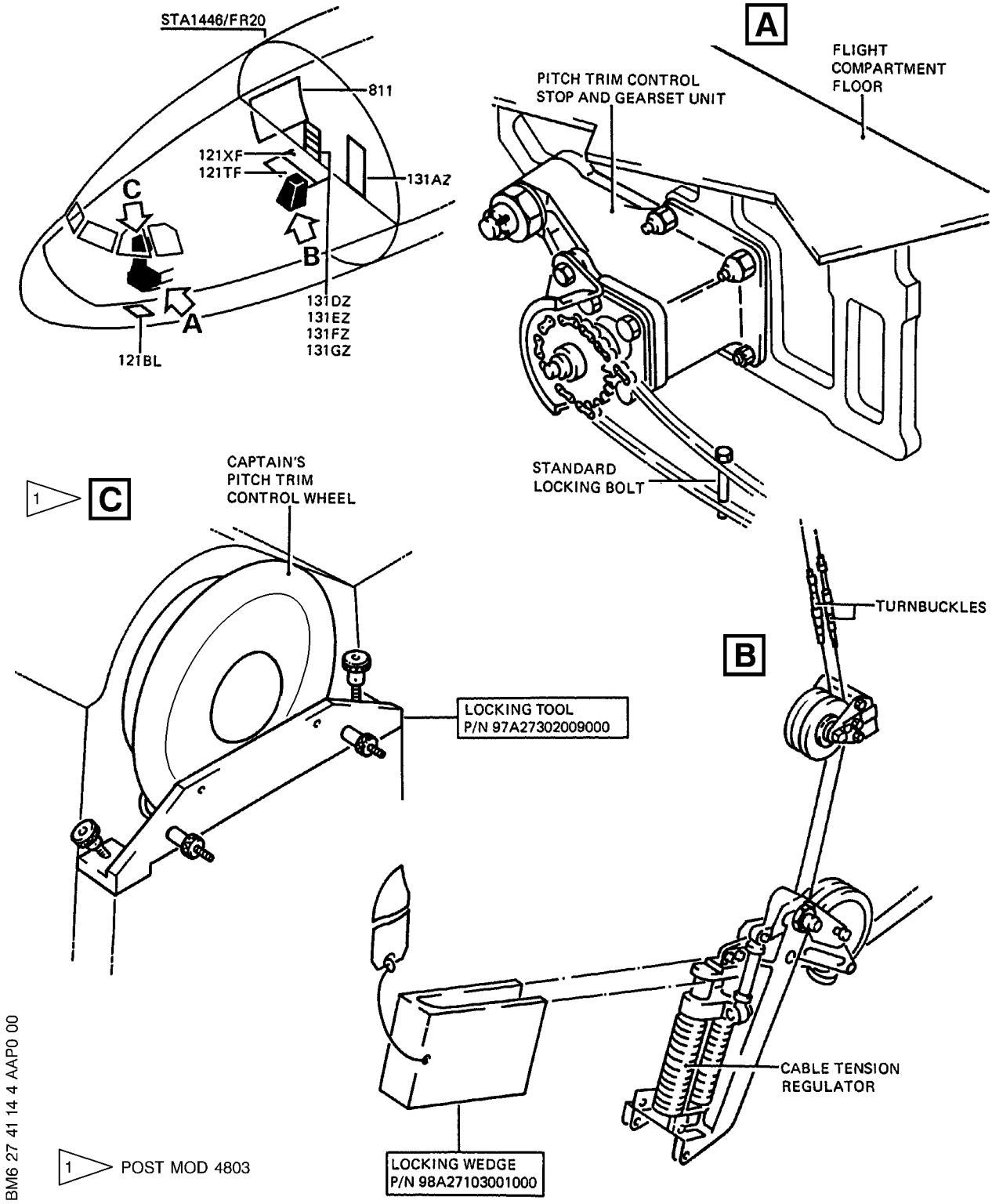
2. Procedure

R A. Job Set-Up (Ref. Fig. 401)
(1)Position access platform.
(2)Make certain that trimmable horizontal stabilizer (THS) is in zero position and install locking tool P/N 97A27302009000 on pitch trim control wheel in flight compartment.
(3)Display warning notice in flight compartment, prohibiting operation of flight controls.
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC 1		103/G 3 to G 7
21VU	FAC 2		103/G 8 to G12

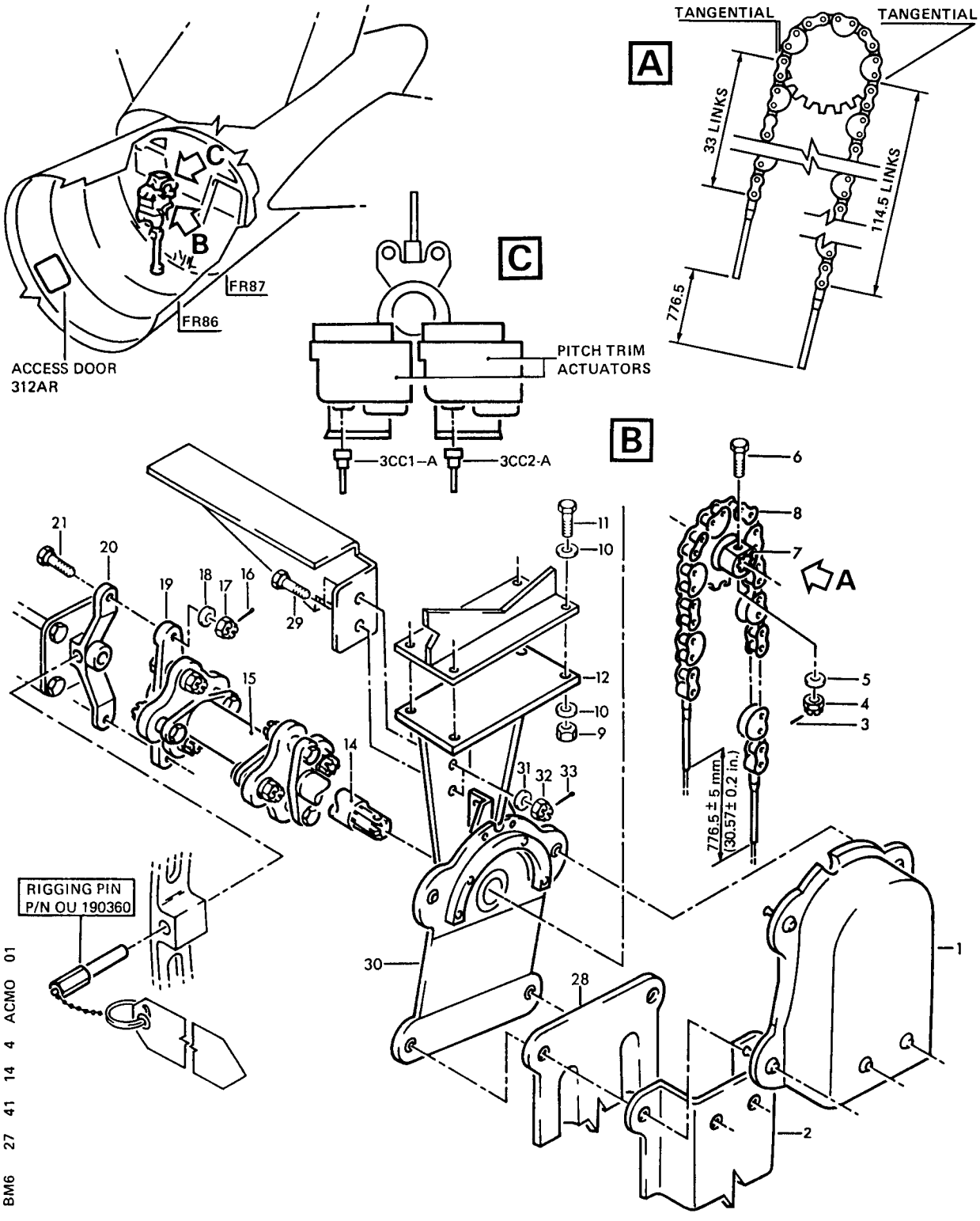
(5)Display warning notices, prohibiting re-pressurization of hydraulic systems.
(6)Open FWD cargo compartment door and access door 131AZ (Ref. Fig.).
(7)On pitch trim control stop and gearset unit, immobilize chain with standard locking bolt.
(8)Remove floor panels 121XF and 121TF to gain access to cable tension regulator.
(9)At STA1446(FR20), remove panels 131DZ thru 131GZ to gain access to turnbuckles.
(10)Remove safety clips from turnbuckles.
(11)Adjust cable tension to enable installation of locking wedge P/N 98A27103001000 in pitch trim control cable tension regulator.
(12)Slacken pitch trim control cables.
(13)Open access door 312AR (Ref. Fig. 402).
(14)Install rigging pin P/N 0U190360 in THS actuator mechanical input lever (20).
(15)Disconnect electrical connectors (13) from pitch trim actuators to prevent electrical trim input and install blanking caps.

B. Removal (Ref. Fig. 402)
(1)Release quick-release fasteners and remove upper and lower chain covers (1, 2).
(2)Remove cotter pin (3), nut (4), washer (5) and bolt (6).
(3)If required, slacken pitch trim control cables.
(4)Remove sprocket (7), disengage chain (8) from sprocket (7) and secure chain with cord to structure.
(5)Remove cotter pins (33) nuts (9, 32), bolts (11, 29), washers (10, 31) and disengage bracket (12) from shaft (14) and airframe structure.
(6)Protect bearings (34) with waxed paper (Ref. Fig. 403).
(7)Remove cotter pins (16), nuts (17), washers (18), bolts (21) and pitch trim control drive shaft assembly (14, 15).



Forward Rigging Location
Figure 401

R



Pitch Trim Control Drive Shaft
Figure 402

C. Preparation of Replacement Components (Ref. Fig. 403)

(1)Disassembly/Assembly of Shafts.

NOTE : The shafts bolt assemblies are identical, only one is illustrated.

(a)Remove cotter pins (22), nuts (23), washers (24), bolts (26), spacers (25), link plate (19), swivel plates (27) and shafts (14, 15).

(b)Position spacers (25), shafts (14, 15), swivel plates (27), link plate (19), and install bolts (26), washers (24), and nuts (23).

(c)Safety nuts (23) with cotter pins (22).

(2)Disassembly/Assembly of Bracket.

(a)Remove cotter pins (33), nuts (32), washers (31) and chain guard base plate (30).

(b)Cut and remove lockwire, remove screws (36), flange (35), and press out bearings (34).

(c)Apply grease, (Mat. No. 04-004) to bearings (34) and press bearings (34) into bracket (12).

(d)Install flange (35) with screws (36) and safety screws (36) with lockwire.

(e)Install chain guard base plate (30) with bolts (29), washers (31) and nuts (32).

(f)TORQUE nuts (32) to between 0.33 and 0.37 m.daN (29.2 and 32.74 lbf.in.) and safety with cotter pins (33).

R D. Installation (Ref. Fig. 401, 402)

(1)Position pitch trim control drive shaft assembly (14, 15) and apply corrosion-preventive paste (Mat. No. 05-002) to bolts (21, 11, 29).

(2)With rigging pin P/N 0U190360 installed, THS in zero position, connect THS actuator mechanical input lever (20) to link plate (19) with bolts (21), washers (18) and nuts (17).

(3)TORQUE nuts (17) to between 0.76 and 0.84 m.daN (67.3 and 74.3 lbf.in.) and safety with cotter pins (16).

(4)Engage bracket (12) on shaft (14) and install bracket (12) with bolts (11, 29), washers (10, 31) and nuts (9, 32).

(5)TORQUE nuts (32) to between 0.33 and 0.37 m.daN (29.2 and 32.74 lbf.in.) and safety with cotter pins (33).

(6)Engage chain (8) on sprocket(7)

- Make certain that LH chain cable fitting is positioned 776.5 ± 5 mm (30.57 ± 0.2 in.) above RH chain cable fitting (Ref. Fig. 402).

or

- Make certain that LH chain length is 33 links and RH chain length is 114.5 links tangential to input sprocket (Ref. Fig. 402).

(7)Align holes and install sprocket (7) with bolt (6), washer (5) and nut (4). Safety nut (4) with cotter pin (3).

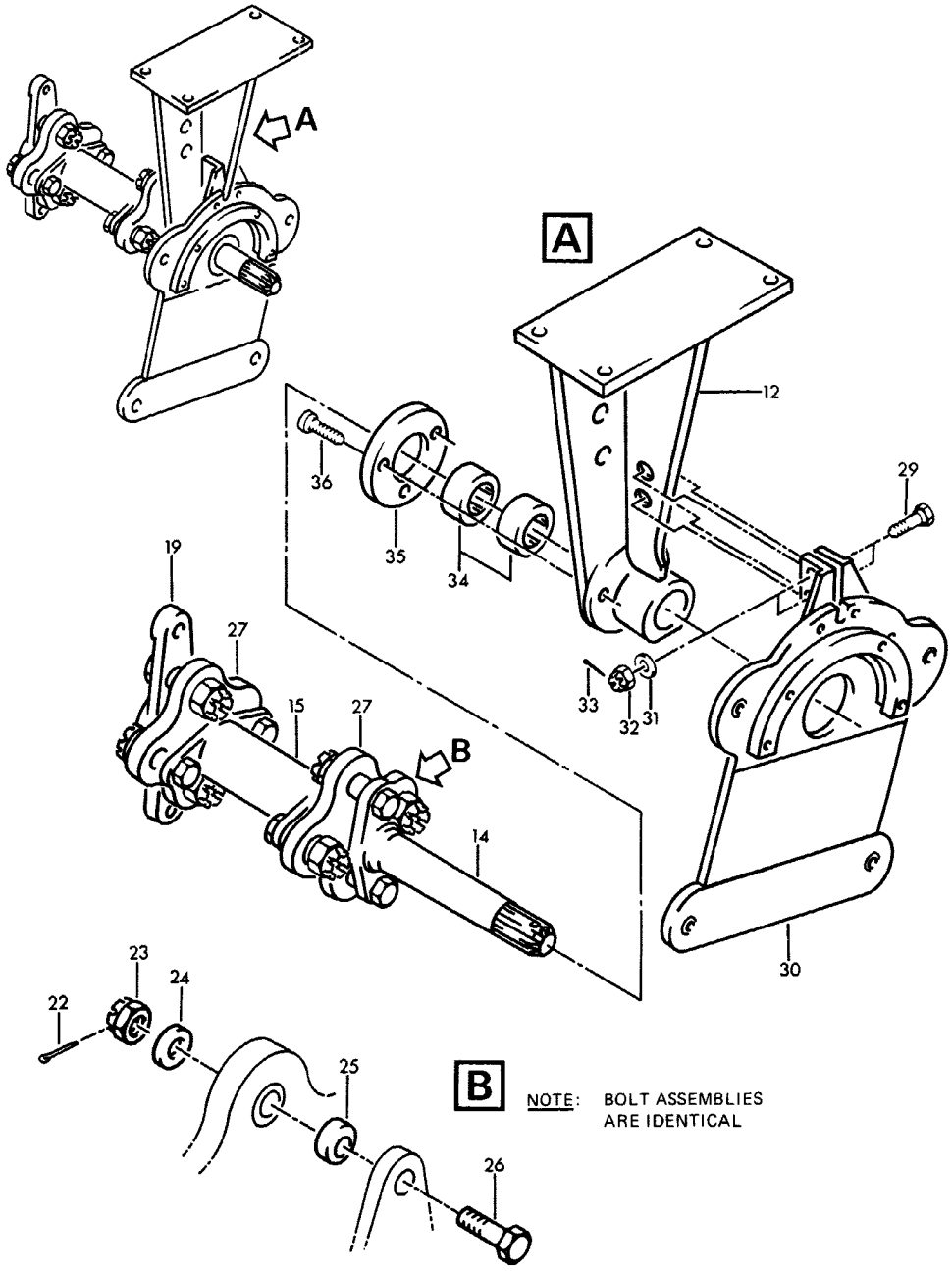
(8)Apply grease, (Mat. No. 04-004) to chain and sprocket.

CAUTION : SPROCKET (7) AND CHAIN (8) MUST NOT BE TREATED WITH MOISTURE-REMOVING OIL.

(9)Check coating of moisture-removing oil, (Mat. No. 05-027) for good condition on pitch trim control drive shaft and renew as necessary (Ref. 51-75-10, P. Block 801).

CAUTION : TO PREVENT MALFUNCTION OF THE THS ACTUATOR MOVEMENT:

- MAKE SURE THAT THE CABLE IS IN THE PROPER POSITION AND CORRECTLY INSTALLED BEFORE YOU CLOSE THE COVER ASSY OF THE



B M 6 27 41 14 4 AEMO

Shafts and Bracket
Figure 403

R CABLE AND CHAIN ASSAMBLY:
R - MAKE SURE THAT THE THSA OPERATES OVER THE FULL RANGE BY USING
R THE ELECTRICAL TRIM
R (ZERO - FULL NOSE-UP - FULL NOSE-DOWN - ZERO) AFTER
R THE COVER HAS BEEN CLOSED (REF. 27-41-00, P. BLOCK 501).

R (10)Make sure that the cable the cable chain assembly runs inside
R the U-form of the guide blocks.
R (11)Install lower and upper chain covers (2, 1) on base plates (30, 28).
R (12)Remove rigging pin P/N 0U190360.
R (13)Remove blanking caps and connect pitch trim actuators electrical
R connectors (13).
R (14)Remove safety clips and tags, and close circuit breakers, FAC1 and
FAC2, previously opened in Para. 2. A. (4).
R (15)Remove locking tool P/N 97A27302009000.

E. Adjustment/Test

R (1)Remove standard locking bolt (Ref. Fig. 401).
(2)Check correct routing of pitch trim control cables.
(3)Tension pitch trim control cables, using turnbuckles at STA1446(FR20) and remove locking wedge P/N 98A27103001000.
(4)Carry out adjustment of pitch trim control cable tension (Ref. 27-40-00, P. Block 501).
(5)Lock turnbuckles with safety clips.
(6)Carry out functional test of THS mechanical control (Ref. 27-41-00, P. Block 501) and verify that the THSA operates over the full range by using the electrical trim (zero - full nose-up - full nose-down - zero).

F. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 312AR.
(3)Install panels 131DZ thru 131GZ at STA1446(FR20).
(4)Install floor panels 121XF and 121TF.
(5)Close access door 131AZ and FWD cargo compartment door.
(6)Remove warning notices.
(7)Remove access platform.

PITCH TRIM CONTROL STOP AND GEARSET UNIT - REMOVAL/INSTALLATION

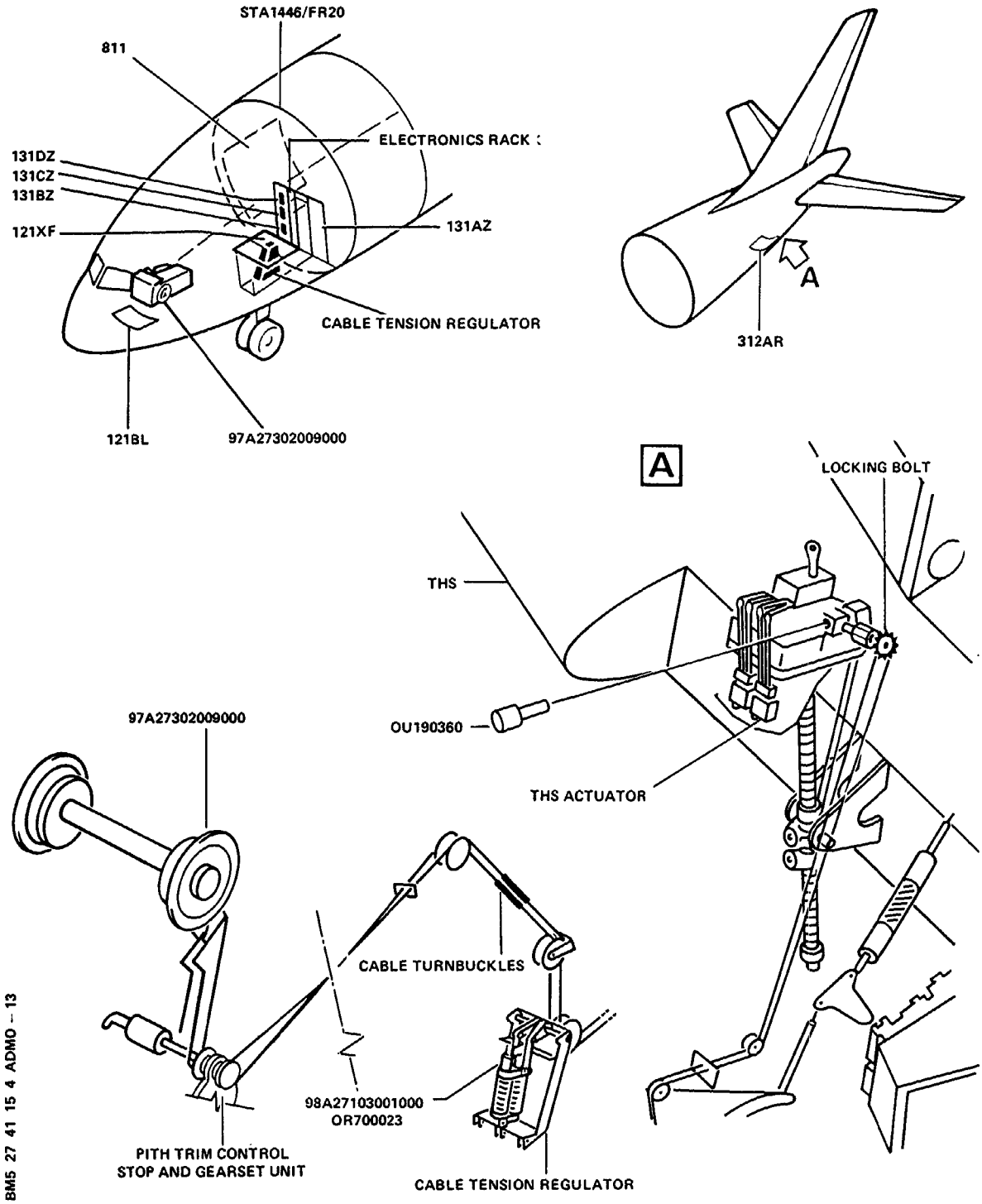
WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A27103001000	Wedge - Locking Pitch Trim Control Cable Tension Regulator
B. 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
C. 0U190360	Rigging Pin - THS Actuator Mechanical Input Lever
D. 82004A27912600	Checking Tool
E.	Weight, 0.250 kg (0.55 lb)
F. Material No. 04-004	Common Greases (Ref. 20-31-00)
G.	Warning Notices Prohibiting Operation of Flight Controls and Pressurization of Green Hydraulic System
H.	Circuit Breaker Safety Clips
I.	Lockwire - Corrosion-Resistant Steel, Dia 0.8 mm (0.032 in.)
J.	Access Platform, 1.5 m to 7 m (5 ft. to 23 ft.)
K. Material No. 08-002	Bonding and Adhesive Compounds (Ref. 20-31-00)
L.	Blanking Plugs/Caps for Electrical Connectors
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-40-00, P. Block 501	Trimmable Horizontal Stabilizer
- 27-41-00, P. Block 501	Mechanical Control (THS)
- 27-41-11, P. Block 401	Pitch Trim Control Mechanism
- 29-21-00, P. Block 301	Green Auxiliary Power

2. Procedure

A. Job Set-Up
(Ref. Fig. 401)
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(2)Pressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block 301).



Component and Rigging Pin Location
Figure 401

(3)On SERVO CTL section of panel 428VU
- make certain that B, G and Y pushbutton switches are pressed (in) and legends off.

(4)Open, safety and tag the following circuits breakers :

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1		Line 103
21VU	FAC2		Line 103

CAUTION : THS DEFLECTION SPEED MUST NOT EXCEED 0.5 DEG/S.

(5)Slowly rotate pitch trim control wheels to full nose down position and immobilize control wheels with locking equipment 97A27302009000.

(6)In flight compartment, display a warning notice prohibiting operation of pitch control.

(7)Open access doors 121BL and 312AR.

(8)On THS actuator mechanical control system remove chain protective cover and lock chain by means of a locking bolt.

(9)Open cargo compartment door 811 and access door 131AZ.

(10)Remove floor panel 121XF to gain access to cable tension regulator.

(11)At STA1446/FR20, remove panels 131DZ, 131BZ and 131CZ to gain access to cable turnbuckles.

(12)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(13)Depressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block 301).

(14)At STA1446/FR20, remove safety clips from turnbuckles and progressively slacken cable tension to enable installation of equipment 98A27103001000 or 700023.

B. Removal

(Ref. Fig. 402)

(1)Disconnect electrical connector (22) and install protective plugs/caps.

(2)On pitch trim control stop and gearset unit, cut and remove lockwire, remove screws (15). Retain washers (14).

(3)Remove chain guard (13).

(4)At STA1446/FR20, progressively slacken cables by means of turnbuckles to enable disengagement of chain from output sprocket (10).

(5)With pitch trim control stop and gearset unit at full aircraft nose down stop, record position of chain by counting the upper links.

(6)Disengage chain from sprocket (10).

(7)Not applicable

(8)Not applicable

(9)Not applicable

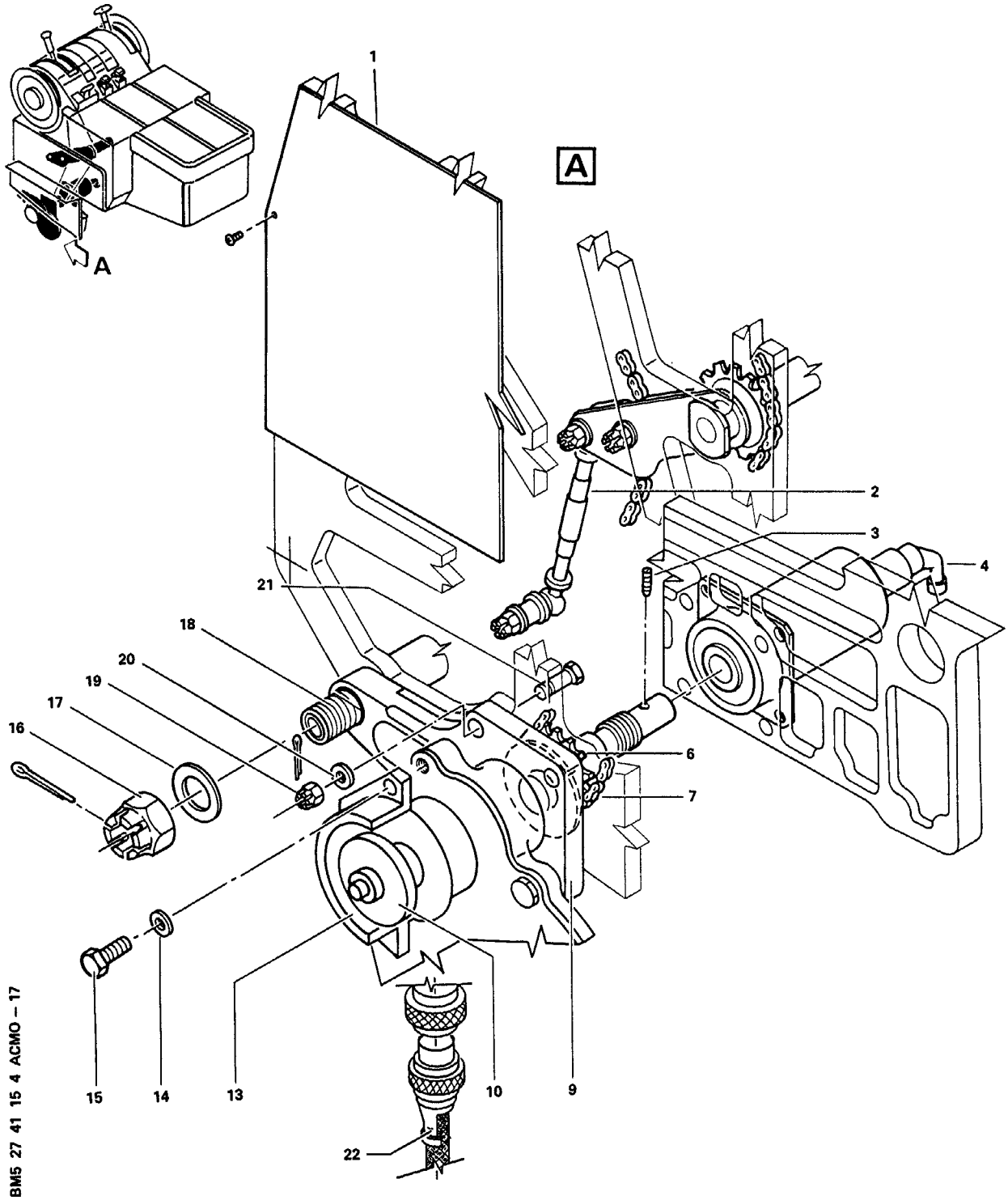
(10)In flight compartment, remove panel (1) attached to center pedestal to gain access to chain tension adjuster (2).

(11)Cut and remove lockwire from tension adjuster (2) and slacken chain (7) to enable disengagement from input sprocket (6).

(12)Remove set screws (3) to disconnect trim rotation sensor (4).

(13)Remove cotter pin and nut (16), retain washer (17).

(14)Remove cotter pin, nuts (19) and retain washers (20).



Pitch Trim Control Stop and Gearset Unit
Figure 402

(15)Support pitch trim control and gearset unit (9).
(16)Remove screws (21).
(17)Remove pitch trim control stop and gearset unit (9).

C. Installation

NOTE : Lubricate nuts, screws and parts with Material No.04-004.

(1)Before installing control stop and gearset unit on its mount, rotate output sprocket (10) to forward stop (nose down).
(2)Position control stop and gearset unit (9) and connect to trim rotation sensor (4) output shaft.
(3)On shoulder bolt (18), engage washer (17), tighten nut (16) and safety with cotter pin.
(4)On unit (9) upper section, install screws (21). Engage washers (20), tighten nuts (19) and safety with cotter pins.
(5)Engage chain (7) on teeth of input sprocket (6) and check correct position of chain on sprockets in center pedestal.
(6)Using tension adjuster (2) and without moving output sprocket (10) from forward stop (nose down), tension chain.
Then perform the following operations :
(a)In flight compartment, remove equipment locking pitch trim control wheels.
(b)Remove captain pitch trim control wheel. Install checking tool 82004A27912600 and a 0.250 kg (0.55 lb) weight (Ref. 27-41-11, P. Block 401).
(c)Adjust tension of chain (7) by acting on adjuster (2) so as to obtain uniform rotation of First Officer pitch trim control wheel.
Rotation torque must be constant from Nose down to Nose up stop.
(d)Remove checking tool 82004A27912600 with weight.
(e)Wirelock adjuster (2).
(7)Install panel (1) on center pedestal.
(8)Return First Officer pitch trim control wheel to full nose down position and lock in this position with equipment 97A27302009000.
(9)Install setscrews (3) using Material No. 08-002 and fully tighten.
(10)Not applicable
(11)Not applicable
(12)Engage chain on output sprocket (10) in the position recorded during removal.
(13)Using Turnbuckles located at STA1446/FR20 tighten cables checking that they lie correctly in pulley grooves.
Remove tool 98A27103001000 or 700023.
(14)Position chain guard (13) and secure on control stop and gearset unit (9) using washers (14) and screws (15). Tighten screws (15) and safety with lockwire.
(15)Not applicable.
(16)In rear section of aircraft, remove locking bolt from THS actuator chain.
(17)Install chain protective cover.
(18)Install Captain pitch trim control wheel (Ref. 27-41-11, P. Block 401).

D. Adjustment

(1)Adjust tension of cables (Ref. 27-40-00, P. Block 501).
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Pressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block 301).
(4)Remove equipment 97A27302009000 locking pitch trim control wheels.
(5)Place pitch trim control wheels in zero position. Lock control wheels in this position with equipment 97A27302009000.
(6)Check that rigging pin 0U190360 can be easily inserted and withdrawn from the THS actuator mechanical input lever.
(7)If this is not possible, adjust cable tension (Ref.27-40-00, P. Block 501).
(8)When correct cable tension is obtained, lock turnbuckle with safety clips.
(9)Remove rigging pins.

E. Test
(1)Rotate pitch trim control wheels from stop to stop and check that operation is carried out freely without friction points.
(2)On panel 21VU, remove safety clips and tags and close circuit breakers FAC1 and FAC2 line 103.
(3)Perform functional test described in 27-41-00, P. Block 501.

F. Close-Up
(1)Depressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block 301).
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Install floor panels and panels giving access to cable turnbuckles.
(4)Remove warning notices.
(5)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(6)Close access doors.
(7)Remove access platform.

THS POSITION TRANSMITTER (41WW) - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
1. 0U190360	Rigging Pin - THS Actuator Mechanical Input Lever
2. 31-200-100	41WW THS Position Transmitter Test Set
3.	Circuit Breaker Safety Clips
4.	Warning Notice Prohibiting Flight Controls Operation
5.	Access Platform, 1.5 m to 7 m (5 ft to 23 ft)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power
- 31-51-00, P. Block 501	ECAM System

2. Procedure

(Ref. Fig. 401)

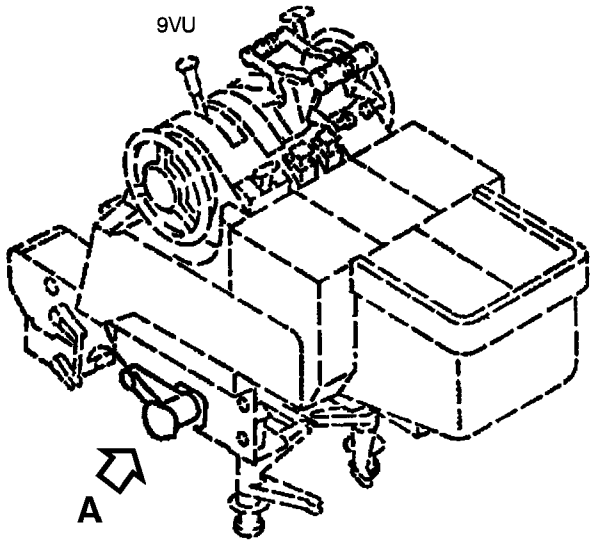
A. Job Set-Up

(1) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.

(2) Position access platform
Pressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block 301).

(3) On SERVO CTL section of panel 428VU :
- make certain that B, G and Y pushbutton switches are pressed and legends off.

(4) Open, safety and tag the following circuit breakers :



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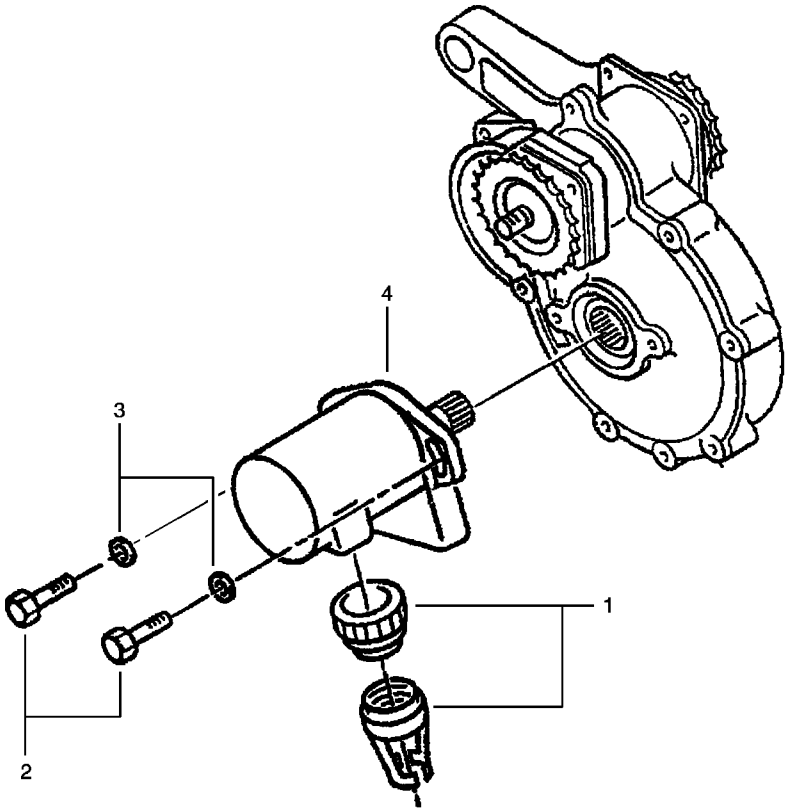

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THS Position Transmitter
Figure 401

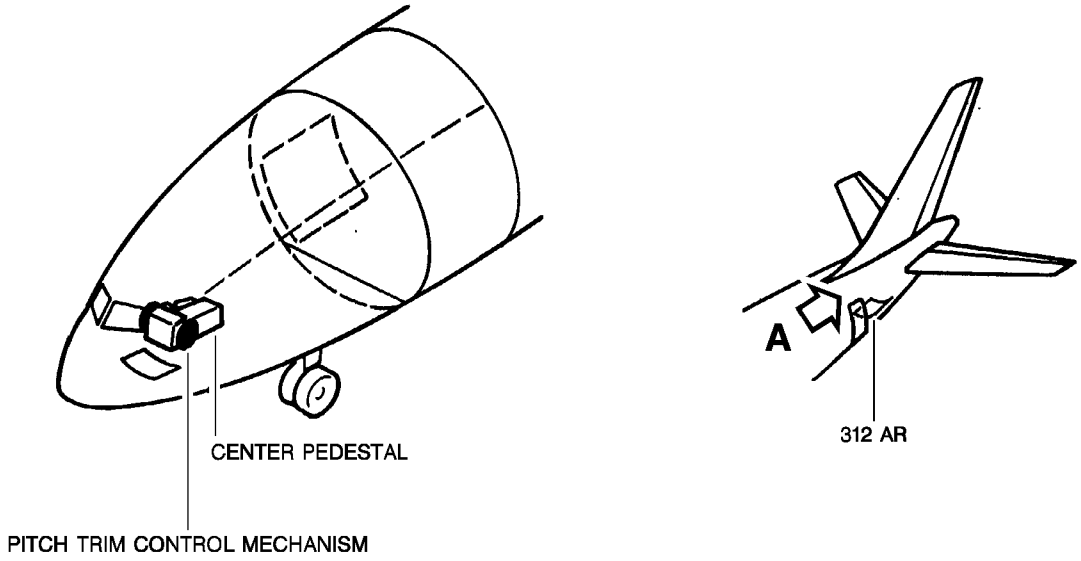
PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1-26VAC	305CC1	103/G7
21VU	FAC1-28VDC/NORM	306CC1	103/G3
21VU	FAC1-28VDC/BAT	323CC1	103/G2
21VU	FAC1-115VAC	309CC1	103/G5
21VU	FAC2-26VAC	305CC2	103/G8
21VU	FAC2-28VDC	306CC2	103/G12
21VU	FAC2-115VAC	309CC2	103/G10
21VU	THS-26VAC	40WW	109/A7
21VU	FWC1-115VAC	7WW	108/B8
21VU	FWC2-115VAC	32WW	109/A8

(5)At fuselage aft section, open door 312AR to gain access to trimmable horizontal stabilizer actuactor.
CAUTION : THS DEFLECTION SPEED MUST NOT EXCEED 0.5 DEG/S.
(6)Slowly rotate pitch trim control wheel to zero and immobilize THS actuator mechanical input lever using rigging pin 0U190360. (Ref. Fig. 402)
(7)In flight compartment, display a warning notice prohibiting operation of pitch control.
(8)Depressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).
(9)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

B. Removal
(1)In the avionic bay, under the pedestal :
- Disconnect the plug (1) from THS position transmitter (4).
(2)Remove the THS position transmitter (4) :
- Loosen the two screws (2) and remove screws (2) with their washers (3).
- Remove the THS position transmitter (4).

C. Installation
(1)Make certain that the THS position transmitter is in the neutral position by checking that the input shaft is locked in place. Do not apply excessive turning force to the input shaft.
(2)Install the new THS position transmitter (4) plug facing down :
- Install screws (2) with their washers (3) and tighten the screws.
CAUTION : DO NOT MOVE THE THS POSITION TRANSMITTER.
(3)Connect the plug (1) to Test Set (Ref. 31-200-100).

D. Test of the THS Position Transmitter
(1)Set the THS to zero with the rigging pin 0U190360. Make sure that the message "RIGHT" is displayed on the THS position transmitter test set ref. 31-200-100 to ensure that the THS position transmitter (4) is set to zero with the test set (Ref. 31-200-100).
If the test is not correct, remove the THS position transmitter (4) as per item B, then install a new one as per item C.
CAUTION : WHEN INSTALLED DO NOT MOVE OR REMOVE THE THS POSITION TRANSMITTER. IF MOVED OR REMOVED, THE THS POSITION TRANSMITTER



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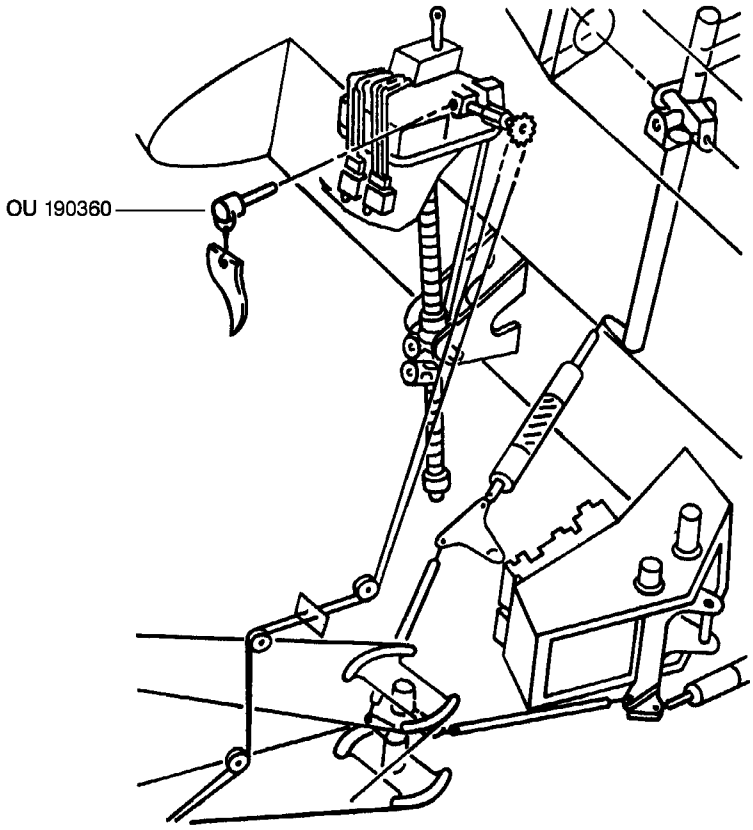


BM5 27 41 51 4 ACM0 00

THS - Pitch Trim Control Mechanism
Figure 402

MUST BE REPLACED.

When the test is correct, safety the two screws (2) with lockwire and disconnect the plug (1) from Test Set (Ref. 31-200-100).

(2)Remove rigging pin OU190360 from THS actuator mechanical input lever.
(3)Connect the plug (1) to THS position transmitter (4).
(4)Re-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(5)On panel 21VU, remove safety clips and tags and close circuit breakers FAC1, FAC2, THS, FWC1 and FWC2.
(6)Close access door 312AR.
(7)Remove warning notices prohibiting operation of flight controls.
(8)Move the THS up then down.

E. Test

Perform the excess AFT CG warning test (Ref. AMM 31-51-00, P. Block 501).

F. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platforms.
(3)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

HYDRAULIC ACTUATION (THS) - DESCRIPTION AND OPERATION

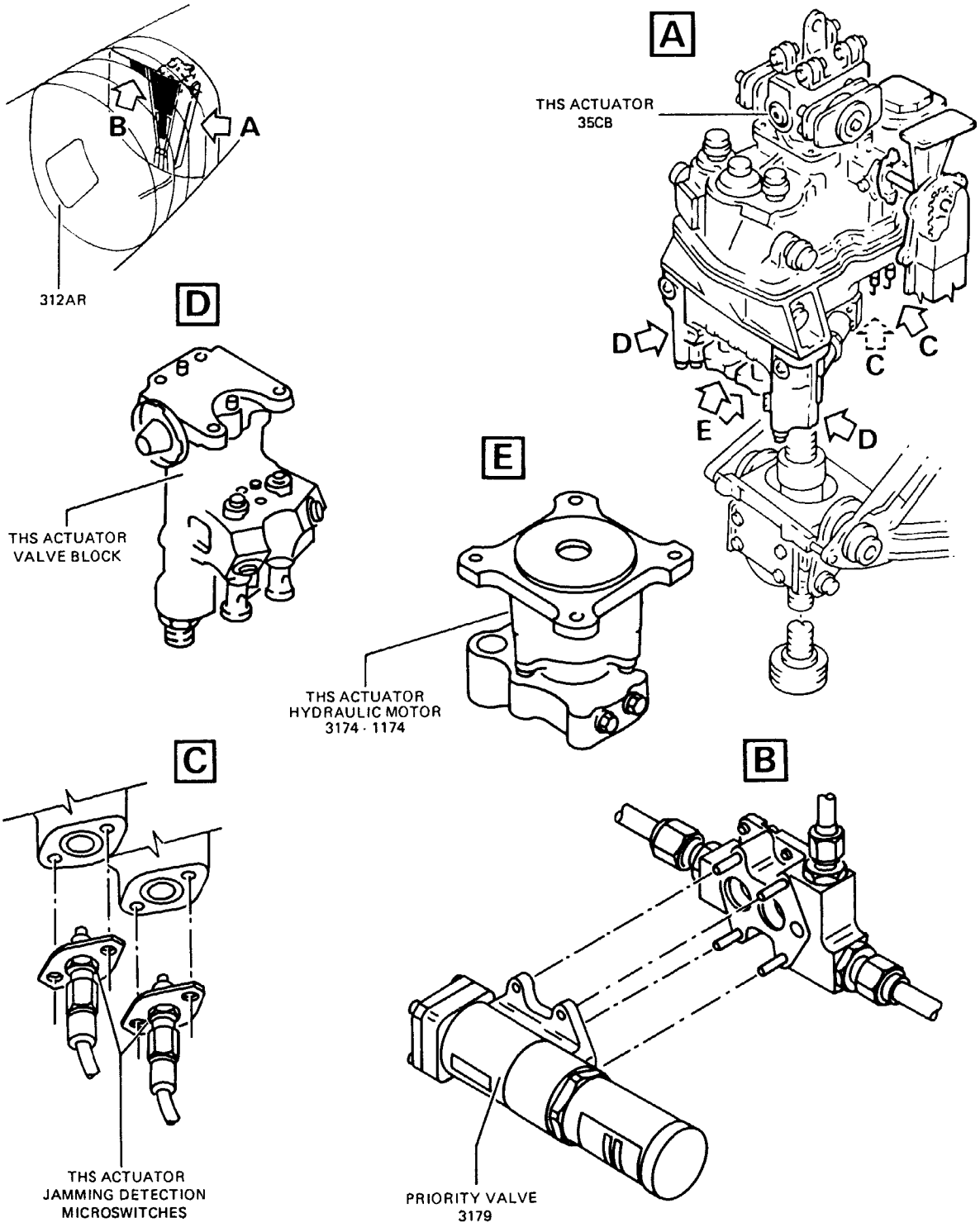
1. General

The trimmable horizontal stabilizer is driven by an actuator which includes two hydraulic motors, each powered by a different hydraulic system (Ref. 27-00).

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
1174	MOTOR - THS ACTUATOR HYDRAULIC, GREEN		312	312AR	27-44-13
3174	MOTOR - THS ACTUATOR HYDRAULIC, YELLOW		311	312AR	27-44-13
3179	PRIORITY VALVE		311	312AR	27-44-16
35CB	ACTUATOR - THS		311	312AR	27-44-11
	VALVE BLOCK - THS ACTUATOR, GREEN		312	312AR	27-44-15
	VALVE BLOCK - THS ACTUATOR, YELLOW		311	312AR	27-44-15
	MSW - THS ACTUATOR JAMMING DETECTION, GREEN		312	312AR	27-44-14
	MSW - THS ACTUATOR JAMMING DETECTION, YELLOW		311	312AR	27-44-14



Component Location
Figure 001

3. Component Description

A. THS Actuator

(1)General

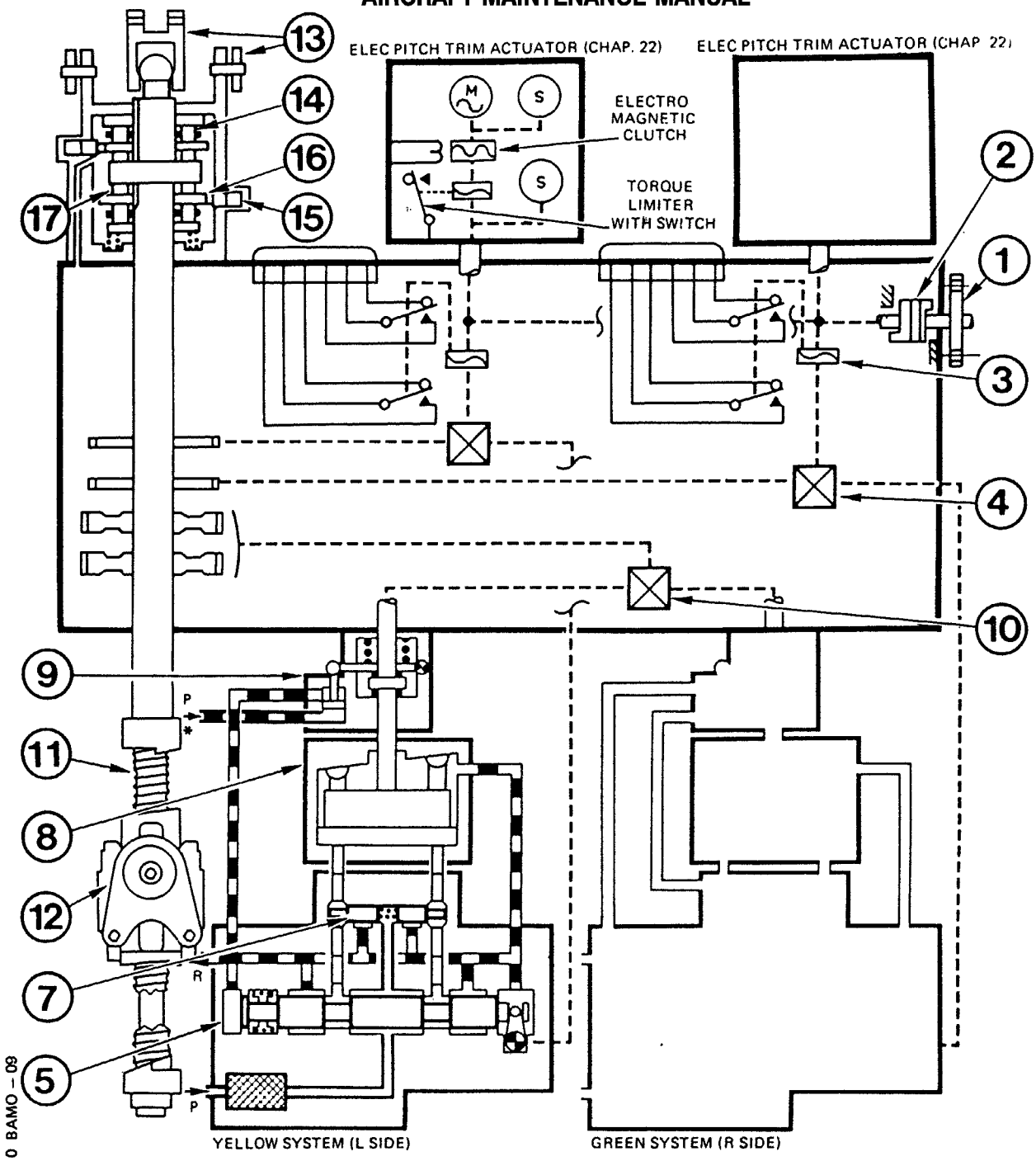
The THS actuator consists of a fail-safe ball screwjack actuated by two hydraulic motors coupled by a differential gear.
(Ref. Fig. 002)
(Ref. Fig. 003)

(2)Normal operation

Pressure-off brakes (9) are released. The ball screw is held by the no-back brake formed by items (14) (15) (16) (17). Rotation of input shaft (1), driven either by one of the electric pitch trim actuators or by the mechanical input, controls rotation of the ball screw through two identical control loops including input and feedback gear trains, feedback differentials (4), control valves (5), hydraulic motors (8) actuating a power gear train through power differential (10).
The control stroke is limited by actuator input shaft stop (2).
The structural components (ball screw and nut assembly, attachments to THS and fuselage) and the power gear train are duplicated, the secondary load path being normally unloaded.

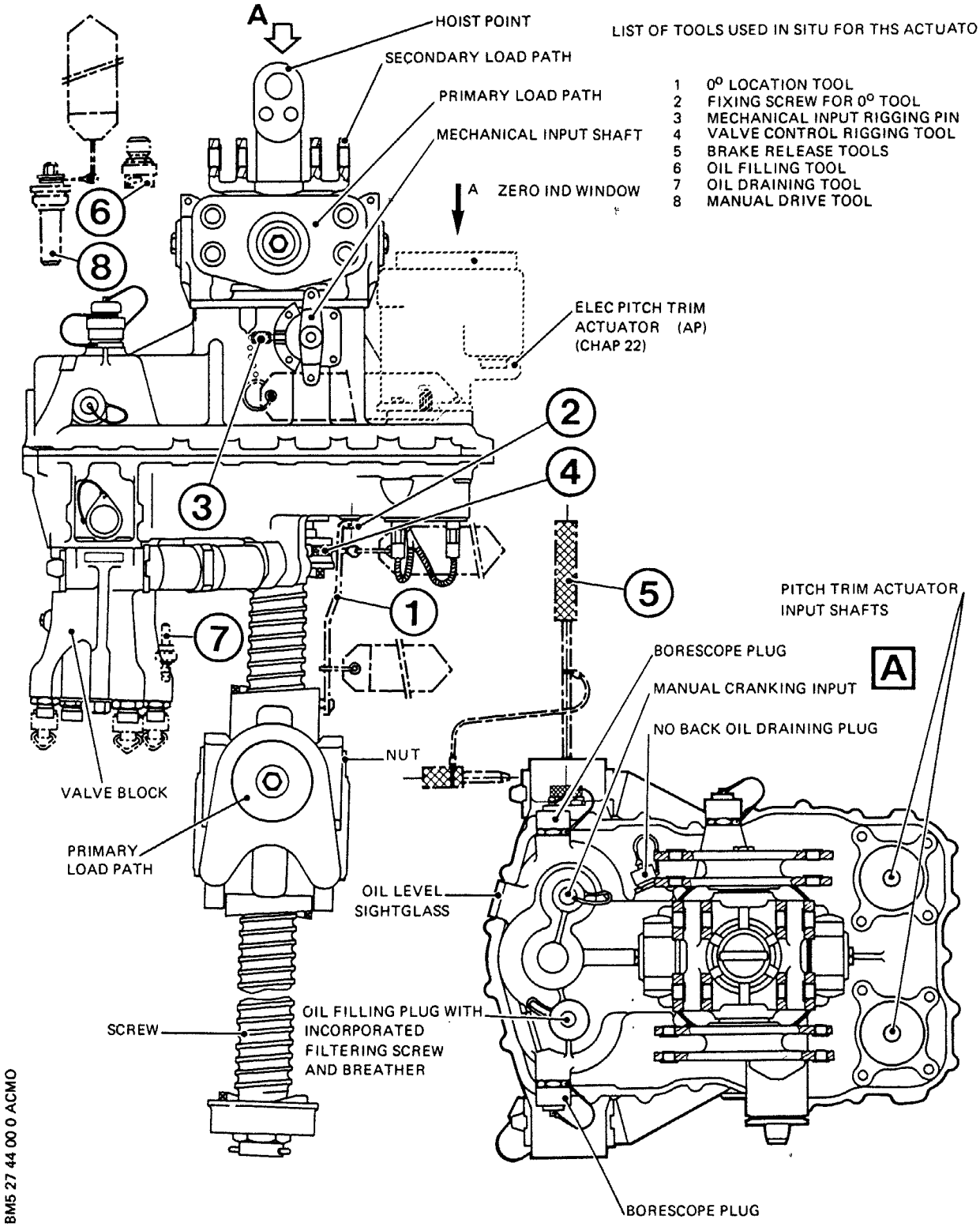
(3)Operation in failure conditions

In the event of failure of one hydraulic system, the associated hydraulic motor is stopped by itspressure-off brake. The other motor can drive the ball screw through the differential gear without any speed limitation.
If both the Green and Yellow systems fail, THS position is maintained by the two pressure-off brakes and the no-back device.
Should a hydraulic motor jam, the ball screw is driven by the other motor through the differential gear.
In the case of total disconnection between the ball screw and either of the hydraulic motors, THS position is maintained by the no-back brake.
If a disconnection occurs in one of the control loops, the associated control valve is held in its neutral position by a centering spring, and the THS is driven by the other hydraulic motor.
In the event of control valve jamming the associated hydraulic motor runs in a direction and with a speed in relation to the jammed position. With actuator input maintained either by one of the electric pitch trim actuators or by the pilot, feedback mechanism movement causes the jammed valve detent to break out, allowing the valid control loop to make the second hydraulic motor run in such a way that the ball screw is maintained in the controlled position. Further operation of the actuator is still possible except in the event of jamming in the fully open position.
In regard with maximum travel speed (0.9 deg./s) required in electrical mode.



1 INPUT SHAFT
2 INPUT STOPS
3 DETENT AND SWITCHES
4 FEEDBACK DIFFERENTIAL
5 CONTROL VALVE
7 RELIEF VALVE
8 HYDRAULIC MOTOR
9 PRESSURE-OFF BRAKE
10 POWER DIFFERENTIAL
11 BALL SCREW
12 BALL NUT
13 ATTACHMENT TO FUSELAGE
14 THRUST BEARING
15 PAWL
16 RATCHET WHEEL
17 FRICTION DISC
* UPSTREAM OF YELLOW PRIORITY VALVE

THS Actuator
Figure 002



THS Actuator
Figure 003

Each detent is fitted with two microswitches. The first is actuated by detent break out, the second is actuated by greater relative rotation of the detent. The signals delivered by these switches are processed by the servo control jamming detection system (Ref. 27-14) which provides a warning to the crew. Power from the hydraulic system involved must be manually shut off to avoid overheating of either the Green or Yellow system which may result from permanent operation of the hydraulic motors, as loss of the valid system due to overheating would result in THS runaway.

(4)Ground test

The detents and microswitches can be operated in order to check the control valve jamming detection system with the Green and Yellow systems depressurized (Ref. 27-14).

Testing of the pressure-off brake and visual examination of the power gears is possible in situ.

(5)Maintenance

(a)Maintenance tasks

- Lubrication of the ball screw nut
- Lubrication of the gearbox
- Borescope inspection of the power gears
- Primary structural load path integrity check.

(b)LRUs

- Hydraulic motors
- Microswitches
- Valve blocks
- Filters

(6)Leading Particulars

(a)Mechanical

- Stroke corresponding to THS total deflection of----------17°
  - . Actuator stroke----------612 mm (24.10 in.)
  - . Actuator overtravel----------12.5 mm (0.49 in.) each end
  - . Input shaft travel stop-to-stop-------6.565 rev
  - . Electric pitch trim actuator output shaft travel----------13.96 rev
- Limit load
  - . Compression----------31,000 daN (69,820 lbf.)
  - . Tension----------25,600 daN (57,658 lbf.)
- Max operating load and associated max speed
  - . One hydraulic motor active (the second stopped by pressure off brake)
  - . 13,700 daN (30,856 lbf.)----------0.4°/s
  - . 8000 daN (18,018 lbf.)----------0.8°/s
  - . The two hydraulic motors operative apply factor 2

(b)Hydraulic
- Hydraulic motor displacement----------8.5 cm/rev
- Max flow under no load condition--------75 l/mn (19.81 US gal/mn)
- Max internal leakage :
  . When new----------150 cm^3/mn (0.04 US gal/mn)
  . After 12,000 flight hours----------800 cm^3/mn (0.2 US gal/mn)
- Pressure-off brake operating----------100 ±5 bars (1450 ±73 psi) pressure

1. Operational/Functional Test
   Refer to 27-14-00, P. Block 501.

TRIMMABLE HORIZONTAL STABILIZER (THS) ACTUATOR 35CB
REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENTS, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : THS ACTUATOR WEIGHS APPROX. 95 kg (210 lb.), OIL NOT INCLUDED.

R

WARNING : MISUSE OF HOIST P/N M025B01 AND HOIST P/N M026B002 IS DANGEROUS AND CAN CAUSE SERIOUS INJURY.
- MAKE CERTAIN THAT THE GEAR SELECTOR IS ENGAGED CORRECTLY AND IS NOT IN THE NEUTRAL POSITION.
- DO NOT CHANGE THE GEAR SELECTION WHEN RAISING OR LOWERING THE LOAD AS THIS WILL ALLOW THE LOAD TO FALL RAPIDLY, OUT OF CONTROL.
- MAKE CERTAIN THAT CABLE IS LOADED WITH A MINIMUM OF 10 daN (22.5 lbf.) WHILE WINDING OR UNWINDING AND LEAVE AT LEAST ONE COMPLETE TURN ON THE DRUM. THIS WILL PREVENT DAMAGE TO THE CABLE.

R

WARNING : WHEN USING HOIST P/N M025B003 OR M026B004 THE FOLLOWING PRECAUTIONS MUST BE OBSERVED:
- MAKE CERTAIN THAT CABLE IS LOADED WITH A MINIMUM OF 10 daN (22.5 lbf.) WHILE WINDING OR UNWINDING.
- MAKE CERTAIN THAT YOU DO NOT UNWIND THE CABLE BEYOND THE RED MARK. THIS WILL PREVENT DAMAGE TO THE CABLE.

R

WARNING : MAKE CERTAIN THAT THE CABLE IS NOT KINKED OR TWISTED.
KEEP THE CABLE CLEAR OF ANY SHARP OBJECTS THAT CAN DAMAGE IT.

CAUTION : REPLACEMENT OF THE SYNCHRO SET PITCH TRIM ACTUATORS MUST BE CARRIED OUT WITH THS ACTUATOR IN 0° POSITION (REF. 22-23-29, P. BLOCK 401).

CAUTION : REPLACEMENT OF THS ACTUATOR MUST BE CARRIED OUT IN 0- POSITION.
THE THS ACTUATOR CAN BE DRIVEN MANUALLY BY SOCKET WRENCH USING THE MANUAL DRIVE INPUT, IF HYDRAULIC POWER IS NOT AVAILABLE. HOWEVER THE RH PRESSURE-OFF BRAKE MUST FIRST BE RELEASED AND THE SCREW STROKE MUST BE LIMITED. POWER TOOLS ARE NOT TO BE USED. THE MECHANICAL INPUT MUST NOT BE RIGGED. FOR MANUAL ACTUATOR OPERATION REFER TO 27-41-00, P. BLOCK 301.

1. Reasons for the Job

A. Replacement of oil filler plug

B. Replacement of bayonet plugs

C. Replacement of oil draining plugs

D. Replacement of THS actuator

2. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 5.5 m (18 ft.)
	B. 0U190358	Tool - 0° Location, THS Actuator
	C. 0U190359	Screw - Fixing, 0° Tool P/N 0U190358
	D. 0U190360	Rigging Pin - THS Actuator Mechanical Input Lever
	E. 97A27302009000	Locking Tool - Pitch Trim Control Wheel
R	F. 98A27408576002	Device - Removal/Installation, THS Actuator
R	G. 98A27408640000	Device - Removal/Installation, THS Actuator
	H. 98A27407514004	Fixture - Strut, Horizontal Stabilizer
	J. 98A27407515000	Trolley - THS Actuator
R	K. 98A27408408002	Equipment - Hoisting, THS Actuator
	L. A3-91-266	Hoist - Minilift, THS Actuator
	or	
	ALKAN P/N M025B01	Mechanical Hoisting System
	or	
	ALKAN P/N M026B002	Mechanical Hoisting System
	ALKAN P/N M025B003	Mechanical Hoisting System
	or	
	ALKAN P/N M026B004	Mechanical Hoisting System
	M. 98A52407620000	Protection - Access Door 312AR Structure
	N. 98A53207606000	Panels - Floor, Fuselage Tail Section
	P. 98A53407566004	Extractor - Attach Bolts, THSA
	Q.	Blanking Caps - Electrical Line
	R.	Blanking Caps/Plugs - Hydraulic Line
	S.	Torque Wrench, up to 1.0 m.daN (7.375 lbf.ft.) and up to 3.5 m.daN (25.81 lbf. ft.)
	T.	Warning Notices
	U.	Circuit Breaker Safety Clips
	V.	Container - Hydraulic Fluid Spillage
	W.	Corrosion-Resistant Steel Lockwire, 0.8 and 1.0 mm (0.032 and 0.04 in.) dia.
	X.	Cotter Pins
	Y.	Packing
	Z. Material No. 04-004	Common Greases (Ref. 20-31-00)
	AA.Material No. 05-002	Special Materials (Ref. 20-31-00)
	AB.Material No. 05-027	Special Materials (Ref. 20-31-00)
	Referenced Procedures	
	- 12-13-27, P. Block 1	Flight Controls Replenishing
	- 20-28-11, P. Block 1	Electrical Bonding

- 22-23-29, P. Block 401 Pitch Trim Actuator
- 24-41-00, P. Block 301 AC External Power Control
- 27-14-00, P. Block 501 Hydraulic Actuation (Aileron)
- 27-40-00, P. Block 501 Trimmable Horizontal Stabilizer
- 27-41-00, P. Block 301 Mechanical Control (THS)
- 27-41-00, P. Block 501 Mechanical Control (THS)
- 27-44-17, P. Block 401 THS Actuator - Spherical Bearings
- 51-75-10, P. Block 801 Repair of Paint Coatings
- 55-16-36, P. Block 401 THS Actuator Arm

3. Procedure

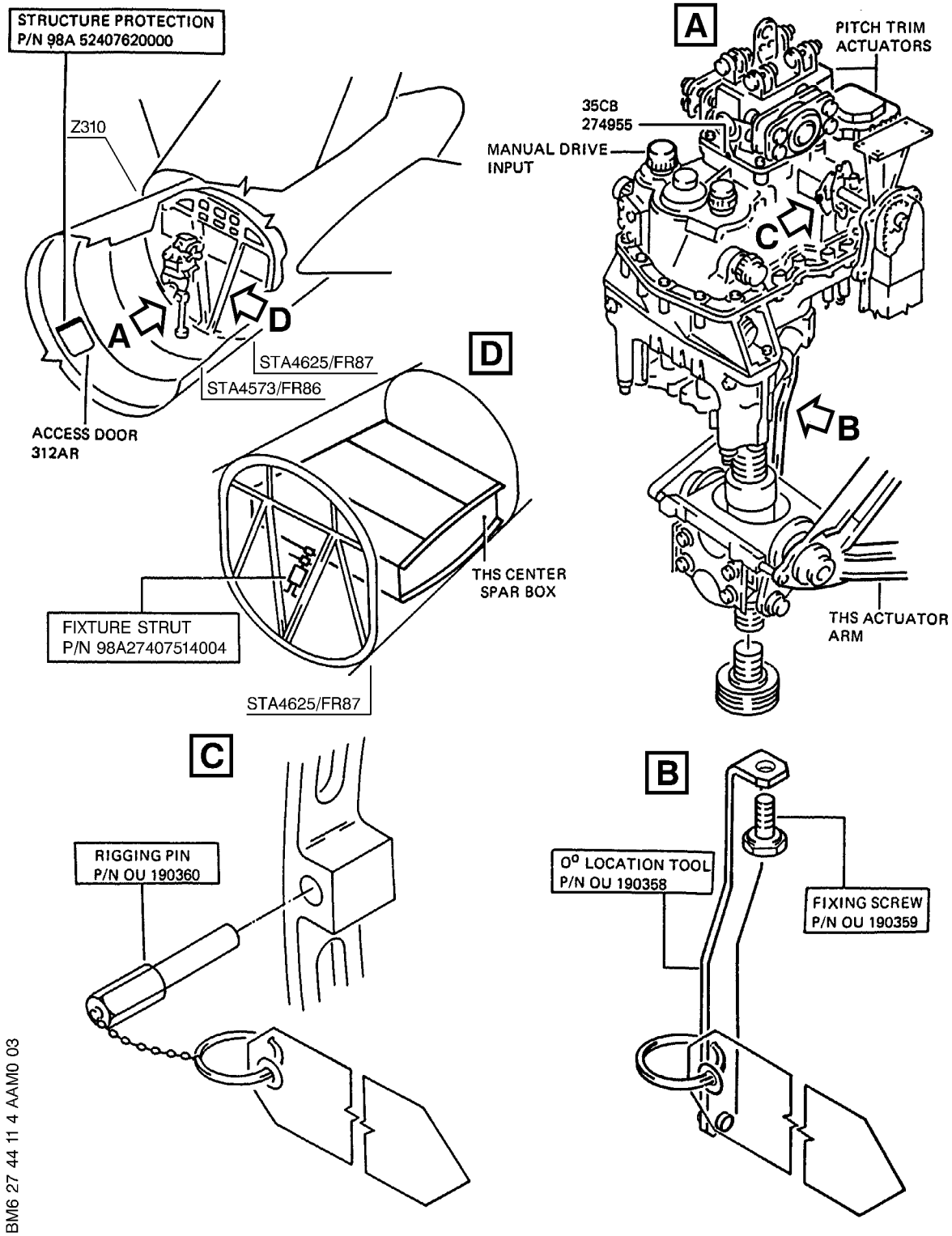
A. Job Set-Up (Ref. Fig. 401, 402)
(1)Position access platform.
(2)Open access door 312AR and install structure protection P/N 98A52407620000.
(3)Install floor panels P/N 98A53207606000 in fuselage tail section.
(4)Make certain that THS is set near zero to facilitate manual cranking at para. 3. A. (8) for installation of rigging pin.
(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC 1/28VDC	306CC1	103/G 3
21VU	FAC 1/115VAC	309CC1	103/G 5
21VU	FAC 1/26VAC	305CC1	103/G 7
21VU	FAC 2/26VAC	305CC2	103/G 8
21VU	FAC 2/115VAC	309CC2	103/G10
21VU	FAC 2/28VDC	306CC2	103/G12
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(6)Display warning notice in flight compartment prohibiting operation of pitch controls.
(7)Display warning notices, prohibiting repressurization of hydraulic systems.
CAUTION : CAUTIONS MUST BE OBSERVED FOR THS ACTUATOR MANUAL ACTUATION.
(8)Manually drive THS actuator to zero (Ref. 27-41-00, P. Block 301), install rigging pin P/N 0U190360 in THS actuator mechanical input and install tool P/N 0U190358 between THS actuator (17) and screwshaft nut (14) with fixing screw P/N 0U190359.
R (9)Secure THS in 0° position with fixture strut P/N 98A27407514004.
(10)Install locking tool P/N 97A27302009000 on pitch trim control wheel in flight compartment.
(11)Remove pitch trim actuators (Ref. 22-23-29, P. Block 401).
(12)Remove bolts (4), washers (3) and disconnect bonding straps (2) from bracket (1).
(13)Position container for hydraulic fluid spillage.

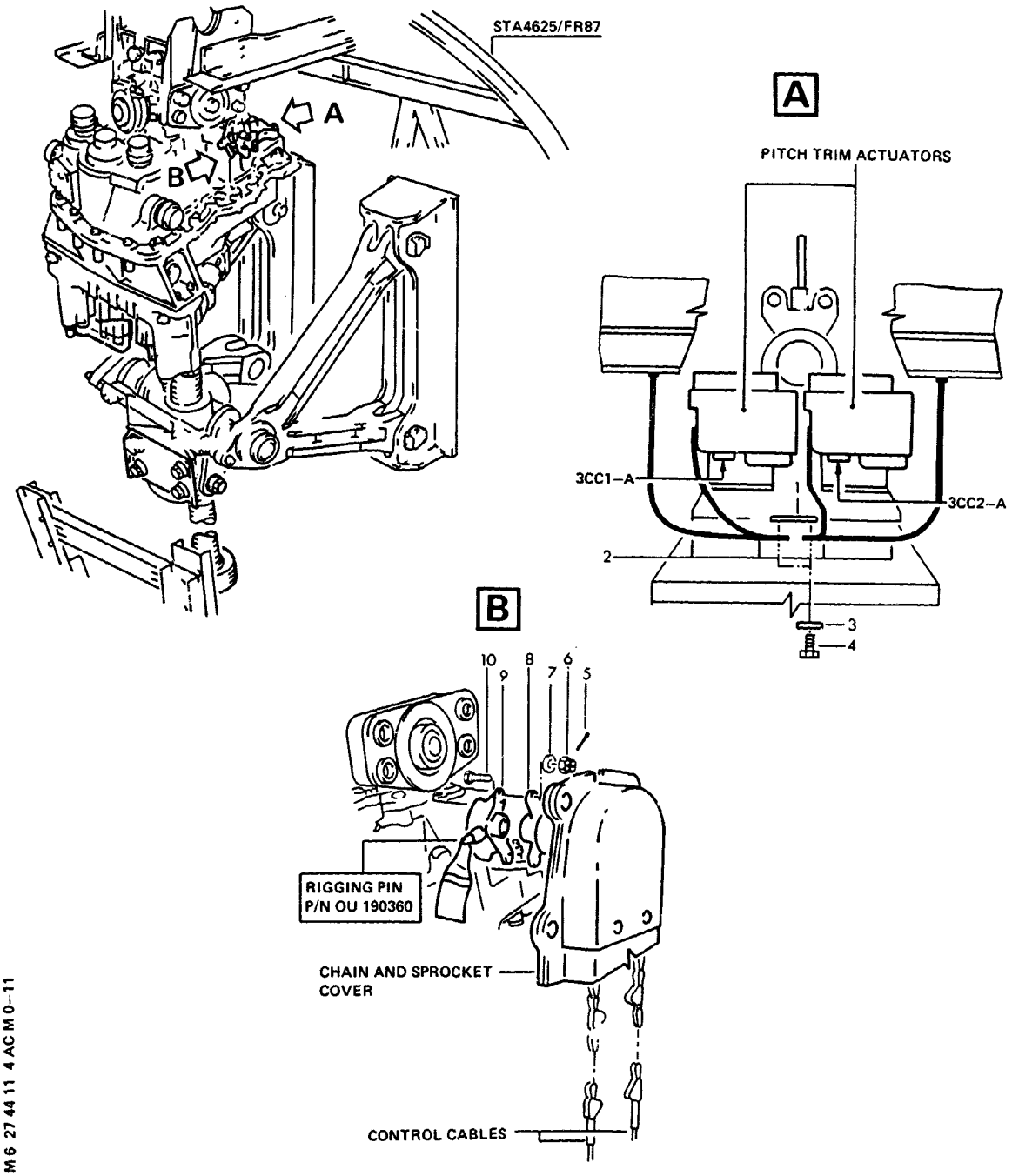
B. Replacement of Oil Filler Plug (Ref. Fig. 403)
(1)Cut and remove lockwire.
(2)Remove breather cap (31) and oil filler plug (30).
(3)Discard packing (29).
(4)Fit new packing (29) to oil filler plug (30).
(5)Install oil filler plug (30) and breather cap (31).
(6)TORQUE oil filler plug (30) to between 2.7 and 3.3 m.daN (19.91 and 24.33 lbf.ft.) and safety with lockwire 0.8 mm (0.032 in.) dia.

C. Replacement of Bayonet Plugs (Ref. Fig. 403)
(1)Cut and remove lockwire.



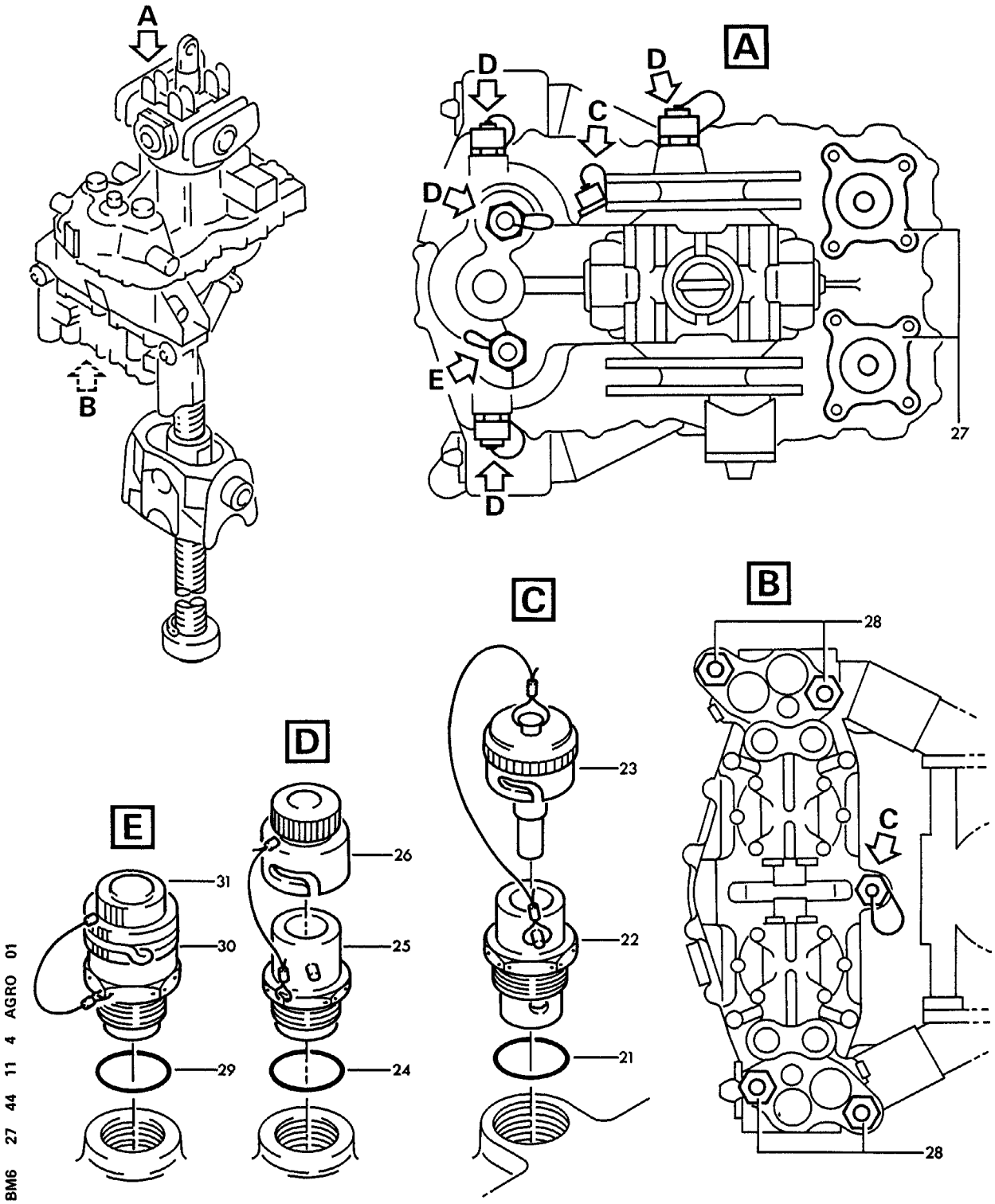
THS Actuator/Locking
Figure 401

R



B M 6 27 44 11 4 AC M 0-11

THS Actuator Mechanical Input
Figure 402



THS Actuator Gearbox Plugs
Figure 403

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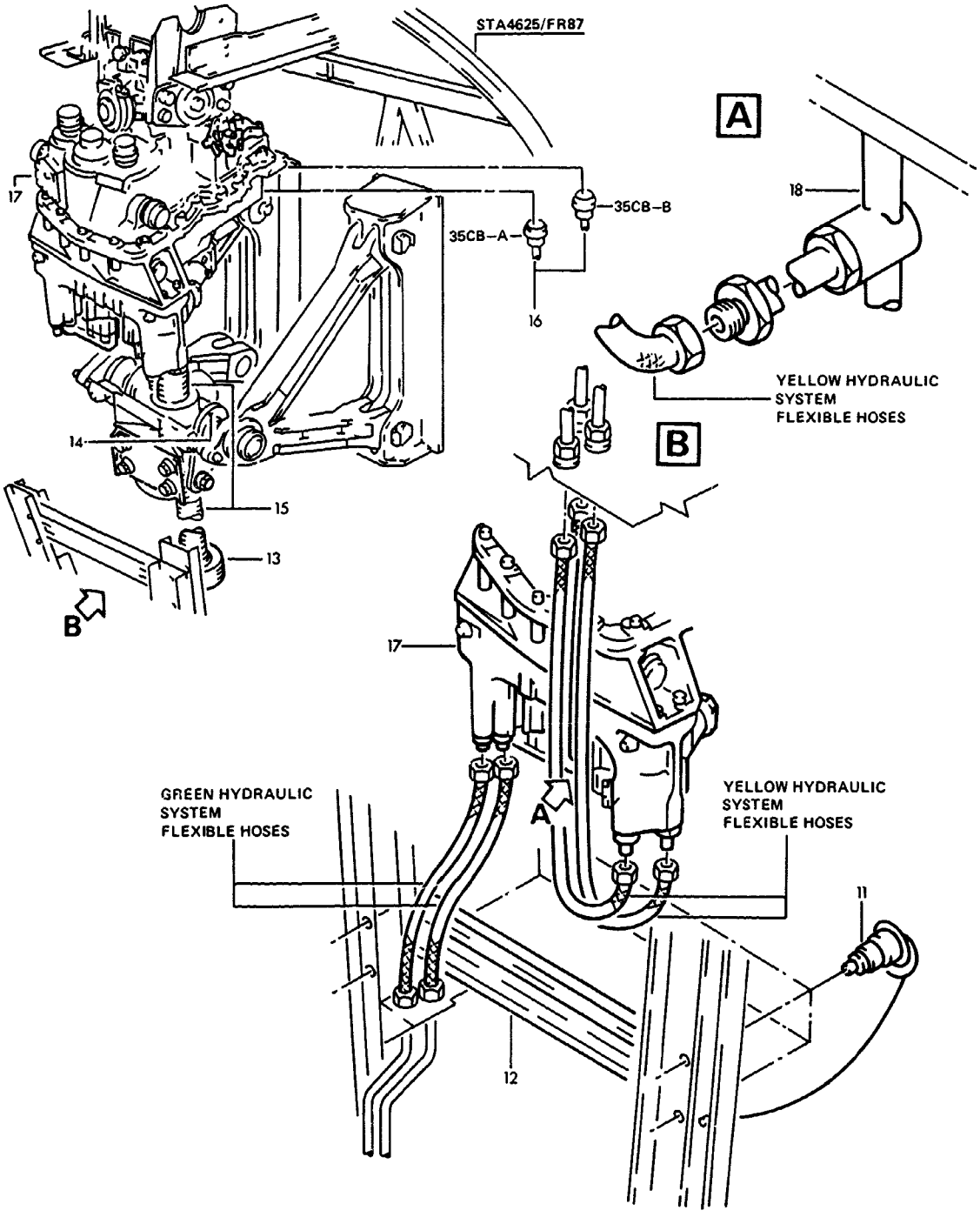
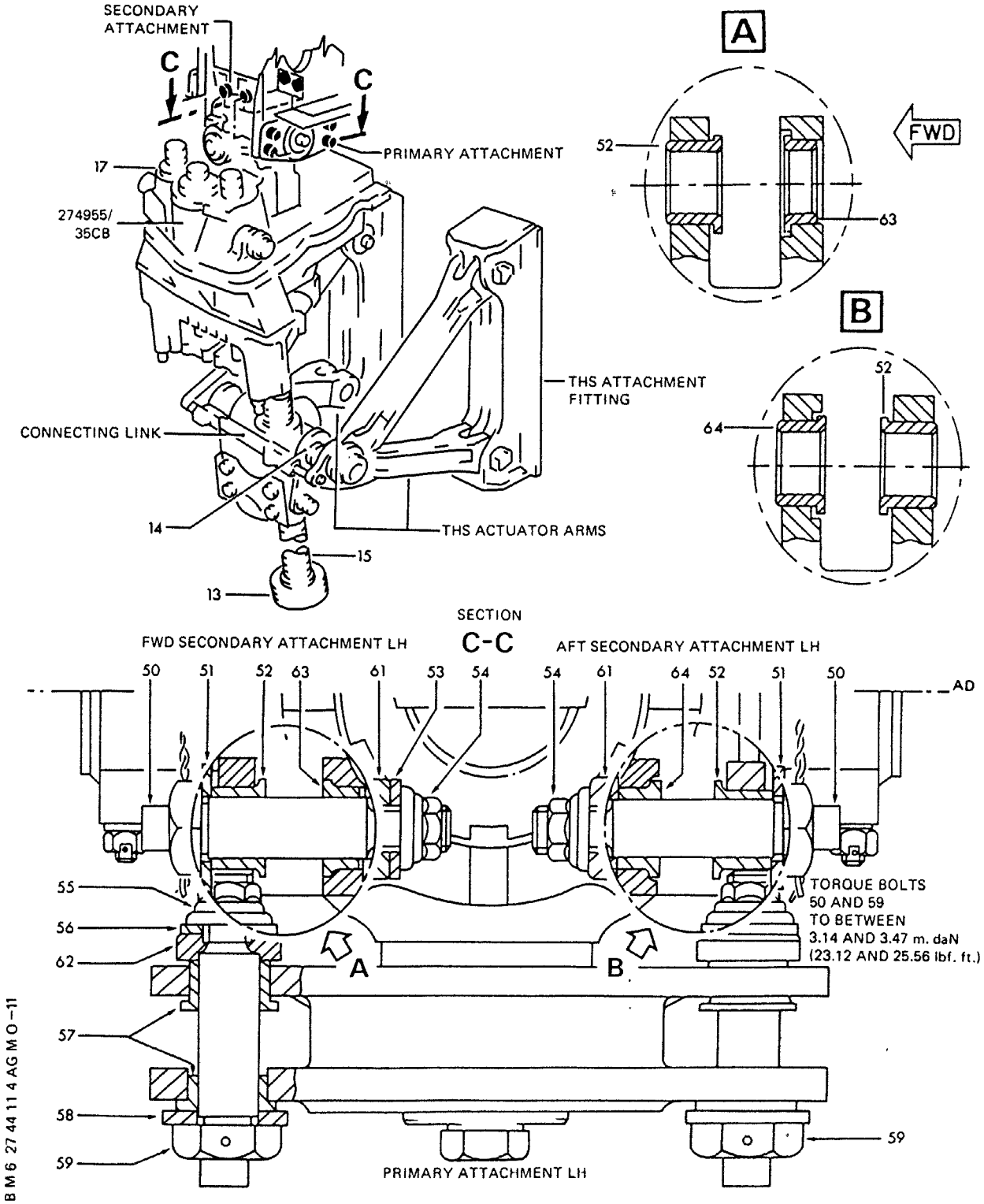
(2)Remove bayonet plugs (25).
(3)Discard packing (24).
(4)Fit new packing (24) to bayonet plugs (25).
(5)Install bayonet plugs (25).
(6)TORQUE bayonet plugs (25) to between 1.8 and 2.2 m.daN (13.27 and 16.22 lbf.ft.) and safety with lockwire 0.8 mm (0.032 in.) dia.

D. Replacement of Oil Draining Plugs (Ref. Fig. 403)
(1)Drain THS actuator oil (Ref. 12-13-27, P. Block 1).
(2)Cut and remove lockwire.
(3)Remove oil draining plugs (22) and magnetic chip detectors (23).
(4)Discard packing (21).
(5)Fit new packing (21) to oil draining plugs (22).
(6)Install oil draining plugs (22) and magnetic chip detectors (23).
(7)TORQUE oil draining plugs (22) to between 1.4 and 1.6 m.daN (10.32 and 11.80 lbf.ft.) and safety with lockwire 0.8 mm (0.032 in.) dia.
(8)Fill THS actuator with oil (Ref. 12-13-27, P. Block 1).

E. Removal
(Ref. Fig. 402, 404, 405)
(Ref. Fig. 406, 407)
(1)Remove cotter pins (5), nuts (6), washers (7), bolts (10) and disconnect mechanical control system link plate (8) from THS actuator input lever (9).
(2)Disconnect Green hydraulic system flexible hoses from THS actuator (17) and cap open ends of hoses and ports. Secure hoses to structure temporarily.
(3)Remove Yellow hydraulic system flexible hoses, installed between THS actuator (17), LH pressure-off brake transfer tube and next upper union fittings and install blanking caps in hoses, ports and union fittings.
(4)Disconnect electrical connectors (16) and install blanking caps.
(5)Remove pip pins (11) and cross member (12).
(6)Disconnect connecting link and remove THS actuator arms from THS attachment fittings and from screwshaft nut (14) (Ref. 55-16-36, P. Block 401)(Ref. Fig. 405).
(7)Disconnection of THS Actuator Primary and Secondary Attachments
NOTE : THS actuator weighs approx. 95 kg (210 lb.).
NOTE : Record position of fasteners and FWD/AFT position of secondary mounting fork to facilitate subsequent installation.
(a)Cut and remove lockwire from bolts (50, 59), remove nuts (54), washers (53) (FWD), and cup washers (61).
R (b)Install device P/N 98A27408640000.
(c)Attach THS actuator top lifting eye to device with pip pin (40) (Ref. Fig. 406) and remove load from bolts (50, 59).
(d)Remove bolts (50) and washers (51), using extractor P/N 98A53407566004.
(e)Remove nuts (55), washers (56) and cup washers (62).
(f)Remove bolts (59) and washers (58), using extractor P/N 98A53407566004.
(8)Removal of THS Actuator (Ref. Fig. 406, 407)
(a)Using speed handle, lower THS actuator sufficiently to allow device



Connections - THS Actuator
Figure 404



THS Actuator
Figure 405

R P/N 98A27408576002 to be attached to structure with pip pins (41).

(b)Lower THS actuator and install connecting plates and turnbuckle
R nuts of device P/N 98A27408576002 with pip pins (42, 43).

WARNING : MISUSE OF HOIST P/N M025B01 AND HOIST P/N M026B002 IS DANGEROUS AND CAN CAUSE SERIOUS INJURY.
- MAKE CERTAIN THAT THE GEAR SELECTOR IS ENGAGED CORRECTLY AND IS NOT IN THE NEUTRAL POSITION.
- DO NOT CHANGE THE GEAR SELECTION WHEN RAISING OR LOWERING THE LOAD AS THIS WILL ALLOW THE LOAD TO FALL RAPIDLY, OUT OF CONTROL.
- MAKE CERTAIN THAT CABLE IS LOADED WITH A MINIMUM OF 10 daN (22.5 lbf.) WHILE WINDING OR UNWINDING AND LEAVE AT LEAST ONE COMPLETE TURN ON THE DRUM. THIS WILL PREVENT DAMAGE TO THE CABLE.

WARNING : WHEN USING HOIST P/N M025B003 OR M026B004 THE FOLLOWING PRECAUTIONS MUST BE OBSERVED:
- MAKE CERTAIN THAT CABLE IS LOADED WITH A MINIMUM OF 10 daN (22.5 lbf.) WHILE WINDING OR UNWINDING.
- MAKE CERTAIN THAT YOU DO NOT UNWIND THE CABLE BEYOND THE RED MARK. THIS WILL PREVENT DAMAGE TO THE CABLE.

WARNING : MAKE CERTAIN THAT THE CABLE IS NOT KINKED OR TWISTED. KEEP THE CABLE CLEAR OF ANY SHARP OBJECTS THAT CAN DAMAGE IT.

(c)Remove load from pip pin (40), remove pip pin (40), and install
R hoisting equipment P/N 98A27408408002 and hoist P/N A3-91-266 or equivalents.

(d)Slide THS actuator forward to a position below transport rail and adjust turnbuckles to a height necessary to install shackle on runner and on THS actuator top lifting eye.

(e)Remove load from turnbuckles and remove pip pins (42) and slide connecting plates aft.

(f)Secure loose bushes (52, 57, 63, 64) temporarily in their original position (Ref. Fig. 405).

R (g)Remove RH rail of device P/N 98A27408576002, slide THS actuator below transfer rail above access door 312AR and install fork adapter to bottom lifting eyes with pip pins (44).

(h)Attach hoist P/N A3-91-266 to runner (C) and connect hoist adapter to fork adapter.

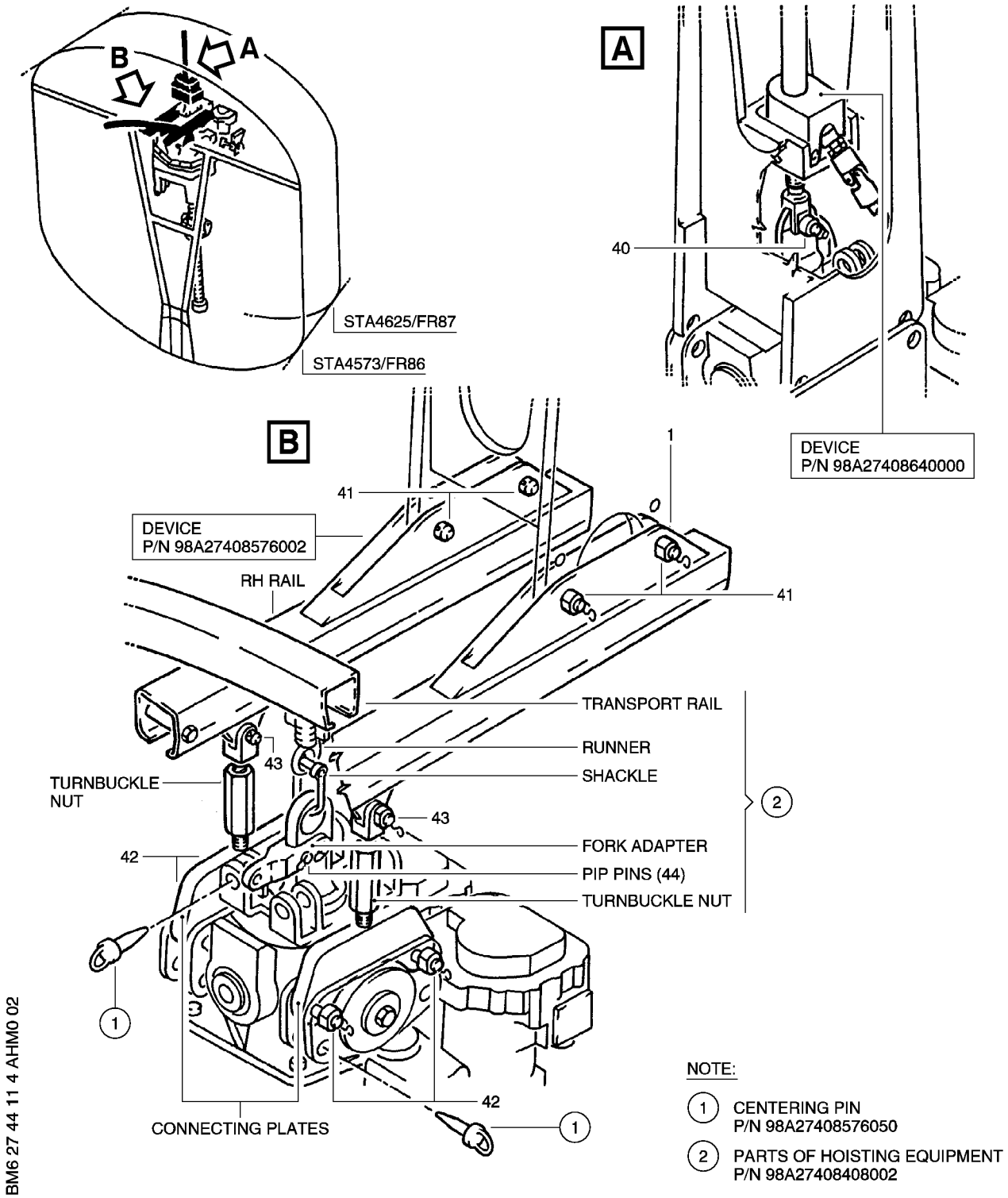
(j)Apply tension to hoist until shackle can be removed from runner (B).

(k)Attach support with shackles between runner (A) and THS actuator top lifting eye.

(l)Lower THS actuator sufficiently to allow hoist adapter to be disconnected from fork adapter, attach hoist adapter to the free end of support cable and apply tension to hoist until shackle can be disconnected from runner (A).

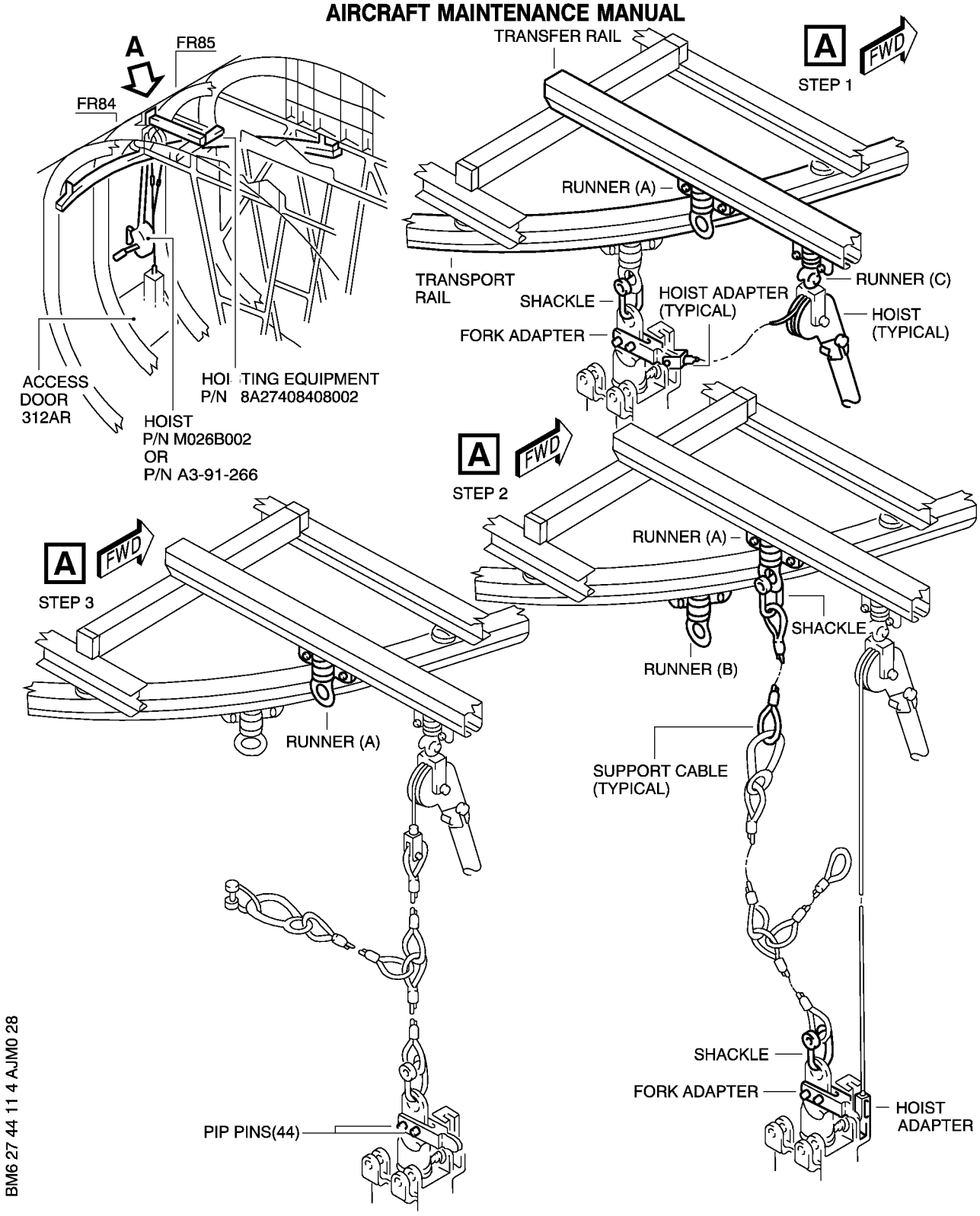
NOTE : Steps (k) and (l) are only applicable, if hoist P/N A3-91-266 is used.

(m)Lower THS actuator thru access door 312AR onto trolley P/N 98A27407515000.



THS Actuator - Removal/Installation Device
Figure 406

R



THS Actuator - Hoisting Equipment
Figure 407

R

F. Preparation for Installation (Ref. Fig. 403)

CAUTION : A RIGGING PIN P/N OU190360 AND A LOCATION TOOL P/N OU190358 SECURE THE REPLACEMENT THS ACTUATOR (Ref. Fig. 401). THESE TOOLS MUST REMAIN INSTALLED THROUGHOUT INSTALLATION PROCEDURE.

(1)Transfer LH spherical bearing from new THS actuator screwshaft nut (14) to LH THS actuator arm (Ref. 27-44-17, P. Block 401).

(2)On new THS Actuators:

(a)Replace red protective cap at oil filler plug (30) by attached breather cap (31).

(b)Remove red storage plates from pitch trim actuator flanges (27).

(c)Remove red tube caps from valve block ports (28).

(d)Check that identificaton placards are affixed.

(3)At THS actuator attachment area:

(a)Carry out visual inspection to make certain that attach fittings, arms and arm attach fittings are free from damage.

G. Installation
(Ref. Fig. 401, 402, 404)
(Ref. Fig. 405, 406, 407)

R

WARNING : MISUSE OF HOIST P/N M025B01 AND HOIST P/N M026B002 IS DANGEROUS AND CAN CAUSE SERIOUS INJURY.
- MAKE CERTAIN THAT THE GEAR SELECTOR IS ENGAGED CORRECTLY AND IS NOT IN THE NEUTRAL POSITION.
- DO NOT CHANGE THE GEAR SELECTION WHEN RAISING OR LOWERING THE LOAD AS THIS WILL ALLOW THE LOAD TO FALL RAPIDLY, OUT OF CONTROL.
- MAKE CERTAIN THAT CABLE IS LOADED WITH A MINIMUM OF 10 daN (22.5 lbf.) WHILE WINDING OR UNWINDING AND LEAVE AT LEAST ONE COMPLETE TURN ON THE DRUM. THIS WILL PREVENT DAMAGE TO THE CABLE.

R

WARNING : WHEN USING HOIST P/N M025B003 OR M026B004 THE FOLLOWING PRECAUTIONS MUST BE OBSERVED:
- MAKE CERTAIN THAT CABLE IS LOADED WITH A MINIMUM OF 10 daN (22.5 lbf.) WHILE WINDING OR UNWINDING.
- MAKE CERTAIN THAT YOU DO NOT UNWIND THE CABLE BEYOND THE RED MARK. THIS WILL PREVENT DAMAGE TO THE CABLE.

R

WARNING : MAKE CERTAIN THAT THE CABLE IS NOT KINKED OR TWISTED. KEEP THE CABLE CLEAR OF ANY SHARP OBJECTS THAT CAN DAMAGE IT.

(1)Attach fork adapter to THS actuator bottom lifting eyes, with pip pins (44), attach support cable and lift THS actuator from trolley P/N 98A27407515000 thru access door 312AR.

(2)Attach support cable free end with shackle to runner (A).

(3)Lower THS actuator until hoist adapter can be removed from support cable and attach hoist adapter to fork adapter.

NOTE : Steps (2) and (3) are only applicable, if hoist P/N A3-91-266 is used.

(4)Lift THS actuator, remove support cable from THS actuator top lifting eye, connect THS actuator top lifting eye with shackle to runner (B) and disconnect hoist adapter.

(5)Position THS actuator opposite structural attach fittings.
(6)Remove pip pins (44) and fork adapter.
R (7)Install RH rail of device P/N 98A27408576002, adjust turnbuckles and install connecting plates of device with pip pins (42) on THS actuator primary attachment.
(8)Remove shackle, slide THS actuator aft and attach THS actuator top
R lifting eye to device P/N 98A27408640000 with pip pin (40).
(9)Remove pip pins (42) from THS actuator primary attachment, remove
R pip pins (41) and device P/N 98A27408576002.
(10)Installation of THS Actuator Primary and Secondary Attachments (Ref. Fig. 405).
CAUTION : ORIENTATE SECONDARY MOUNTING FORK. WHERE FWD/AFT POSITION IS NOT RECORDED, IDENTIFY DIFFERENT INNER BUSHES (63, 64) IN FWD AND AFT SECONDARY MOUNTING FORKS (Ref. Fig. 405).

(a)Check that bushes (57) are correctly positioned.
R (b)Using speed handle, lift THS actuator with device P/N 98A27408640000
R until centering pins P/N 98A27408576050 (Part of Device set
R P/N 98A27408576002) can be easily inserted.
NOTE : To ensure that none of the attach point bolts are under any load at any time, the THS actuator must be supported in the
R device P/N 98A27408640000 during the entire assembly operation of the attach bolts.
(c)At primary attachment:
1 Apply grease (Mat. No. 04-004) to bolts (59) and nuts (55).
2 Remove centering pins P/N 98A27407512600.
3 Install washers (58), bolts (59), cup washers (62), washers (56) and nuts (55). Make certain that lockwire holes in bolt heads are positioned vertically.
4 TORQUE bolts (59) to between 3.14 and 3.47 m.daN (23.12 and 25.56 lbf.ft.) and safety with lockwire.
(d)At secondary attachment:
1 Apply grease (Mat. No. 04-004) to bolts (50) and nuts (54).
2 Remove centering pins P/N 98A27407512600.
3 Install washers (51), bolts (50), cup washers (61), washers (53) and nuts (54). Make certain that lockwire holes in bolt heads are positioned horizontally.
NOTE : Washers (53) are applicable to FWD secondary attachment only.
4 TORQUE bolts (50) to between 3.14 and 3.47 m.daN (23.12 and 25.56 lbf.ft.) and safety with lockwire.
R (11)Remove pip pin (40) and device P/N 98A27408640000.
(12)Make certain that spherical bearing (stationary bearing) is installed in LH THS actuator arm and spherical bearing (free-floating bearing) is installed on RH pivot of THS actuator screwshaft nut.
(13)Install THS actuator arms and connecting link (Ref. 55-16-36, P. Block 401).
(14)Remove fixture strut P/N 98A27407514004 and tools P/N 0U190358 and P/N 0U190359 (Ref. Fig. 401).
(15)Install cross member (12) with pip pins (11).
(16)Remove blanking caps and connect Green hydraulic system flexible hoses.
(17)Remove blanking caps and install Yellow hydraulic system flexible hoses.

(18)Remove blanking caps and connect the following electrical connectors (16):
(a)LH: 35CB-A
(b)RH: 35CB-B
(19)Apply corrosion-preventive paste (Mat. No. 05-002) to bolts (10) (Ref. Fig. 402).
(20)With rigging pin P/N 0U190360 installed, connect THS actuator mechanical input lever (9) to control system link plate (8) with bolts (10), washers (7) and nuts (6).
(21)If bolts (10) cannot be easily installed, adjust mechanical control system (Ref. 27-40-00 and 27-41-00, P. Blocks 501).
(22)TORQUE nuts (6) to between 0.76 and 0.84 m.daN (67.3 and 74.3 lbf.in.) and safety with cotter pins (5).
(23)Install pitch trim actuators, making certain that synchro setting is correct and connectors 3CC1-A and 3CC2-A are connected (Ref. Fig. 402) (Ref. 22-23-29, P. Block 401).
(24)Connect bonding straps (2) at bracket (1) with bolts (4) and washers (3).
(25)Safety bolts (4) with lockwire. For electrical bonding refer to 20-28-11, P. Block 1.
(26)Remove rigging pin P/N 0U190360 and locking tool P/N 97A27302009000.
R (27)Remove hoisting equipment P/N 98A27408408002 and hoist P/N A3-91-266 or equivalents.
(28)Remove safety clips and tags and close circuit breakers 306CC1, 309CC1, 305CC1, 305CC2, 309CC2, 306CC2, 2CB and 1CB.

H. Test
(1)Check oil level of THS actuator (Ref. 12-13-27, P. Block 1).
(2)Carry out functional and system tests of THS control (Ref. 27-41-00, P. Block 501).
(3)Carry out operational test of THS jamming detection (Ref. 27-14-00, P. Block 501).
(4)Check that hydraulic connections are free from leaks.

J. Close-Up
CAUTION : DO NOT APPLY MOISTURE-REMOVING OIL TO THE THS ACTUATOR SCREWSHAFT (15), CONTROL CABLES, SPROCKET AND CHAIN.
(1)Check coating of moisture-removing oil (Mat. No. 05-027) for good condition on THS actuator (17), including pitch trim actuators, hydraulic motors, screwshaft nut (14) and shock absorber (13) and renew as necessary (Ref. 51-75-10, P. Block 801) (Ref. Fig. 402).
(2)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(3)Remove hydraulic fluid spillage container.
(4)Remove floor panel P/N 98A53207606000 and structure protection 98A52407620000.
(5)Close access door 312AR.
(6)Remove warning notices.
(7)Remove access platform.

TRIMMABLE HORIZONTAL STABILIZER (THS) ACTUATOR 35CB
INSPECTION/CHECK

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENTS, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

CAUTION : CAUTIONS MUST BE OBSERVED FOR THS ACTUATOR MANUAL ACTUATION (REF. 27-41-00, P. BLOCK 301).

1. Reasons for the Job

A. Inspection/Check of the following:
NOTE : Item numbers correspond with paragraphs.
(1)Not applicable
(2)Thorough Visual Check
(3)Metal Particle Check
(4)No-Back Assembly Check
(5)Oil Pump Check
(6)Torque Check
(7)Pressure-OFF Brake Check
(8)Backlash Check

2. Thorough Visual Check

A. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 5.5 m (18 ft.)
	(2)	Warning Notice
R	(3)	Torque Wrench, up to 3.5 m.daN (25.81 lbf.ft)
R	(4)	Flashlight
R	(5)	Inspection-Mirror, Flexible

B. Procedure
(1)Job Set-Up
(a)Position access platform and open access door 312AR.
(b)Display warning notice in flight compartment prohibiting operation of pitch controls.
(2)Use a flashlight and a flexible inspection-mirror and inspect the THS actuator as follows (Ref. Fig. 601, 602):
(a)Primary and secondary attachment for cracks, dents, corrosion, scratches, material missing and protective finishes.

1 Make sure that there are no metallic particles on the base of the tie rod sphere (5).
- If metallic particles are found, contact Airbus Customer Support.

NOTE : The presence of metallic particles is one of the consequences of the friction between the tie rod sphere and the fail safe lug when the upper secondary path is loaded. These particles are mainly titanium chips (less than 5 mm, 0.20 inch, length) coming from the sphere of the tie rod.

2 If necessary, clean the areas to be inspected.
3 Do a visual inspection of the no back housing yokes (9) together with the no back housing yokes on the opposite side.
- Make sure that the visible part of each lug (8) has no cracks, scratches or material missing.
- Make sure that the no back housing yokes (9) have no cracks, scratches or material missing.
R - Make sure that the yoke bolts (7) are installed and secured.
R - Check manually the position of the yoke bolts (7) to make sure that they are immobile.
4 Do a visual inspection of the upper gimbal (6).
- Make sure that the visible surfaces have no cracks, scratches or material missing.
5 Do a visual inspection of the mounting clevis (1) together with the mounting clevis on the opposite side.
- Make sure that the cup washers (3) have no cracks, scratches or material missing and that there is no gap between the cup washers (3) and the spherical bearings.
- Check manually the position of the cup washers (3) to make sure that they are immobile.
- Make sure that the locking screws (4) have no cracks, scratches or material missing and that the tab washers are in good condition.
R - Use a torque wrench to make sure that the locking screws (4)
R are torqued between 3.14 and 3.47 m.daN.
- Make sure that the mounting clevises (1) has no cracks,
R - Use a torque wrench to make sure that the locking screws (2)
R are torqued between 3.14 and 3.47 m.daN.
R - Make sure that the locking screws are secured.

(b)Screw nut attachment for general condition, cracks and corrosion.
(c)Screw thread for cracks and wear marks.
NOTE : Ensure that thread under screw nut is inspected.
(d)Parts with cracks have to be replaced before the next flight.
Parts where the surface protection is damaged have to be replaced and sent to a repair shop for inspection and possible repair.

(3)Close-Up
(a)Close access door, 312AR.
(b)Remove warning notice and access platform.

3. Metal Particle Check

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 5.5 m (18 ft.)
(2)OU190364	Tool - Oil Draining, THS Actuator
(3)	Warning Notices
(4)	Container - Oil Drainage, 5 l (1.3 US gal.)
(5)	Flexible Tube - Oil Drainage
(6)	Borescope
(7)	Filter, Paper

Referenced Procedures

- 12-13-27, P. Block 1	Flight Controls Replenishing
- 27-41-00, P. Block 301	Mechanical Control (THS)
- 27-41-00, P. Block 501	Mechanical Control (THS)
- 27-44-11, P. Block 401	Trimmable Horizontal Stabilizer (THS) Actuator
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

B. Procedure

(1)Job Set-Up

(a)Position access platform.

(b)Open access door 312AR.

(c)Make certain that THS is set near zero.

(d)Display warning notice in flight compartment prohibiting operation of pitch controls.

(e)Display warning notices, prohibiting repressurization of hydraulic systems.

(2)Magnetic Chip Detectors Check (Ref. Fig. 601)

(a)Disconnect magnetic chip detectors from no-back housing and from gearbox and check for unusually large collection of metal particles.

(b)If metal particles are present in chips exceeding 2 mm (0.08 in.) by 1 mm (0.04 in.) carry out borescope check of power gear teeth.

(3)Borescope Check

(a)Position container for oil drainage.

(b)Connect oil draining tool P/N OU190364.

(c)Using flexible tube, drain no-back housing and gearbox oil thru a paper filter and check for metal particles.

(d)Disconnect caps from inspection ports.

(e)Insert a suitable optical probe into the gearbox and focus on power gear teeth.

CAUTION : CAUTIONS MUST BE OBSERVED FOR THS ACTUATOR MANUAL ACTUATION.

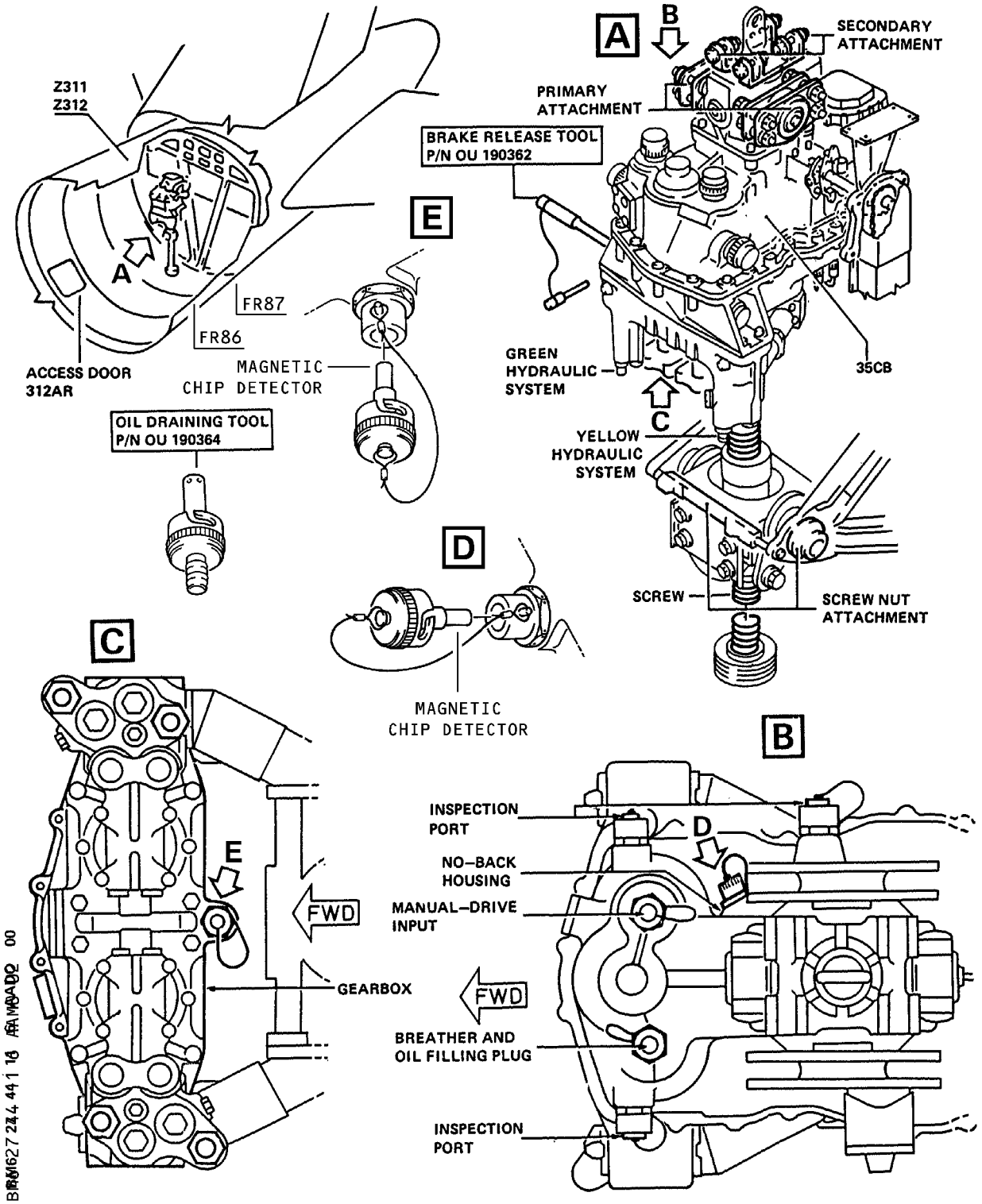
(f)Rotate manual-drive input (Ref. 27-41-00, P. Block 301) and visually examine power gear teeth whilst rotating thru one revolution.

(g)Proceed likewise thru all inspection holes.

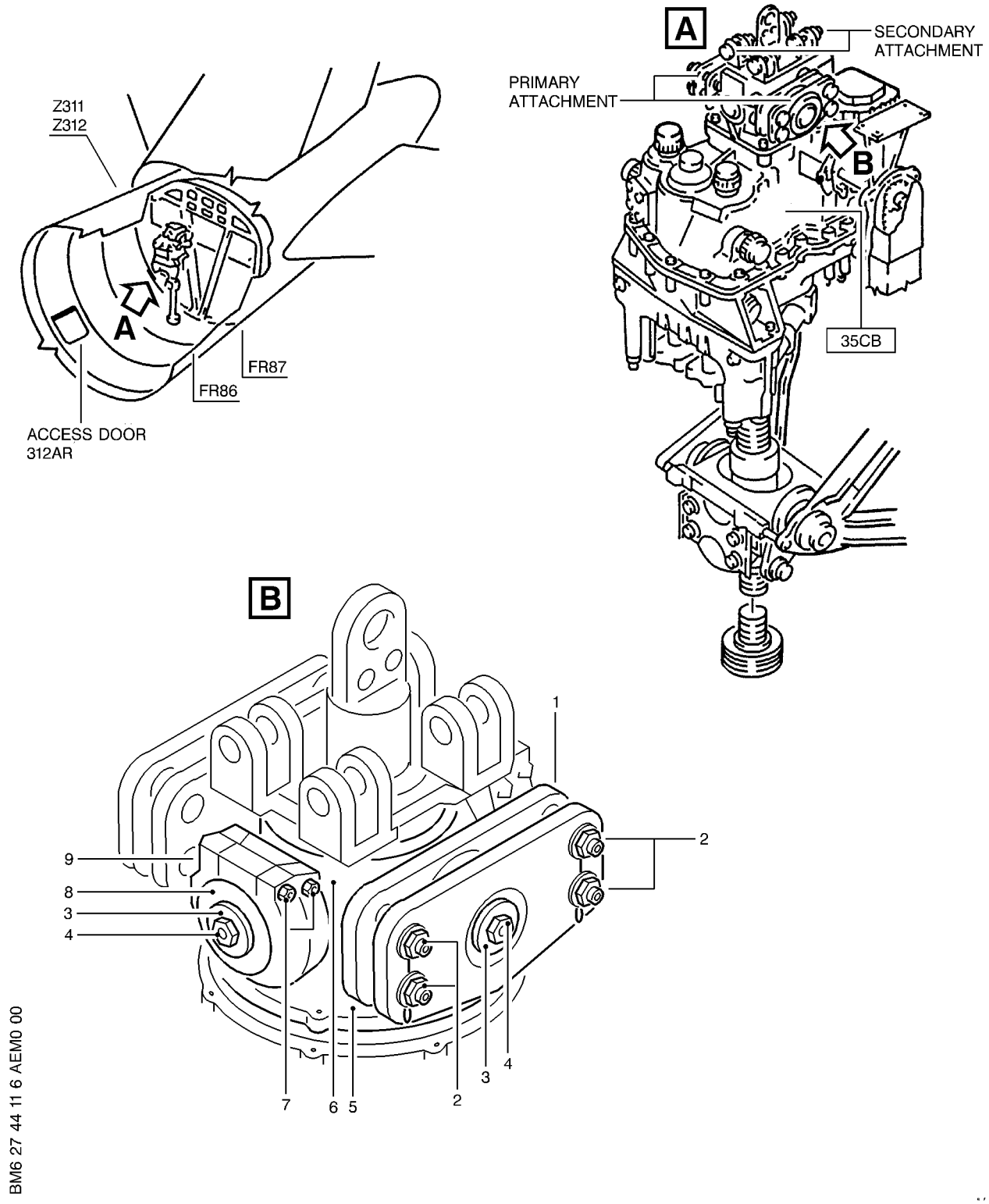
(h)Rotate manual-drive input respectively until THS is in zero position.

(j)If any gear teeth are chipped, THS actuator must be replaced (Ref. 27-44-11, P. Block 401).

NOTE : Do not clean magnetic chip detectors. The collection of all metal particles may provide a basis for analysis to determine



THS Actuator
Figure 601



THS Actuator - Upper Attachment
Figure 602

R

the reason for THS actuator failure.

(k)If no gear defects are observed, carry out a test as follows:
- Restore THS actuator to normal operating condition (Ref. 27-41-00, P. Block 301).
- Disconnect tool P/N 0U190364.
- Connect caps to inspection ports.
- Replenish THS actuator (Ref. 12-13-27, P. Block 1).
- Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
- Proceed with functional test of THS system with individual hydraulic systems (Ref. 27-41-00, P. Block 501).

(l)If checks fail, THS actuator must be replaced (Ref. 27-44-11, P. Block 401).

(m)Remove oil drainage container.

(n)Clean and install magnetic chip detectors.

(4)Close-Up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Close access door 312AR.

(c)Remove warning notices.

(d)Remove access platform.

4. No-Back Assembly Check

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 5.5 m (18 ft.)
(2)	Warning Notices

Referenced Procedures

- 27-41-00, P. Block 301	Mechanical Control (THS)

B. Procedure

(1)Job Set-Up

(a)Position access platform.

(b)Open access door 312AR.

(c)Display warning notice in flight compartment, prohibiting operation of pitch controls.

(d)Display warning notices prohibiting repressurization of hydraulic systems.

(2)Check ratchet wheels of no-back assembly (Ref. Fig. 601).

CAUTION : CAUTIONS MUST BE OBSERVED FOR THS ACTUATOR MANUAL ACTUATION.

(a)Rotate manual-drive input a minimum of two full rotations in both directions from the neutral position (Ref. 27-41-00, P. Block 301).

(b)Audibly check operation of ratchet wheels, noticing a typical tic-tac noise caused by pawls, whilst rotating drive shaft.

NOTE : To pass the check it is necessary to rotate manual-drive input in both directions a minimum of two full rotations in both directions from the neutral position.

(c)If check fails replace THS actuator (Ref.: 27-44-11 P. Block 401).

(d)Restore THS actuator to normal operating condition (Ref. 27-41-00, P. Block 301).

(3)Close-Up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Close access door 312AR.

(c)Remove warning notices.

(d)Remove access platform.

5. Oil Pump Check

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE. BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENTS, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

NOTE : Check, using Green hydraulic system only is described. Repeat this check with Yellow hydraulic system.

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 5.5 m (18 ft.)
(2)OU190364	Tool - Oil Draining, THS Actuator
(3)	Vessel - Measuring, Graduated up to 500 cm^3 (17 US fl.oz.)
(4)	Flexible Tube - Oil Drainage, Container - Oil Drainage, 5 l (1.3 US gal.)
(5)	Warning Notice
Referenced Procedures	
- 12-13-27, P. Block 1	Flight Controls Replenishing
- 24-41-00, P. Block 301	AC External Power Control
- 27-44-11, P. Block 401	Trimmable Horizontal Stabilizer (THS) Actuator
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

B. Procedure

(1)Job Set-Up

(a)Position access platform.

(b)Open access door 312AR.

(c)Display warning notice in flight compartment, prohibiting operation of pitch controls.

(d)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(e)Connect hydraulic ground power cart or use green electric pump with yellow PTU and pressurize hydraulic systems (Ref. 29-23-00, P. Block 301) or (Ref. 29-21-00, P. Block 301) and (Ref. 29-23-00, P. Block 301).
(f)On center pedestal:
- rotate pitch trim control wheel, operating THS actuator from 0° to 4° A/C nose-up position
- rotate pitch trim control wheel, operating THS actuator from 4° (nose-up) to 0°.

NOTE : THS actuator must be driven smoothly while using a constant rotational motion of the hand wheel.

(g)On SERVO CTL section of panel 428VU:
- make certain that G and Y pushbutton switches are released.

(2)Check capacity of oil pump (Ref. Fig. 601) view B.
(a)Position container for oil drainage.
(b)Disconnect magnetic chip detector from no-back housing (view B).
(c)Connect oil draining tool P/N OU190364 and flexible tube, and completely drain no-back housing into oil drainage container.
(d)Place flexible tube in measuring vessel.
NOTE : Position measuring vessel lower than the THS actuator to make certain of complete drainage.
(e)On SERVO CTL section of panel 428VU:
- press G (green system) pushbutton switch (legend off).
(f)On center pedestal:
- rotate pitch trim control wheel, operating THS actuator from 0° to 4° A/C nose-up position.
NOTE : THS actuator must be driven smoothly while using a constant rotational motion of the hand wheel.
(g)Check measuring vessel. Oil quantity must be 300 cm³ (10.14 US fl.oz.) minimum.
- if no oil bleeds out, do the following:
1 On center pedestal:
- rotate pitch trim control wheel, operating THS actuator from 4° (nose-up) to 0° position.
NOTE : THS actuator must be driven smoothly while using a constant rotational motion of the hand wheel.
2 Check measuring vessel again. Oil quantity must be 300 cm³ (10.14 US fl.oz.) minimum.
NOTE : If the result is not correct when you use green electric pump, repeat the test with a ground power cart.
(h)Disconnect tool P/N OU190364 together with flexible tube and install magnetic chip detector.
(j)Replenish THS actuator (Ref. 12-13-27, P. Block 1).
(k)Return THS to 0° position.
(l)On SERVO CTL section of panel 428VU:
- release G pushbutton switch.
(m)Repeat for Y (yellow system).

NOTE : If the result is not correct when you use green electric pump and yellow PTU, repeat the test with a ground power cart.

(n)If check of G or Y system fails, replace THS actuator (Ref. 27-44-11, P. Block 401).

(o)Remove oil drainage container and measuring vessel.

(3)Close-Up

(a)Shut down pressurization of hydraulic systems and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).

(b)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(d)Close access door 312AR.

(e)Remove warning notices.

(f)Remove access platform.

6. Torque Check

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 5.5 m (18 ft.)
(2)OU190362	Tool - Brake Release, THS Actuator
(3)OU190365	Tool - Brake Testing, THS Actuator
(4)	Torque Wrench, up to 7 m.daN (51.6 lbf.ft.)
(5)	Warning Notices
Referenced Procedure	
- 27-41-00, P. Block 301	Mechanical Control (THS)
- 27-44-11, P. Block 401	Trimmable Horizontal Stabilizer (THS) Actuator
- 27-44-13, P. Block 401	THS Actuator Hydraulic Motor 293174, 291174

B. Procedure

(1)Job Set-Up

(a)Position access platform.

(b)Open access door 312AR.

(c)Display warning notices in flight compartment, prohibiting operation of pitch controls and repressurization of hydraulic systems.

(2)Check torque of brakes (Ref. Fig. 601)

(a)Remove oil filling plug and breather (Ref. 27-44-11, P. Block 401) and install brake testing tool P/N OU190365 (for checking LH brake).

(b)Remove plug from manual-drive input (Ref. 27-44-11, P. Block 401) (for checking RH brake).

(c)Install brake release tool P/N OU190362 and release brake (Ref. 27-41-00, P. Block 301).

NOTE : Release RH brake to check LH brake and release LH brake to check RH brake.

(d)Check that static torque of LH and RH pressure-off brakes is 2.2 m.daN (16.22 lbf.ft.)minimum.

- Repeat above for different rotor/stator positions by moving the rotor via manual cranking in steps of approximately 120° (in total three

measurements).

NOTE : Between each measurement for different rotor/stator positions an interval of at least one minute has to elapse.

NOTE : Brake must not move during torque check with less than 2.2 m.daN (16.22 lbf.ft) applied.

(e)If check fails replace brake (Ref. 27-44-13, P. Block 401).

(f)Remove brake release tool P/N 0U190362 (Ref. 27-41-00, P. Block 301).

(g)Remove brake testing tool P/N 0U190365, install oil filling plug and breather (Ref. 27-44-11, P. Block 401).

(h)Install manual-drive input plug (Ref. 27-44-11, P. Block 401).

(3)Close-Up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Close access door 312AR.

(c)Remove warning notices.

(d)Remove access platform.

7. Pressure-OFF Brake (Check of static torque)

NOTE : Check, using Green hydraulic system only is described. Repeat this check with Yellow hydraulic system and brake release tool installed in LH brake.

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 5.5 m (18 ft.)
(2)0U190362	Tool - Brake Release, THS Actuator
(3)	Warning Notice
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-41-00, P. Block 301	Mechanical Control (THS)
- 27-44-13, P. Block 401	THS Actuator Hydraulic Motor 293174, 291174
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

B. Procedure

(1)Job Set-Up

(a)Position access platform.

(b)Open access door 312AR.

(c)Display warning notice in flight compartment, prohibiting operation of pitch controls.

(d)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(e)Connect hydraulic ground power cart but do not pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).

(2)Check brake release pressure (Ref. Fig. 601).

(a)Install brake release tool P/N 0U190362 and release brake (Ref. 27-41-00, P. Block 301).

(b)To observe brake control piston movement, do not safety tool P/N 0U190362 with attached pin.
(c)On SERVO CTL section of panel 428VU:
- release Y pushbutton switch,
- press G pushbutton switch.
(d)Progressively increase hydraulic pressure (Ref. 29-10-00, P. Block 301) and observe downward movement of tool P/N 0U190362.
(e)When tool P/N 0U190362 stops moving, the brake is released. Brake release pressure must not exceed 90 bar (1305.35 psi).
(f)On SERVO CTL section of panel 428VU:
- release G pushbutton switch.
(g)Repeat for Y system.
(h)If check fails replace brake (Ref. 27-44-13, P. Block 401).
(j)Remove brake release tool P/N 0U190362 (Ref. 27-41-00, P. Block 301).

(3)Close-Up
(a)Shut down pressurization of hydraulic systems and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(b)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(d)Close access door 312AR.
(e)Remove warning notice.
(f)Remove access platform.

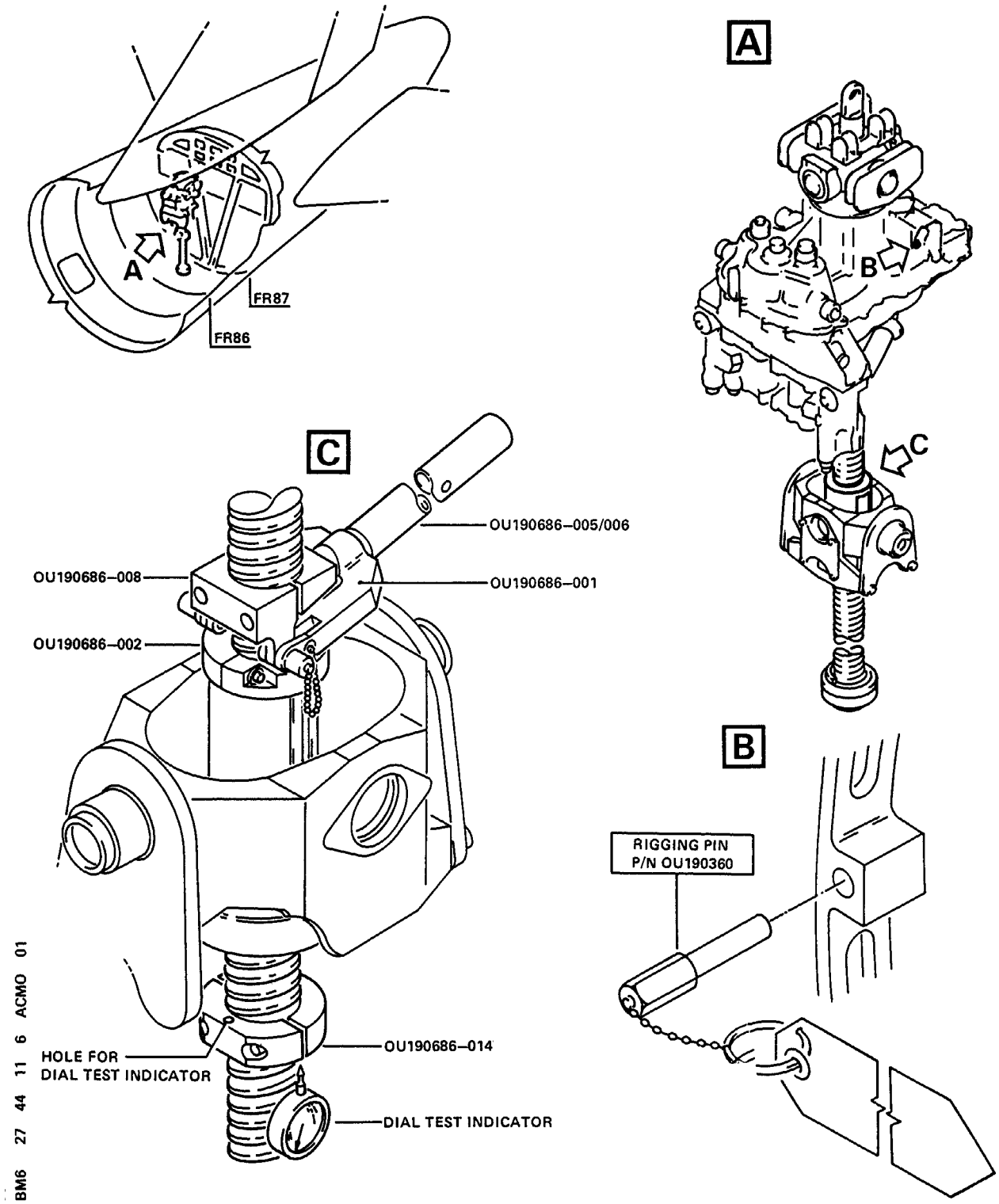
8. Backlash-Check

CAUTION : BACKLASH-CHECK MUST BE CARRIED OUT IN STILL AIR.

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 5.5m (18ft.)
(2)0U190360	Rigging Pin - THS Actuator Mechanical Input Lever
(3)0U190686	Ball Nut Backlash Checking Tool
(4)	Dial Test Indicator
(5)	Warning Notice
Referenced Procedure - 27-41-00, P. Block 301	Mechanical Control (THS)

B. Procedure
(1)Job Set-Up
(a)Position access platform.
(b)Open access door 312AR.
(c)Display warning notice in flight compartment, prohibiting operation of pitch controls.
(2)Check ball nut backlash (Ref. Fig. 603).



Ball Nut Backlash Check
Figure 603

(a)Drive THS actuator to zero (Ref. 27-41-00, P. Block 301).
(b)Install rigging pin P/N 0U190360 in THS actuator mechanical input.
(c)Install ball nut backlash checking tool P/N 0U190686-002 on upper side of nut and P/N 0U190686-008 on screw shaft above nut.
(d)Install lever tool P/N 0U190686-001 with lever arm P/N 0U190686-005/006 on tool P/N 0U190686-008 by pins.
(e)Install dial test indicator holder tool P/N 0U190686-014 on lower side of nut.
(f)Install dial test indicator into the foreseen hole of tool P/N 0U190686-014.
(g)Apply a load between screw shaft and nut of not less than 700 daN (1574 lbf.).
NOTE : By applying, for example, a vertical load of 22.0 daN (49.5 lbf.) on a lever arm of 750 mm (29.5 in.).
(h)Check dial test indicator, that backlash does not exceed 0.25 mm (0.01 in.).
(j)If backlash exceeds 0.25 mm (0.01 in.) replace THS actuator.
(k)Remove dial test indicator.
(l)Remove ball nut backlash checking tools P/N 0U190686.
(m)Remove rigging pin.

(3)Close-Up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Close access door 312AR.
(c)Remove warning notice.
(d)Remove access platform.

THS ACTUATOR HYDRAULIC MOTOR 293174, 291174 - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

NOTE : The THS actuator hydraulic motors are identical in design and function. Only one is described and illustrated.

1. Reasons for the Job

A. Removal and Installation of the following:
(1)THS actuator hydraulic motor 293174, 291174
(2)Pressure-off brakes

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18 ft.)
B.	Warning Notices
C.	Container, Hydraulic Fluid Spillage
D.OU141869	Mounting Cone
E.OU141898	Precasting Bush
F.	Circuit Breaker Safety Clips
G.	Blanking Plugs and Caps - Hydraulic Line
H.	Tabwashers
J.	O-Rings
K.	Seals
L. Material No. 04-015	Common Greases (Ref. 20-31-00)

Referenced Procedures

- 12-12-29, P. Block 1	Hydraulics
- 27-41-00, P. Block 501	Mechanical Control (THS)
- 27-44-15, P. Block 401	THS Actuator Valve Blocks

3. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Hydraulic motors to be removed are identified as follows:

HYDRAULIC SYSTEM	THS ACTUATOR HYDRAULIC MOTOR	
	HYDRAULIC IDENTIFIER	LOCATION
GREEN	291174	RH MOTOR
YELLOW	293174	LH MOTOR

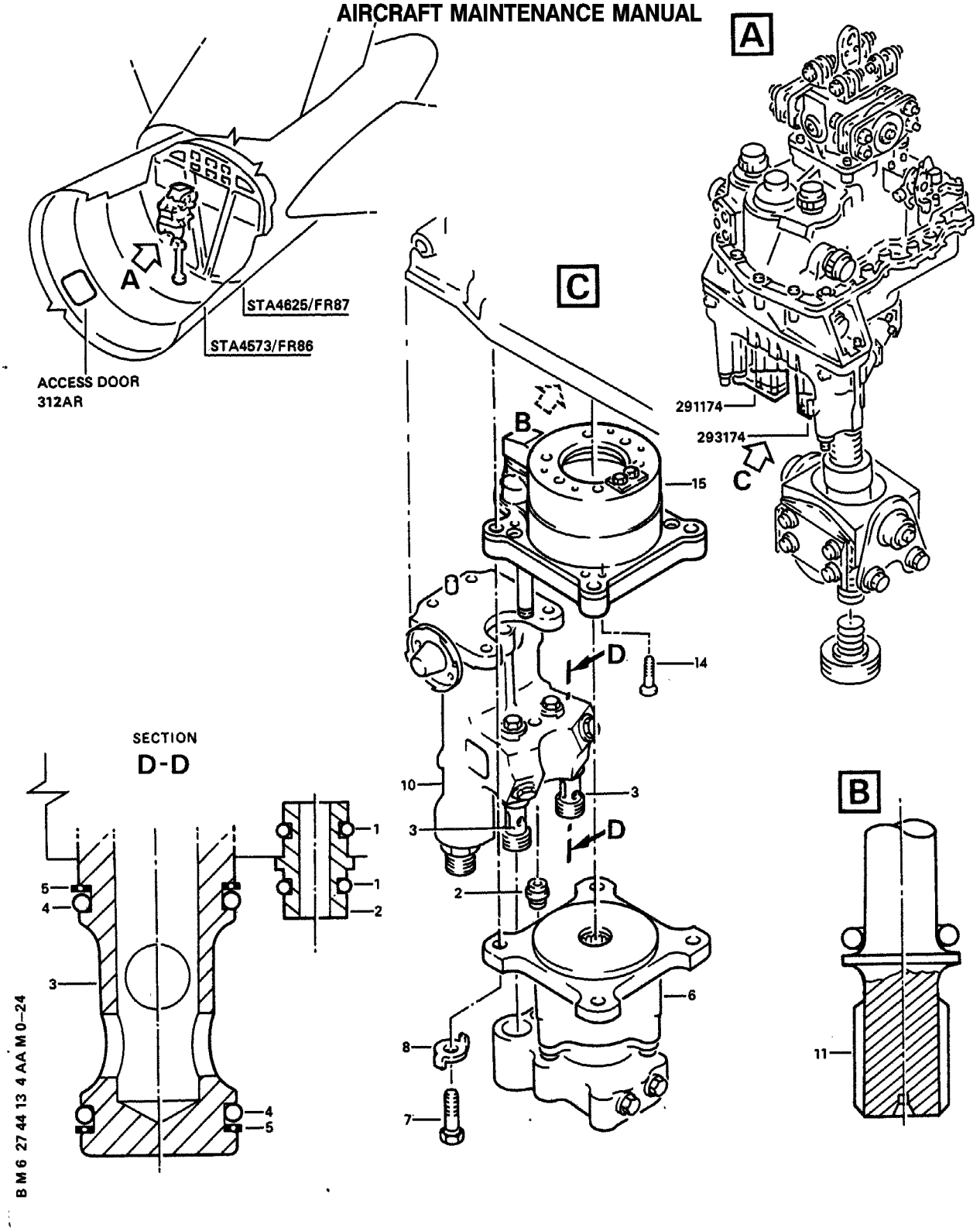
(3)Display warning notice in flight compartment prohibiting operation of pitch controls.
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC 1/28 V DC	306CC1	103/G 3
21VU	FAC 1/115 V AC	309CC1	103/G 5
21VU	FAC 1/26 V AC	305CC1	103/G 7
21VU	FAC 2/26 V AC	305CC2	103/G 8
21VU	FAC 2/115 V AC	309CC2	103/G10
21VU	FAC 2/28 V DC	306CC2	103/G12
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(5)Display warning notice, prohibiting re-pressurization of hydraulic systems.
(6)Open access door 312AR.
(7)Position container for hydraulic fluid spillage.

B. Removal (Ref. Fig. 401)
(1)Removal of THS actuator hydraulic motor.
(a)Release tabwashers (8), remove bolts (7) and tabwashers (8).
(b)Remove hydraulic motor (6) downwards, carefully disengaging from transfer tubes (3).
(c)Remove bobbin (2).
(d)Install blanking plugs in ports and cap transfer tubes (3).
(2)Removal of pressure-off brakes.
(a)Remove THS actuator hydraulic motor (Ref. para. 3.B. (1).
(b)Remove THS actuator valve block (Ref. 27-44-15, P. Block 401).
(c)Remove screws (14) (qty. two per brake).
(d)Extract brake (15).

C. Preparation for Installation (Ref. Fig. 401)
(1)Remove and discard O-rings (1), packings (4) and back up rings (5).
R (2)Fit back up rings (5) to transfer tubes (3) using mounting cone P/N OU141869.
R (3)Compress back up rings (5) using precasting bush P/N OU141898.



THS Actuator Hydraulic Motors
Figure 401

R (4)Fit packing (4) to transfer tubes using mounting cone P/N 0U141869.
R (5)Install O-rings (1) to bobbin (2).
WARNING : MATERIAL NO. 04-015 IS TOXIC. DO NOT BREATH VAPORS. USE IN WELL VENTILATED AREA FREE FROM SPARKS, FLAME, OR HOT SURFACES. WEAR SPLASH GOGGLES, SOLVENT-RESISTANT GLOVES AND OTHER PROTECTIVE GEAR. IN CASE OF EYE CONTACT, FLUSH WITH WATER AND SEEK MEDICAL ATTENTION. IN CASE OF SKIN CONTACT, WASH WITH SOAP AND WATER.
R (6)Apply grease (Mat. No. 04-015) to O-rings (4) and outside of transfer tubes (3).
R (7)Check identification of replacement hydraulic motor (6) (Refer to table in Para. 3.A.(2)).

D. Installation (Ref. Fig. 401)
(1)Installation of pressure-off brakes.
CAUTION : BEFORE INSTALLATION OF BRAKES, MAKE CERTAIN THAT SHUR-LOK NUTS ARE SAFETIED CORRECTLY.
(a)Position brake (15) on splined shaft. Take care not to damage seals.
NOTE : The brake, equipped with the transfer tube and its union assy, must be fitted on the LH side of the THS actuator.
(b)Install screws (14).
(c)Install THS actuator valve block (Ref. 27-44-15, P. Block 401).
(2)Installation of THS actuator hydraulic motor.
(a)Install bobbin (2) into hydraulic block (10).
(b)Install hydraulic motor (6) on gearbox (9), positioning transfer tubes (3) and bobbin (2) in corresponding ports on hydraulic motor (6). Take care not to damage seals.
(c)Make certain that splined motor shaft (11) and internal splines of hydraulic motor (6) engage easily.
(d)Position tabwashers (8) and install bolts (7).
(e)Tighten bolts (7) in a diagonal sequence and safety with tab-washers (8).
(f)Remove safety clips and tags, and close circuit breakers 306CC1, 309CC1, 305CC1, 305CC2, 309CC2, 306CC2, 1CB and 2CB.

E. Test
(1)Carry out THS functional test (Ref. 27-41-00, P. Block 501).
(2)Check that hydraulic connections are free from leaks.

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove container.
(3)Close access door 312AR.
(4)Remove warning notices.
(5)Check fluid level in hydraulic tanks. Replenish as required (Ref. 12-12-29, P. Block 1).
(6)Remove access platform.

THS ACTUATOR JAMMING DETECTION MICROSWITCHES REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reasons for the Job

A. Replacement of Jamming Detection Microswitches

R B. Replacement of Command Pistons

R C. Replacement of Command Pistons Seals

2. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 5.5 m (18 ft.)
	B. OU141257	Cone - O-Ring, Threaded Sleeve, Microswitch 2, THS Actuator
	C. OU141271	Cone - O-Ring, Threaded Sleeve, Microswitch 1, THS Actuator
	D. OU142484	Wrench - Removal/Installation, Threaded Sleeve, THS Actuator
	E. OU142592	Cone - O-Ring, Command Piston, THS Actuator
	F. OU190601	Check Box - THS Actuator Jamming Detection Microswitch
	G.	Warning Notice
	H.	Circuit Breaker Safety Clips
	J.	Electrical Connector Blanking Caps
	K.	Corrosion-Resistant Steel Lockwire, 0.8 mm (0.031 in.) dia.
	L.	Tabwashers
R	M.	Seals
R	N.	Peel Shims
R	P. Material No. 03-003	Oils (Ref. 20-31-00)
R	Q. Material No. 08-007	Bonding and Adhesive Compounds (Ref. 20-31-00)

Referenced Procedures

- 12-13-27, P. Block 1	Flight Controls Replenishing
- 27-14-00, P. Block 501	Hydraulic Actuation (Aileron)
- 27-41-00, P. Block 501	Mechanical Control (THS)
- 27-44-14, P. Block 501	THS Actuator Jamming Detection Microswitches

3. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Jamming detection microswitch electrical connectors from THS actuator are identified as follows:

HYDRAULIC SYSTEM	JAMMING DETECTION MICROSWITCH ELECTRICAL CONNECTOR	
	LOCATION	ELECTRICAL IDENTIFIER
GREEN	RH CONNECTION	35CB-B
YELLOW	LH CONNECTION	35CB-A

(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC 1		103/G 3 to G 7
21VU	FAC 2		103/G 8 to G12
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(4)Display warning notice in flight compartment prohibiting operation of pitch controls.
(5)Display warning notices prohibiting repressurization of hydraulic systems.
(6)Open access door 312AR.
(7)Disconnect electrical connectors 35CB-B and 35CB-A, as required and install blanking caps.

B. Removal of Jamming Detection Microswitches (Ref. Fig. 401)

NOTE : The jamming detection microswitches, LH and RH pairs, are identical in design and function. If one microswitch is unserviceable the affected pair must be replaced. Only the LH pair is described and illustrated.

(1)Cut and remove lockwire and remove nuts (13).

(2)Release tabwashers (11), remove bolts (10), tabwashers (11),
R disconnect bonding straps (12) and discard tabwashers (11).

(3)Release tabwashers (14), remove bolts (15), tabwashers (14),
R bracket (9) and discard tabwashers (14).

(4)Remove electrical connector (4) from identified position on bracket (9).

(5)Cut and remove lockwire from nuts (3) but do not loosen nuts (3).

R (6)Release tabwashers (6), remove bolts (5), tabwashers (6) and
R discard tabwashers (6).

(7)Remove microswitch assemblies, springs (7) and install blanking caps.

C. Preparation for Replacement (Ref. Fig. 401)

NOTE : Adjustment of microswitches is identical, only microswitch No. 1 is described.

(1)Loosen nut (3) and remove support (2) from microswitch (1).

(2)Install support (2) to new microswitch (1).

(3)Remove blanking caps, connect check box P/N 0U190601 to electrical connector (4) and switch check box on.

(4)Adjust dimension 'A' as follows :

(a)Make certain that command piston (17) is correctly seated in threaded sleeve (16).

(b)Position support (2) with microswitch (1) in contact at corresponding threaded sleeve (16).

(c)Adjust support (2), using check box P/N 0U190601 so that any movement of the command piston (17) will operate microswitch immediately.

(d)Tighten nut (3).

(5)Switch check box P/N 0U190601 off, disconnect from electrical connector (4) and install blanking caps.

D. Installation of Jamming Detection Microswitches (Ref. Fig. 401)

(1)Position springs (7) and install microswitch assemblies as follows:

(a)Microswitch with short cable loom in forward recess (position 1).

(b)Microswitch with long cable loom in aft recess (position 2).

R (2)Install bolts (5) with new tabwashers (6), tighten bolts (5) and safety with tabwashers (6).

(3)Install electrical connector (4) at identified position on bracket (9), install nut (13).

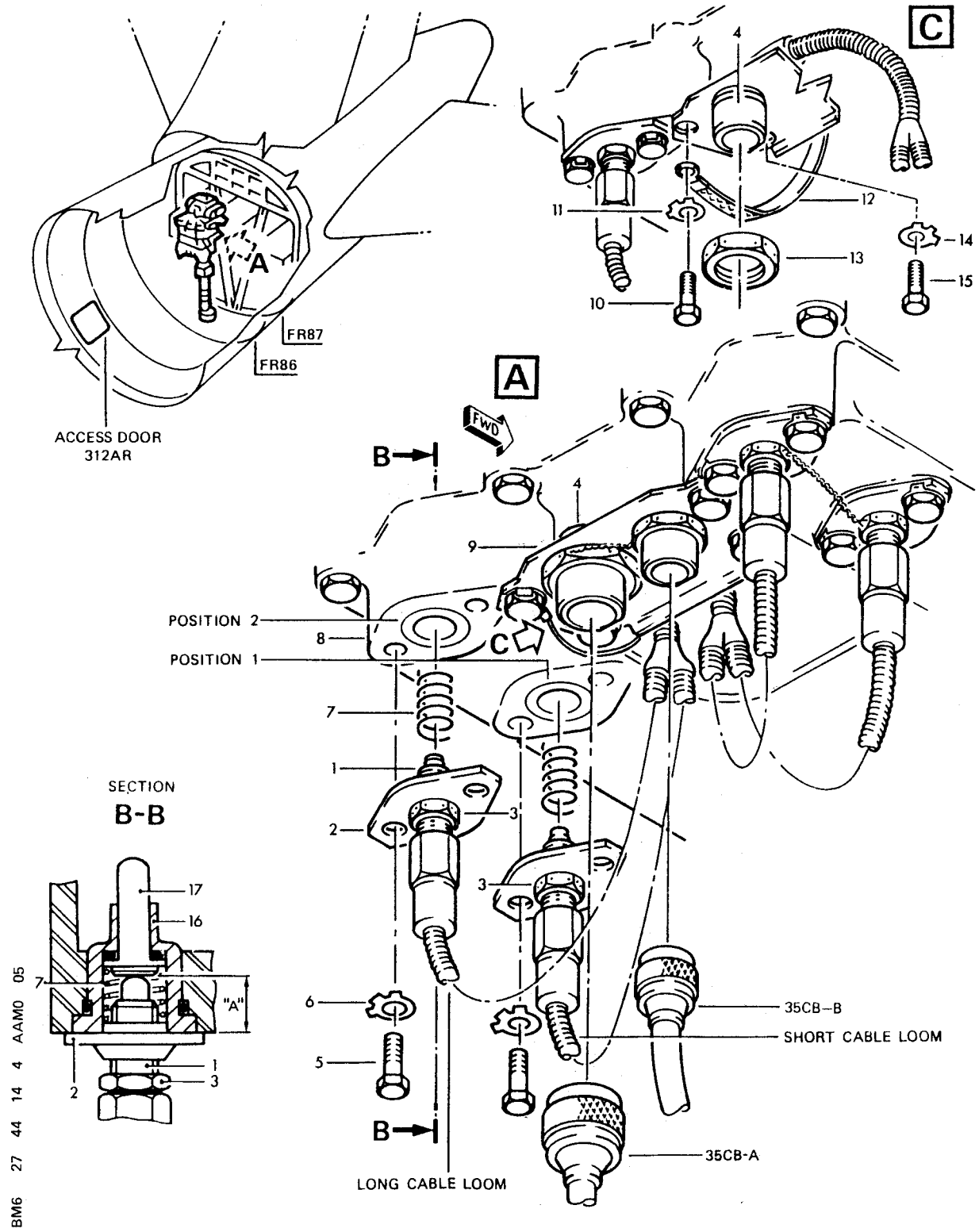
R (4)Position bracket (9), new tabwashers (14), install bolts (15) and safety tabwashers (14).

R (5)Connect bonding straps (12) with bolts (10), new tabwashers (11) and safety.

(6)Safety nuts (13) with lockwire.

(7)Carry out adjustment of microswitch assemblies (Ref. 27-44-14, P. Block 501).

(8)Safety nut (3) with lockwire.



THS Actuator Jamming Detection Microswitches
Figure 401

R

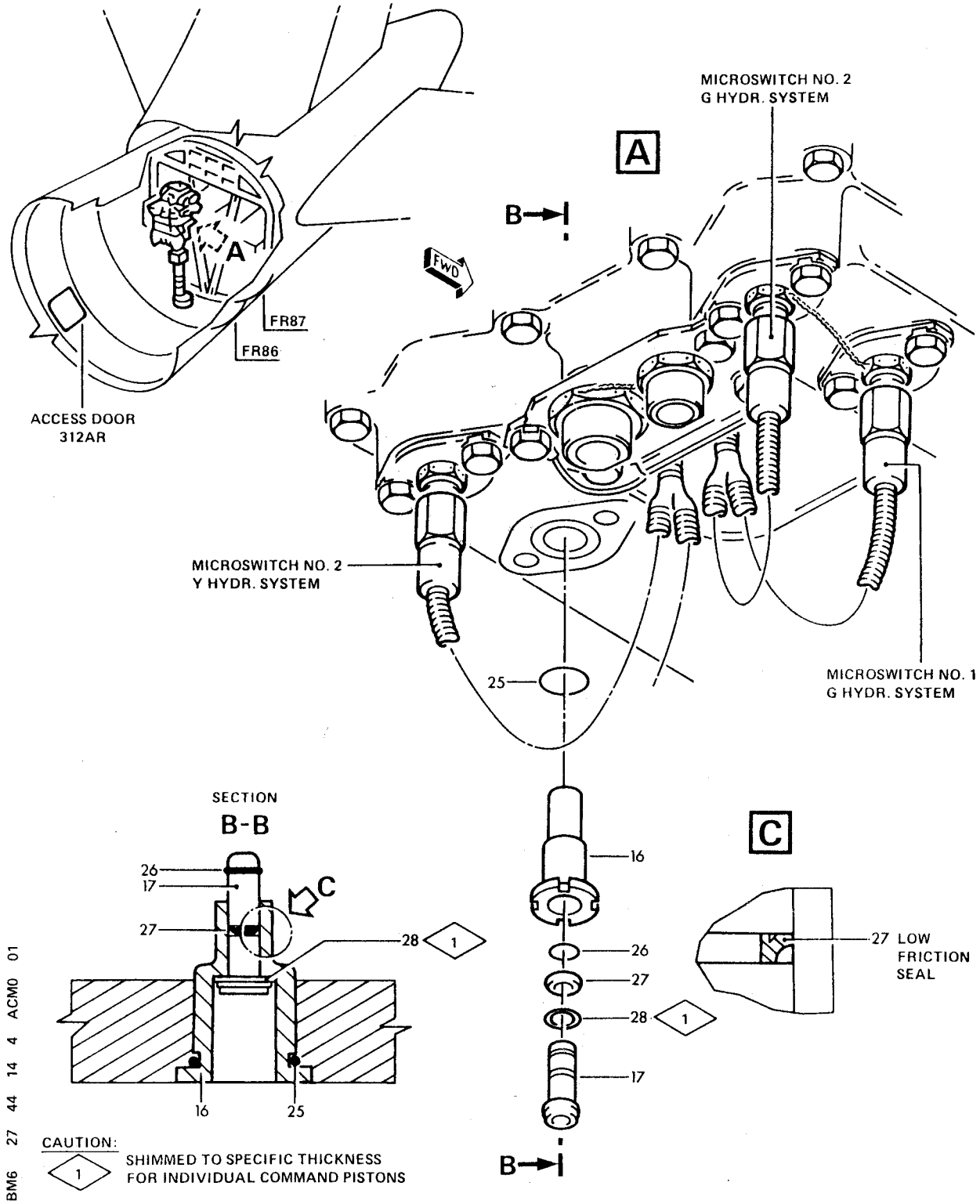
(9)Remove blanking caps and connect electrical connectors 35CB-B and 35CB-A as required.
(10)Remove safety clips and tags and close circuit breakers FAC 1, FAC 2 and FLT CTL, previously opened in Para. 3.A.(3).

E. Test
(1)Carry out THS functional test (Ref. 27-41-00, P. Block 501).
(2)If JAM legend of G/Y pushbutton switch on SERVO CTL section of panel 428VU comes on, establish cause of jamming (Ref. 27-44-14, P. Block 501) and carry out the required corrective procedure.
(3)Carry out test of THS jamming detection using jamming detection microswitches (Ref. 27-14-00, P. Block 501).

F. Removal of Command Piston Seals(Ref. Fig. 401, 402)
NOTE : The command pistons are identical. Only one is described and illustrated.
CAUTION : TO AVOID MIXING OF ADJUSTMENT SHIMS (28), REMOVE ONE PISTON ONLY AT A TIME.
(1)Drain THS actuator oil (Ref. 12-13-27, P. Block 1).
CAUTION : DO NOT UNLOCK NUT (3).
(2)Remove microswitch assembly (Ref. Para. 3. B.).
R (3)Remove threaded sleeve (16) using wrench P/N OU142484.
NOTE : Threads of sleeve (16) are coated with sealant (Mat. No. 08-007).
R (4)Remove and discard seal (25).
R (5)Remove and discard retaining seal (26) from command piston (17).
CAUTION : SHIM (28) IS OF SPECIFIC THICKNESS. DO NOT ALTER.
R (6)Remove command piston (17) and shim (28).
R (7)Remove and discard seal (27).

G. Preparation for Installation (Ref. Fig. 402)
(1)Clean threaded sleeve (16) to remove all evidence of sealant.

H. Installation of Command Piston Seals (Ref. Fig. 402)
(1)Install shim (28) on command piston (17).
CAUTION : MAKE CERTAIN THAT LIP OF SEAL (27) FACES SEAL (26) WHEN INSTALLED.
R (2)Install new low friction seal (27) using cone P/N OU142592.
R NOTE : For easier installation of new seal (27), soak seal for 24 hours in oil (Mat. No. 03-003).
CAUTION : DURING INSTALLATION, ROTATE COMMAND PISTON (17) TO AVOID DAMAGING SEAL (27).
(3)Install command piston (17) into threaded sleeve (16).
R (4)Install new retaining seal (26) using cone P/N OU142592.
R (5)Install new seal (25) on threaded sleeve (16).
NOTE : For installation of seal (25) on threaded sleeve (16) (microswitch 1), use cone P/N OU141271 and on threaded sleeve (16) (microswitch 2), use cone P/N OU141257.
(6)Apply sealant (Mat. No. 08-007) to threads of sleeve (16).
(7)Install threaded sleeve (16) into gear box.
(8)TORQUE threaded sleeve (16) to between 1.0 and 1.2 m.daN (88.5 and 106.2 lbf.in.) using wrench P/N OU142484.
(9)Replenish THS actuator oil (Ref. 12-13-27, P. Block 1).



Command Piston
Figure 402

R

(10)Install microswitch assembly (Ref. Para. 3. D.).

R J. Test
R (1)Carry out THS functional test (Ref. 27-41-00, P. Block 501).
R (2)If JAM legend of G/Y pushbutton switch on SERVO CTL section of panel 428VU comes on, establish cause of jamming (Ref. 27-44-14, P. Block 501) and carry out the required corrective procedure.
R (3)Carry out test of THS jamming detection using jamming detection microswitches (Ref. 27-14-00, P. Block 501).

R K. Removal of Command Piston (Ref. Fig. 402)
R NOTE : The command pistons are identical. Only one is described and illustrated.
R (1)Drain THS actuator oil (Ref. 12-13-27, P. Block 1).
R CAUTION : DO NOT UNLOCK NUT (3).
R (2)Remove microswitch assembly (Ref. Para. 3. B.).
R (3)Remove threaded sleeve (16) using wrench P/N OU142484.
R (4)Remove and discard seal (25).
R (5)Remove and discard retaining seal (26) from command piston (17).
R (6)Remove command piston (17) and shim (28).
R (7)Remove and discard seal (27).

R L. Preparation for Installation (Ref. Fig. 402)
R (1)Clean threaded sleeve (16) to remove all evidence of sealant.

R M. Installation of new Command Piston (Ref. Fig. 402, 403)
R (1)Install threaded sleeve (16) into gear box.
R (2)Position command piston (17) in its threaded sleeve (16) and measure dimension 'A'.
R (3)Remove command piston (17) and install new shim (28) on command piston.
R (4)Position command piston (17) with new shim (28) in its threaded sleeve (16) and measure dimension 'B'.
R (5)The thickness of washer shim (28) must be determined as follows, to obtain switch related clearence x.

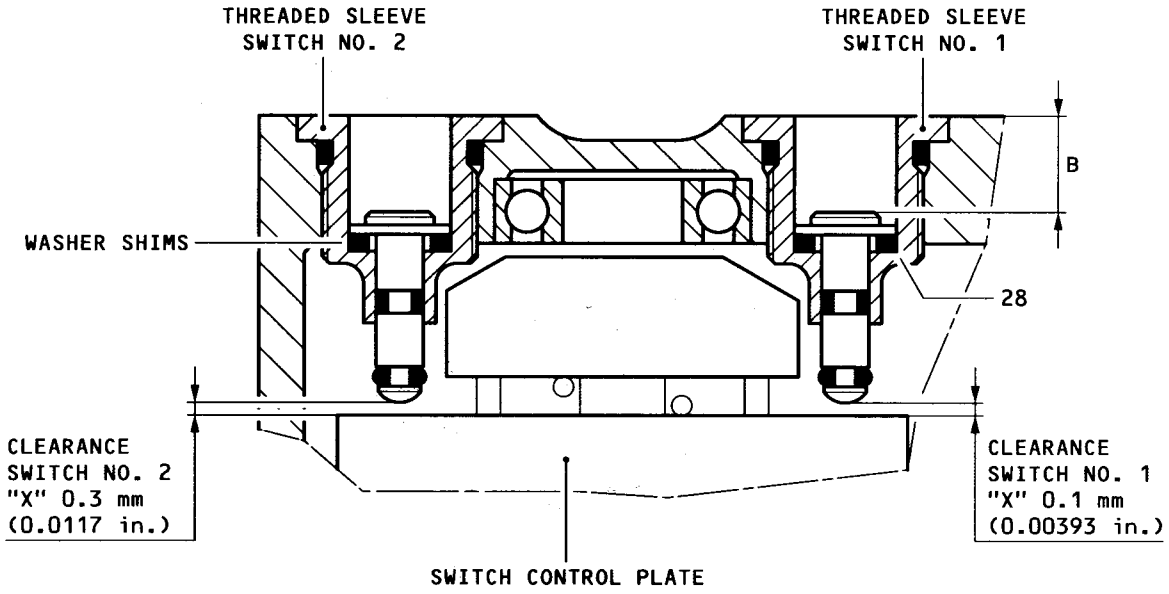
R (A - B) - clearence x = thickness to be removed on washer shim (28).

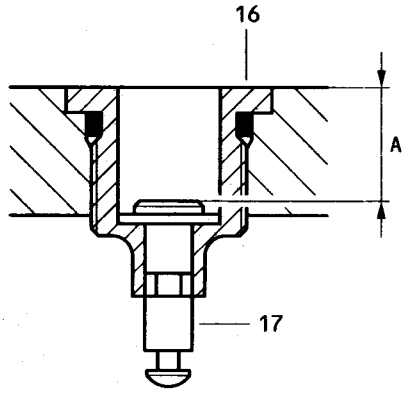
R Clearence x for switches no. 1 is 0.1 mm (0.00393 in).

R Clearence x for switches no. 2 is 0.3 mm (0.0117 in).

R (6)Adjust thickness of washer shim (28).
R (7)Remove threaded sleeve (16).
R (8)Install shim (28) on command piston (17).
R CAUTION : MAKE CERTAIN THAT LIP OF SEAL (27) FACES SEAL (26) WHEN INSTALLED.
R (9)Install low friction seal (27) using cone P/N OU142592.
R NOTE : For easier installation of seal (27), soak seal for 24 hours in oil (Mat. No. 03-003).

R CAUTION : DURING INSTALLATION, ROTATE COMMAND PISTON (17) TO AVOID DAMAGING





BM6 27 44 14 4 AEMO 00

Adjustment of Command Piston
Figure 403

R

R SEAL (27).
R (10)Install command piston (17) into threaded sleeve (16).
R (11)Install retaining seal (26) using cone P/N OU142592.
R (12)Install seal (25) on threaded sleeve (16).
R NOTE : For installation of seal (25) on threaded sleeve (16)
R (microswitch 1), use cone P/N OU141271 and on threaded sleeve (16)
R (microswitch 2), use cone P/N OU141257.
R (13)Apply sealant (Mat. No. 08-007) to threads of sleeve (16) and install
R into gear box.
R (14)TORQUE threaded sleeve (16) to between 1.0 and 1.2 m.daN
R (88.5 and 106.2 lbf.in.) using wrench P/N OU142484.
R (15)Replenish THS actuator oil (Ref. 12-13-27, P. Block 1).
R (16)Install microswitch assembly (Ref. Para. 3. D.).

R N. Test
R (1)Carry out THS functional test (Ref. 27-41-00, P. Block 501).
R (2)If JAM legend of G/Y pushbutton switch on SERVO CTL section of panel
R 428VU comes on, establish cause of jamming (Ref. 27-44-14, P. Block 501)
R and carry out the required corrective procedure.
R (3)Carry out test of THS jamming detection using jamming detection micro-
R switches (Ref. 27-14-00, P. Block 501).

R P. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscel-
laneous items of equipment.
(2)Close access door 312AR.
(3)Remove warning notice.
(4)Remove access platform.

THS ACTUATOR JAMMING DETECTION MICROSWITCHES ADJUSTMENT/TEST

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

NOTE : For removal/installation of THS Actuator Jamming Detection Microswitches refer to 27-44-14, P. Block 401.

R NOTE : The jamming detection microswitches, LH and RH pairs, are identical
R in design and function. If one microswitch is unserviceable the
R affected pair must be replaced.

1. Reason for Job

A. Establish cause of jamming indication and adjustment of microswitches

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18 ft.)
B. OU190360	Rigging Pin - THS Actuator Mechanical Input Lever
C. OU190364	Oil Draining Adaptor
D. OU190513	Adjusting Tool - THS Actuator Jamming Detection Microswitch
E. OU190514	Rigging Pin (Qty. 2)
F. OU190601	Check Box - THS Actuator Jamming Detection Microswitch
G.	Circuit Breaker Safety Clips
H.	Corrosion-Resistant Steel Lockwire, 0.8 mm (0.031 in.) dia.
J.	Electrical Connector Blanking Caps
K.	Warning Notices
L.	O-rings

Referenced Procedures

- 12-13-27, P. Block 1	Flight Controls Replenishing
- 22-23-29, P. Block 401	Pitch Trim Actuator 3CC1 (3CC2)

- 24-41-00, P. Block 301 AC External Power Control
- 27-14-00, P. Block 501 Hydraulic Actuation (Aileron)
- 27-44-14, P. Block 401 THS Actuator Jamming Detection Microswitches
- 29-10-00, P. Block 301 Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301 Green Auxiliary Power
- 29-23-00, P. Block 301 Yellow Auxiliary Power (Power Transfer Unit)
- 27-41-00, P. Block 101 Trimmable Horizontal Stabilizer Control-Trouble Shooting Manual (TSM)

3. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Open access door 312AR.
(3)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Make certain that electronics racks ventilation is correct.
(5)Make certain that circuit breakers on overhead panel are closed, particularly those associated with FAC 1 and FAC 2.
(6)Make certain that flap and slat control lever is in first notch position.
(7)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.
(8)On SERVO CTL section of panel 428VU, make certain that G and Y pushbutton switches are released (legends on).
(9)Pressurize Green and Yellow hydraulic systems with either hydraulic ground power cart (Ref. 29-10-00, P. Block 301) or the Green and Yellow auxiliary power (Ref. 29-21-00, P. Block 301 and 29-23-00, P. Block 301 respectively).

B. Establish Cause of Jamming Indication

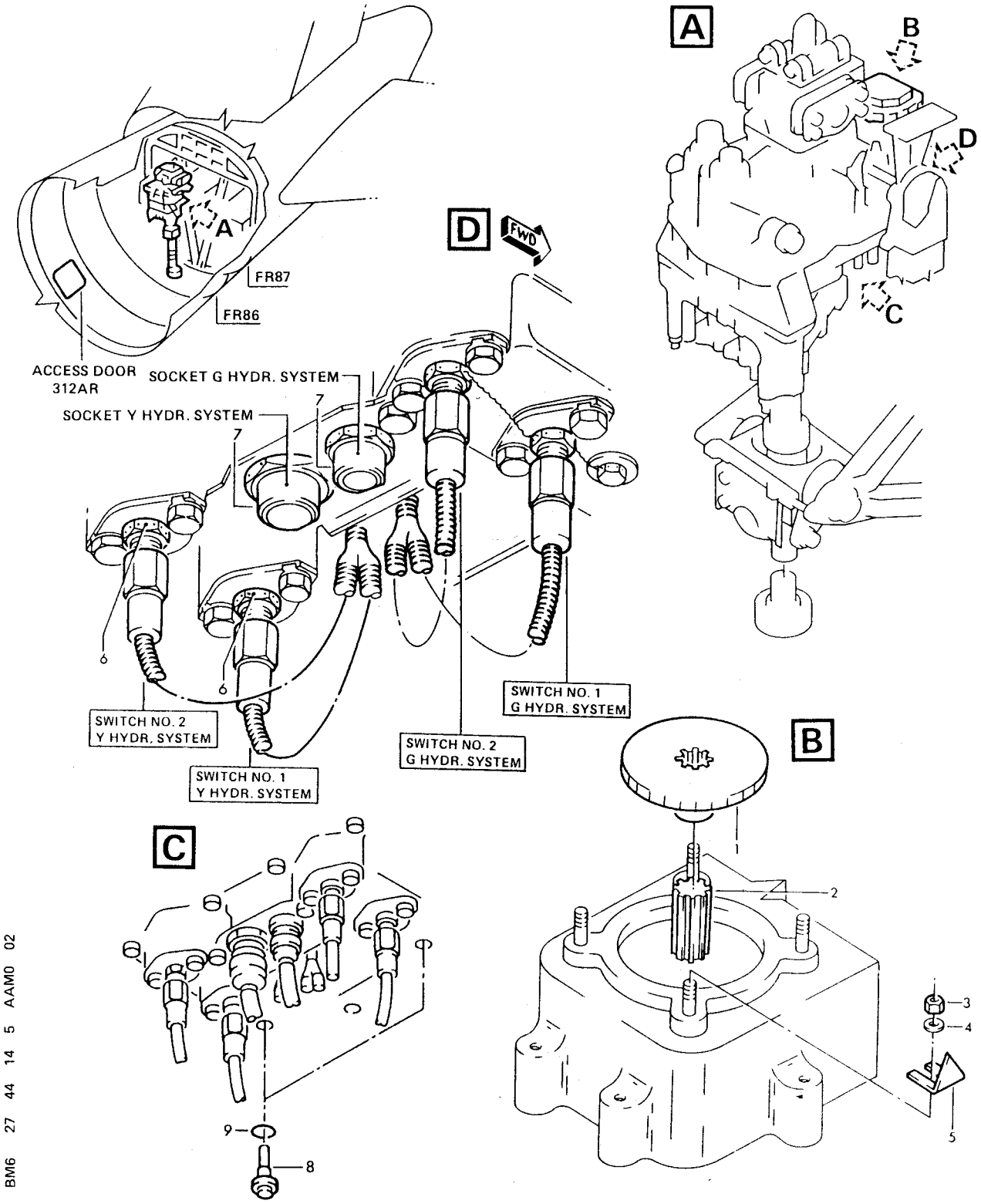
CAUTION : IF THE HSA MOVES, IMMEDIATELY DEPRESSURIZE THE HYDRAULIC SYSTEM.

(1)On SERVO CTL section of panel 428VU:
- press pushbutton switch supplying the JAM indication system,
- make certain that pushbutton switch supplying other system is released.

(2)Manually actuate THS actuator mechanical input lever.
NOTE : Do not disconnect input lever from pitch trim control drive shaft.
(3)Repeat test with other system pressurized, and JAM indicating system released.
(4)If THS actuator operates incorrectly during test, perform THS control trouble shooting (Ref. TSM 27-41-00, P. Block 101).
(5)If THS actuator operates correctly, the jamming is not confirmed, carry out adjustment of THS actuator microswitches assemby.

C. Adjustment of Microswitches Assembly (Ref. Fig. 501)

(1)Make certain that THS is set at zero and install rigging pin P/N 0U190360 in THS actuator mechanical input.
(2)Display warning notice in flight compartment prohibiting operation of



Adjustment of THS Actuator
Jamming Detection Microswitches
Figure 501

R

pitch controls.

(3) Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301), and display warning notice prohibiting repressurization.

(4) Remove LH pitch trim actuator (Ref. 22-23-29, P. Block 401).

(5) Open safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC1/28 V DC	306CC1	103/G 3
21VU	FAC1/115 V AC	309CC1	103/G 5
21VU	FAC1/26 V AC	305CC1	103/G 7
21VU	FAC2/26 V AC	305CC2	103/G 8
21VU	FAC2/115 V AC	309CC2	103/G10
21VU	FAC2/28 V DC	306CC2	103/G12
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(6) Install marker (5) (part of adjusting tool P/N 0U190513) to LH pitch trim actuator mounting bolt with washer (4) and nut (3).

(7) Install disc (1) (part of adjusting tool P/N 0U190513) to splined input shaft (2).

(8) Jamming detection microswitch electrical connectors from THS actuator are identified as follows:

HYDRAULIC SYSTEM	JAMMING DETECTION MICROSWITCH ELECTRICAL CONNECTOR	
	LOCATION	ELECTRICAL IDENTIFIER
GREEN	RH CONNECTION	35CB-B
YELLOW	LH CONNECTION	35CB-A

(9) Disconnect electrical connectors 35CB-B and 35CB-A, and install blanking caps.

(10) Remove rigging pin P/N 0U190360.

(11) Remove blanking caps, connect check box P/N 0U190601 to LH and RH connector (7).

(12) Connect check box P/N 0U190601 to electrical supply and switch test box on. All red lights come on.

(13) Drain THS actuator oil (Ref. 12-13-27, P. Block 1).

(14) Remove mechanical stops (8).

(15) Discard O-rings (9).

(16) Using non-threaded side of rigging pin P/N 0U190514 and check that the valve block control mechanism (internal to HSA) is correctly positionned.

NOTE : No movement can be achieved when trying to rotate the mechanical input lever.

(17) Install rigging pins P/N 0U190514 in place of mechanical stops (8).

R (18)Test of microswitches.
R

NOTE : With every directional change of disc (1) gear tooth backlash must be taken up.

NOTE : There are two different 0° positions of the splined input shaft (2). One for testing in the clockwise direction (Para. 1 - 6) and one for testing in the counterclockwise direction (Para. 7-10).

ACTION	RESULT
1. Carefully rotate disc (1) clockwise to a stop to take up gear tooth backlash. Align marker (5) with a scale on disc (1).	Splined input shaft (2) 0° position (clockwise testing).
2. Rotate disc (1) clockwise 3°.	On check box P/N 0U190601, switch no. 1: - red light goes off. - yellow light comes on.

R NOTE : If result cannot be obtained, adjust microswitch (Ref. Para. (19)).

R NOTE : If the switch no. 1 does not come on for a 5° rotation of the
R input shaft, the proper adjustment will not be achived by adjusting
R the switch position only.
R Replace worn out command piston (Ref. 27-44-14 P. Block 401).

3. Rotate disc (1) counterclockwise 3°.	On check box P/N 0U190601, switch no. 1: - red light comes on. - yellow light goes off.

R NOTE : If result cannot be obtained, adjust microswitch (Ref. Para. (19)).

4. Rotate disc (1) clockwise 7°.	On check box P/N 0U190601, switch no. 2: - red light goes off. - yellow light comes on.

R NOTE : If result cannot be obtained, adjust microswitch (Ref. Para. (19)).

R NOTE : If the switch no. 2 does not come on for a 11° rotation of the
R input shaft, the proper adjustment will not be achived by adjusting
R the switch position only.
R Replace worn out command piston (Ref 27-44-14 P. Block 401).

ACTION	RESULT
5. Rotate disc (1) counterclockwise 4°.	On check box P/N 0U190601, switch no. 2: - red light comes on. - yellow light goes off. Switch no. 1: - yellow light remains on.
NOTE : If result cannot be obtained, adjust microswitch (Ref. Para. (19)).	
R 6. Rotate disc (1) counterclockwise 3°.	On check box P/N 0U190601, switch no. 2: - red light comes on. - yellow light goes off. Switch no. 1: - red light comes on. - yellow light goes off.
7. Carefully rotate disc (1) counterclockwise to a stop to take up gear tooth backlash. Align marker (5) with a scale on disc (1).	Splined input shaft (2) 0° position (counterclockwise testing).
8. Rotate disc (1) counterclockwise between 2.5° and 4°.	On check box P/N 0U190601, switch no. 1: - red light goes off. - yellow light comes on.
NOTE : If result can not be obtained, it is possible to readjust switch no. 1 in clockwise direction remaining within clearences given above (Ref. Para. (19).	
9. Rotate disc (1) counterclockwise between 6.5° and 8°.	On check box P/N 0U190601, switch no. 2: - red light goes off. - yellow light comes on.
NOTE : If result can not be obtained, it is possible to readjust switch no. 2 in clockwise direction remaining within clearences given above (Ref. Para. (19).	
10. Rotate disk (1) clockwise to check actuation sequence.	Switches no. 1 are actuated prior to any of the switches no. 2.
NOTE : If the actuation sequence is not achived check microswitch adjustment (Ref. Para. (19).	
(19)Adjust microswitches.	

(a)Cut and remove lockwire from nut (6).
(b)Loosen nut (6) of switch.
(c)Adjust switch by rotation, as required.
NOTE : 36° rotation of switch corresponds to 1° rotation of splined input shaft.
(d)Tighten nut (6) of switch.
(e)Repeat test procedure, refer to Para. (18).
NOTE : If test results cannot be obtained after second test: Remove microswitches and check that command pistons move freely in threaded sleeves. If not, replace command piston seals (Ref. 27-44-14, P. Block 401).
(f)Safety nuts (6) with lockwire.
(20)Remove rigging pins P/N 0U190514.
(21)Install new O-rings (9) to mechanical stops (8).
(22)Install mechanical stops (8).
(23)Replenish THS actuator oil (Ref. 12-13-27, P. Block 1).
(24)Make certain that THS is set at zero and install rigging pin P/N 0U190360 in THS actuator mechanical input.
(25)Switch off and disconnect check box P/N 0U190601.
(26)Remove blanking cap from socket of Green hydraulic system.
(27)Connect the following electrical connectors:
LH: 35CB-A
RH: 35CB-B.
(28)Remove disc (1), nut (3), washer (4) and marker (5).
(29)Install LH pitch trim actuator (Ref. 22-23-29, P. Block 401).
NOTE : Make certain that synchro setting is correct.
(30)Remove safety clips and tags and close circuit breakers 305CC1, 306CC1, 309CC1, 305CC2, 306CC2, 309CC2, 1CB and 2CB.
(31)Remove warning notices.
(32)Remove rigging pin P/N 0U190360.
(33)Carry out test of THS jamming detection using jamming detection microswitches (Ref. 27-14-00, P. Block 501).

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 312AR.
(3)Remove access platform.

THS ACTUATOR VALVE BLOCKS - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

CAUTION : THE TRIMMABLE HORIZONTAL STABILIZER (THS) ACTUATOR MAY BE DRIVEN MANUALLY BY SOCKET WRENCH USING THE MANUAL DRIVE INPUT, IF HYDRAULIC POWER IS NOT AVAILABLE. HOWEVER THE RH PRESSURE-OFF BRAKE MUST FIRST BE RELEASED AND THE SCREW STROKE MUST BE LIMITED. POWER TOOLS ARE NOT TO BE USED. THE MECHANICAL INPUT MUST NOT BE RIGGED. FOR MANUAL ACTUATOR OPERATION REFER TO 27-41-00, P. BLOCK 301.

NOTE : The THS actuator valve blocks are identical in design and function. Only one is described and illustrated.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18 ft.)
B.	Blanking Caps - Electrical Line
C.	Blanking Plugs and Caps - Hydraulic Line
D.	Circuit Breaker Safety Clips and Tags
E.	Container, Hydraulic Fluid Spillage
F.	TORQUE Wrench up to 5 m.daN (36.87 lbf.ft.)
G.	Warning Notices
H.0U131134	Mounting Cone
J.0U134302	Precasting Bush
K.0U141861	Mounting Cone
L.0U141863	Mounting Cone
M.0U141864	Mounting Cone
N.0U141869	Mounting Cone
P.0U141870	Mounting Cone
Q.0U141898	Precasting Bush
R.0U142567	Mounting Cone
S.0U190360	Rigging Pin - THS Actuator Mechanical Input Lever
T.0U190362	Brake Release Tool
U.0U190365	Tool - Brake Testing, THS Actuator
V.0U190514	Pin - Rigging, Spool Control Gear Box (Qty. 2)
W.97A27302009000	Locking Tool - Pitch Trim Control Wheel
X.98A53207606000	Panels - Floor, Fuselage Tail Section
Y.	Corrosion-Resistant Steel Lockwire, 0.6 mm (0.024 in.) dia.

ITEM	DESIGNATION
Z.	Corrosion-Resistant Steel Lockwire, 0.8 mm 0.032 in.) dia.
AA.	Back Up Rings
AB.	O-Rings
AC.	Packings
AD.	Lockwashers
AE.Material No. 04-015	Common Greases (Ref. 20-31-00)
AF.Material No. 05-027	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 12-13-27, P. Block 1	Flight Controls Replenishing
- 23-44-00, P. Block 1	Cabin and Service Interphone
- 24-41-00, P. Block 301	AC External Power Control
- 27-41-00, P. Block 301	Mechanical Control (THS)
- 27-41-00, P. Block 501	Mechanical Control (THS)
- 27-44-13, P. Block 401	THS Actuator Hydraulic Motor 293174, 291174
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 51-75-10, P. Block 801	Repair of Paint Coatings

2. Procedure

A. Job Set-Up (Ref. Fig. 401)
(1)Position access platform and open access door 312AR.
(2)Valve blocks to be removed are identified as follows:

HYDRAULIC SYSTEM	THS ACTUATOR VALVE BLOCK	
	HYDRAULIC MOTOR IDENTIFIER	LOCATION
GREEN	291174	RH VALVE BLOCK
YELLOW	293174	LH VALVE BLOCK

(3)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Make certain that electronics racks ventilation is correct.
(5)Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
R (6)Install fuselage tail section floor panels P/N 98A53207606000.
R (7)Lock horizontal stabilizer.
R (a)Manually move THS actuator to neutral position (Refer 27-41-00,
R P. Block 301) until rigging pin P/N 0U190360 can be easily installed
R in THS actuator input lever.
R (b)Install locking tool P/N 97A27302009000 on pitch trim control
R wheel in flight compartment.
(8)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC 1/28VDC	306CC1	103/G 3
21VU	FAC 1/115VAC	309CC1	103/G 5
21VU	FAC 1/26VAC	305CC1	103/G 7
21VU	FAC 2/26VAC	305CC2	103/G 8
21VU	FAC 2/115VAC	309CC2	103/G10
21VU	FAC 2/28VDC	306CC2	103/G12
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(10)Display warning notices in flight compartment prohibiting operation of pitch controls.

(11)Disconnect electrical connectors from pitch trim motors and install blanking caps.
(12)Position container for hydraulic fluid spillage.
(13)Disconnect hydraulic system flexible hoses (4) and fit blanking caps.
(14)For removal of LH valve block, disconnect hose to priority valve from transfer tube (25) and fit blanking caps.
(15)Drain THS actuator oil (Ref. 12-13-27, P. Block 1).
(16)Cut and remove lockwire from mechanical stops (3).
(17)Remove mechanical stops (3), discard packings (2) and install the two rigging pins P/N 0U190514 in spool control gearbox outputs.

B. Removal (Ref. Fig. 401, 402)

CAUTION : REMOVAL PROCEDURE MUST BE FOLLOWED EXACTLY THUS AVOIDING FURTHER ADJUSTMENT DURING INSTALLATION.

NOTE : When removing the defective valve block(s), it is mandatory to remove at the same time the motor and the transmission coupling/drive shaft assembly (31) fitted with the sliding shaft (35) without separating them.

(1)Cut and remove lockwire from protection sleeve (29) (Ref. Fig. 402).
(2)Screw protection sleeve (29) into protection sleeve (28) until thread disengages and slide protection sleeve (29) into protection sleeve (28) to gain access to sliding shaft (35).

CAUTION : DO NOT DEFORM TRANSMISSION COUPLING (31) WHEN RETRACTING SLIDING SHAFT (35).

(3)Disconnect sliding shaft (35) from yoke hinge (36) as follows:
(a)Cut and remove lockwire from screw (34).
(b)Loosen screw (34) and retract sliding shaft (35) into coupling (32) against spring (33).
(c)Tighten screw (34) to hold sliding shaft (35) in the retracted position.
(4)Release lockwashers (6), remove bolts (5) and discard lockwashers (6) (Ref. Fig. 401).
(5)Remove hydraulic motor attach bolts (Ref. 27-44-13, P. Block 401).
(6)Simultaneously remove hydraulic motor, valve block (1), protecting sleeves (28, 29) and transmission coupling/drive shaft assembly (Ref. Fig. 402).
(7)Disconnect and remove protecting sleeves (28, 29) from valve block (1).
(8)Cut and remove lockwire from screw (30).

CAUTION : DO NOT OVERSTRESS TRANSMISSION COUPLING WHEN PULLING ON COUPLING (32).

(9)Remove screw (30) and pull transmission coupling/drive shaft assembly from gear shaft (40).

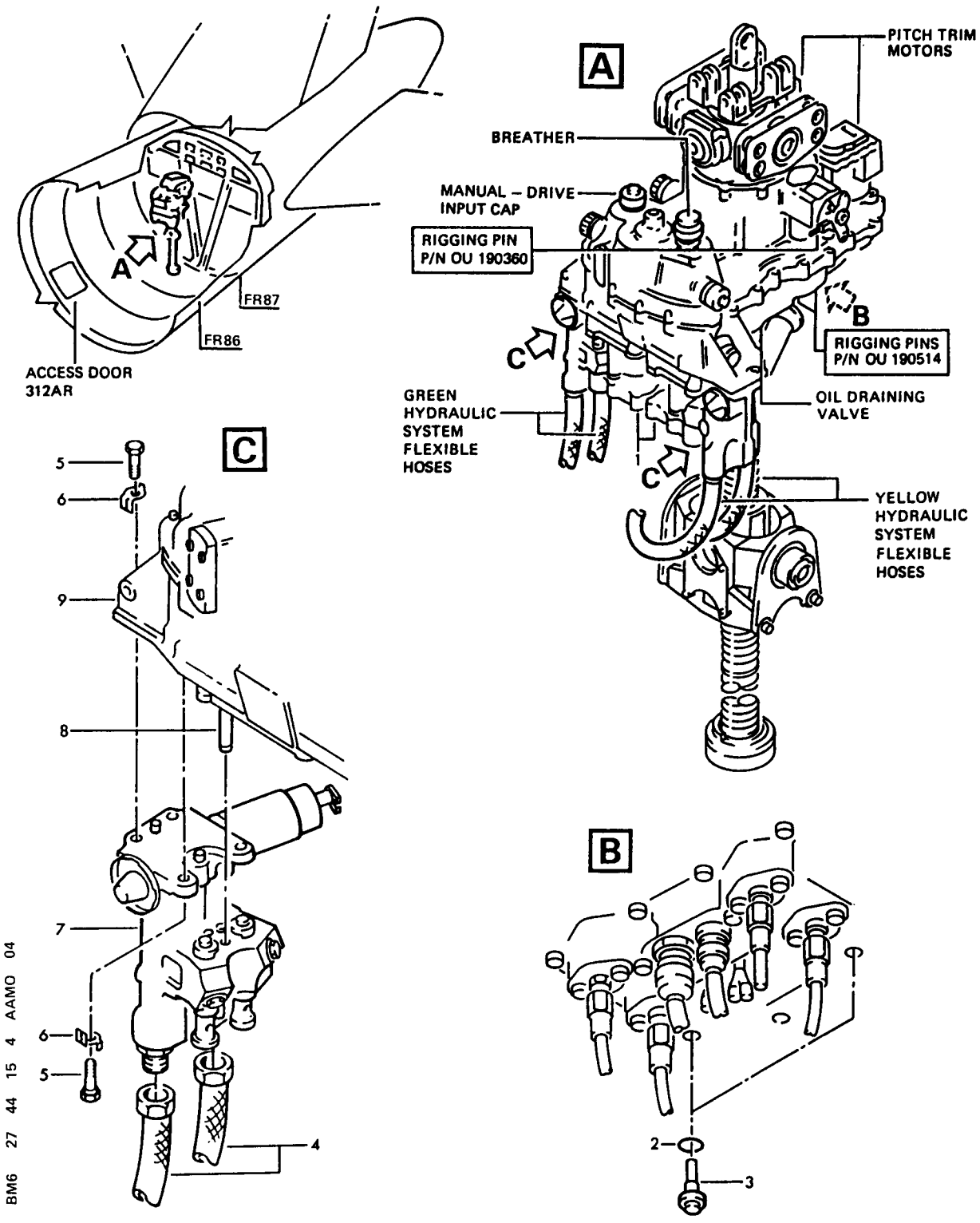
NOTE : Do not separate sliding shaft (35) from coupling (32). Both parts have to stay with the THS actuator.

(10)Separate hydraulic motor from valve block (7) (Ref. Fig. 401) (Ref. 27-44-13, P. Block 401).
(11)Remove dumb-bell (12) and discard packings (11) (Ref. Fig. 402).
(12)Remove bobbin (6) and discard O-rings (5).

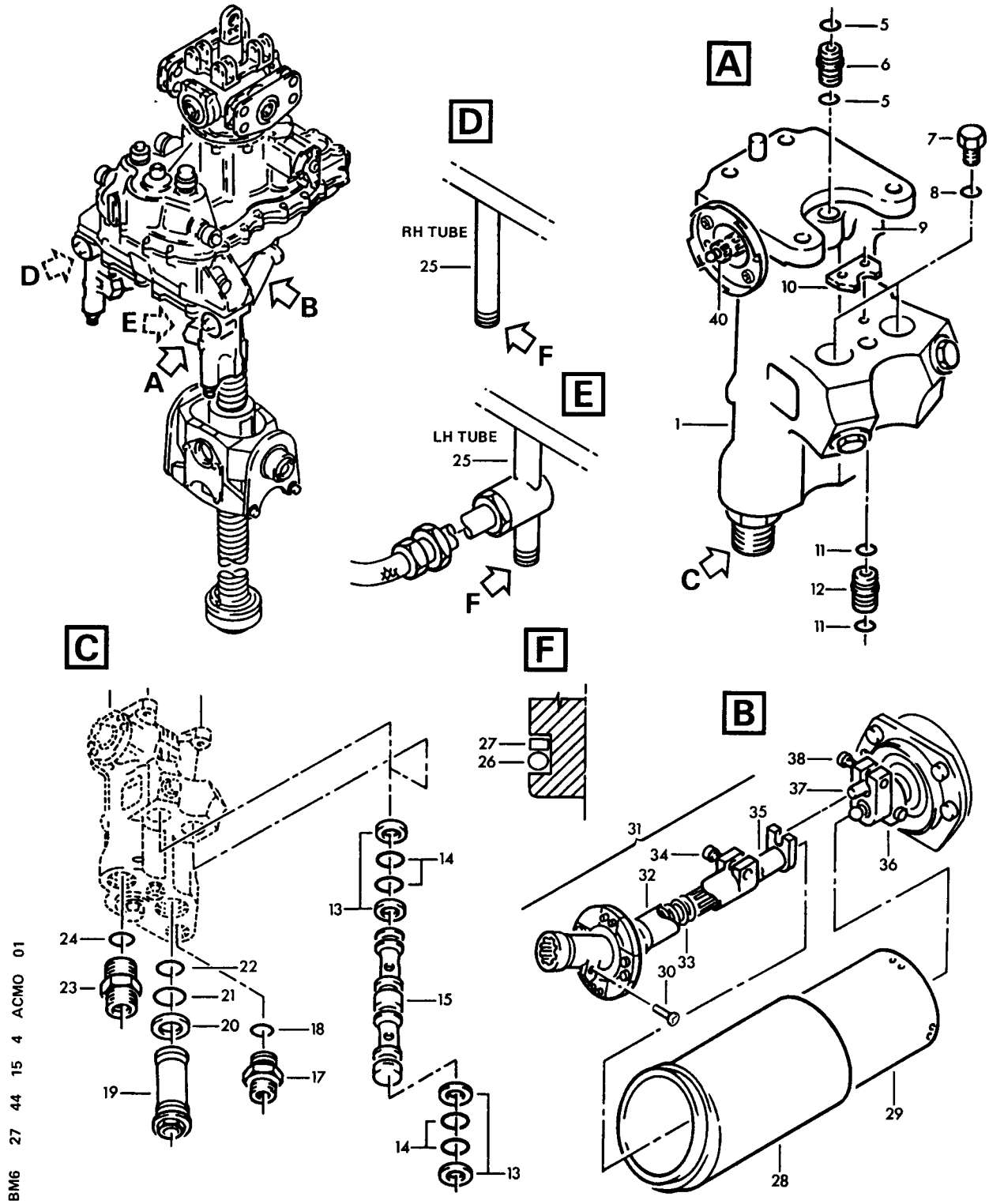
C. Replacement of Sealing Rings on removed Valve Block (Ref. Fig. 402)

(1)Change sealing rings of transfer tubes (15) as follows:
(a)Cut and remove lockwire from plugs (7).
(b)Remove plugs (7) and discard packings (8).
(c)Cut and remove lockwire from screws (9).
(d)Remove screws (9) and clamp (10).
(e)Push transfer tubes (15) from valve block (1).
(f)Remove and discard packings (14) and back up rings (13).
(g)Fit new back up rings (13) using precasting bush P/N OU141898 and new packings (14) using mounting cone P/N OU141869 on transfer tubes (15).

WARNING : MATERIAL NO. 04-015 IS TOXIC. DO NOT BREATH VAPORS. USE IN WELL VENTILATED AREA FREE FROM SPARKS, FLAME, OR HOT



THS Actuator Valve Block
Figure 401



Control Valve Assembly
Figure 402

SURFACES. WEAR SPLASH GOGGLES, SOLVENT-RESISTANT GLOVES, AND OTHER PROTECTIVE GEAR. IN CASE OF EYE CONTACT, FLUSH WITH WATER AND SEEK MEDICAL ATTENTION. IN CASE OF SKIN CONTACT, WASH WITH SOAP AND WATER.

(h)Apply grease (Mat. No. 04-015) to the packings (14) and outside of transfer tubes (15).
(j)Install transfer tubes (15) in valve block (1).
(k)Safety transfer tubes (15) with clamp (10) and screws (9).
(l)Safety screws (9) with lockwire 0.6 mm (0.024 in.) dia.
(m)Fit new packings (8) on plugs (7) using mounting cone P/N OU141870.
(n)Apply grease (Mat. No. 04-015) to the packings (8) and thread of plugs (7).
(p)Install plugs (7) in valve block (1).
(q)TORQUE plugs (7) to between 0.7 and 0.9 m.daN (5.17 and 6.63 lbf.ft.).
(r)Safety plugs (7) with lockwire 0.6 mm (0.024 in.) dia.

R (2)Change sealing rings of filter (19) if required as follows:
R NOTE : Not applicable for new or repaired valve blocks.
(a)Cut and remove lockwire from filter (19).
(b)Remove filter (19).
(c)Remove and discard packings (21, 22) and back up ring (20).
(d)Fit new back up ring (20) and new packings (21, 22) on filter (19) using mounting cone P/N OU141861.
(e)Apply grease (Mat. No. 04-015) to the packings (21, 22).
(f)Install filter (19) in valve block (1).
(g)TORQUE filter (19) to between 3.3 and 3.6 m.daN (24.33 and 26.55 lbf.ft.).
(h)Safety filter (19) with lockwire 0.8 mm (0.032 in.) dia.

R (3)Change packings of unions (17, 23) if required as follows:
R NOTE : Not applicable for new or repaired valve blocks.
(a)Remove unions (17, 23).
(b)Remove and discard packings (18, 24).
(c)Fit new packing (18) on union (17) using mounting cone P/N OU141864.
(d)Fit new packing (24) on union (23) using mounting cone P/N OU141863.
(e)Apply grease (Mat. No. 04-015) to the packings (18, 24) and the thread of unions (17, 23).
(f)Install unions (17, 23) in valve block (1).
(g)TORQUE union (17) to between 2.3 and 2.5 m.daN (16.96 and 18.44 lbf.ft.).
(h)TORQUE union (23) to between 2.1 and 2.3 m.daN (15.48 and 16.96 lbf.ft.).

(4)Change sealing rings of transfer tube (25) as follows:
(a)Remove and discard packing (26) and back up ring (27).
(b)Fit new back up ring (27) and new packing (26) on transfer tube (25) using mounting cone P/N OU142567.
(c)Compress back-up ring (27) using precasting bush P/N OU134302.

D. Preparation for Installation (Ref. Fig. 402)

CAUTION : HYDRAULIC MOTOR AND TRANSMISSION COUPLING/DRIVE SHAFT ASSEMBLY MUST BE TRANSFERRED FROM THE REMOVED TO REPLACEMENT VALVE BLOCK TO AVOID FURTHER ADJUSTMENT DURING INSTALLATION.

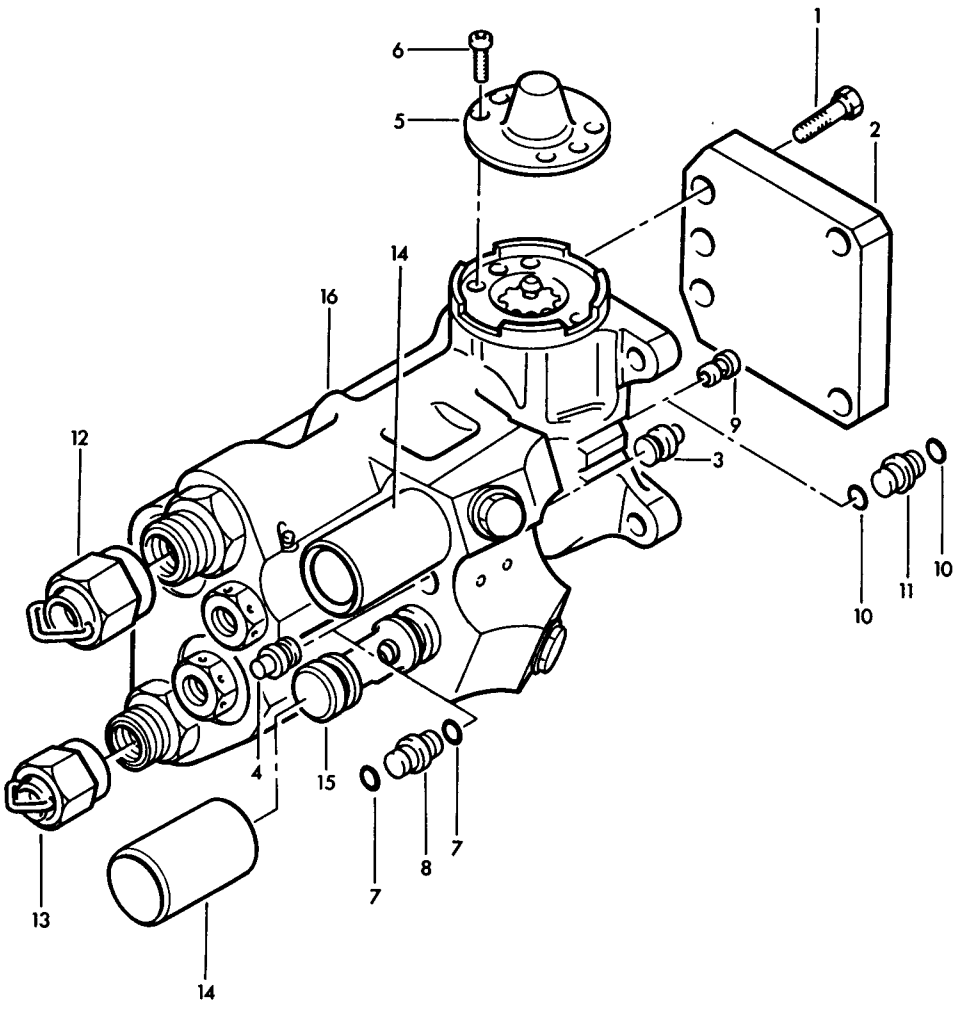
NOTE : The new valve block must be equipped with the motor and the transmission coupling/drive shaft assembly which have been removed from the other control valve block. This allows the sliding shaft (35) to be directly connected to the eccentric (37) without re-adjustment.

(1)Prepare new replacement valve block (1) as follows: (Ref. Fig. 403)
(a)Remove one of covers (5) in accordance with the side selected for installation and re-install screws (6).
(b)Remove bolts (1) and storage plate (2).
(c)Remove storage plug (3).
(d)Remove storage plugs (4).
(e)Fit new packings (7) on dumb-bell (8) retained from removed valve block using mounting cone P/N 0U131134.
(f)Install dumb-bell (8) in valve block (16).
(g)Remove storage plug (9).
(h)Fit new O-rings (10) to bobbin (11) retaind from removed valve block.
(j)Install bobbin (11) in valve block (16).
(k)Remove plugs (12,13).
(l)Pull protective tubes (14) from transfer tubes (15).
(m)Make sure that the two rigging pins P/N 0U190514 are still in place.

E. Installation (Ref. Fig. 402)

(1)Install hydraulic motor on valve block (1) (Ref. 27-44-13, P. Block 401).
(2)Fully engage transmission coupling (31) on valve block control shaft (40).
(3)Tighten screw (30) and safety with lockwire 0.6 m (0.024 in.) dia.
(4)Mount protection sleeves (28, 29) on valve block (1).
NOTE : Protection sleeves (28, 29) will be closed after synchronization check.
(5)Position valve block (7) with hydraulic motor on THS actuator housing (9) (Ref. Fig. 401).
(6)Install hydraulic motor attach bolts (Ref. 27-44-13, P. Block 401).
(7)Install bolts (5) and safety with lockwashers (6).
(8)Untighten screw (34), so that sliding shaft (35) is pushed out by spring (33) (Ref. Fig. 402).
(9)Fit the fork of sliding shaft (35) to eccentric (37).
(10)TORQUE screw (34) to between 0.3 and 0.4 m.daN (26.55 and 35.40 lbf.in).
(11)Safety screw (34) with lockwire 0.6 mm (0.024 in.) dia.
(12)Remove blanking caps and connect hydraulic system flexible hoses (4) (Ref. Fig. 401).
R (13)Removed blanking caps and connect connect hose fom priority valve
R to transfer tube (25).
(14)Remove blanking caps and connect electrical connectors to pitch trim motors.

F. Test (Ref. Fig. 404)



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Preparation of Replacement Component
Figure 403

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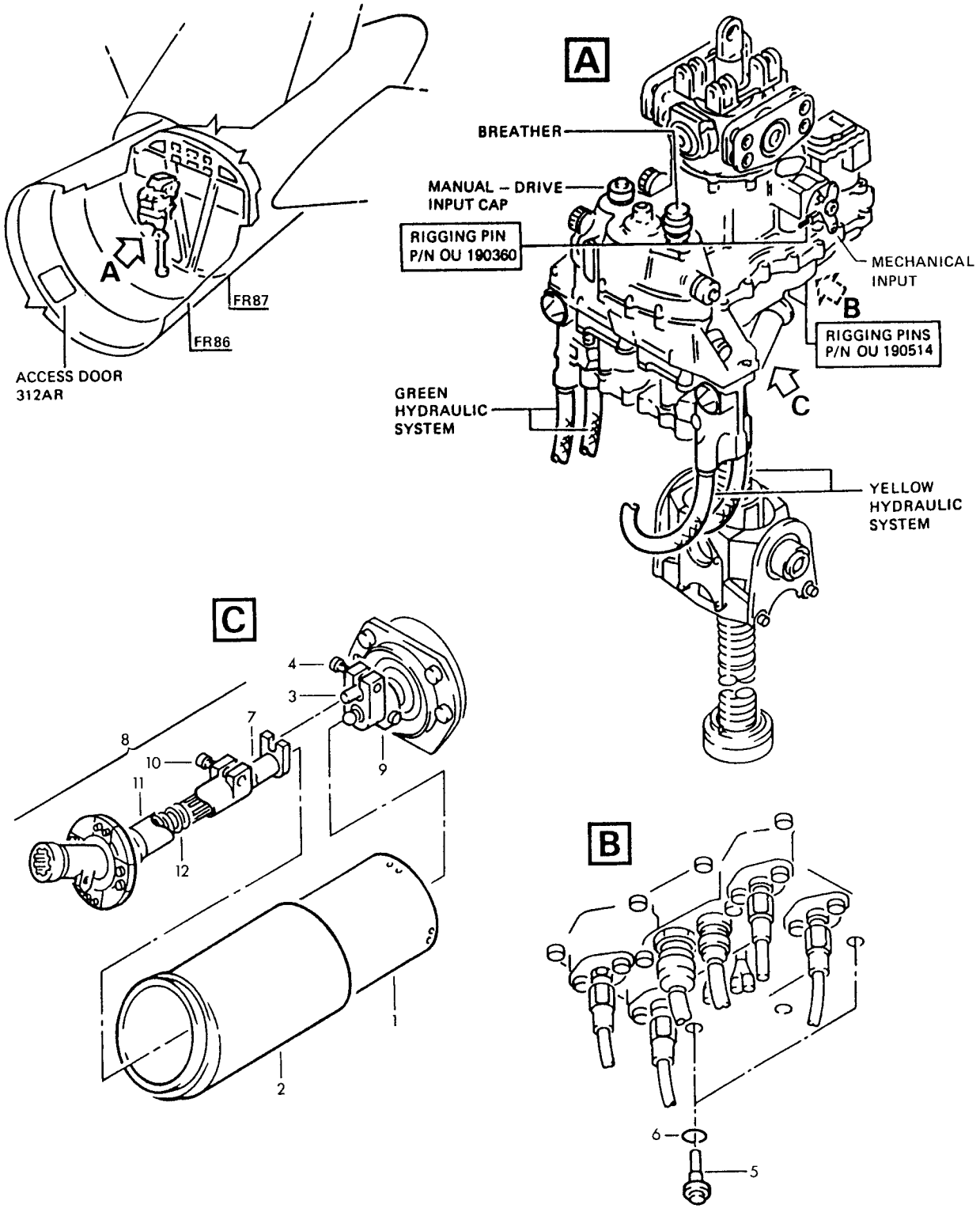

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Valve Block Syncronization
Figure 404

R

(1)Remove rigging pins P/N 0U190514 from spool control gearbox outputs.
R (2)Fit packings (6) to mechanical stops (5).
R (3)Install mechanical stops (5) and safety with lockwire 0.8 mm (0.032 in.) dia.
(4)Replenish THS actuator oil (Ref. 12-13-27, P. Block 1).
(5)Remove locking tool P/N 97A27302009000 from pitch trim control wheel in flight compartment.
(6)Remove rigging pin P/N 0U190360 from THS actuator input lever.
(7)Activate service interphone system (Ref. 23-44-00, P. Block 1).
NOTE : The following procedure require the services of two persons, one at THS actuator the other at panel 428VU and pitch trim control wheel and use of interphone system.
(8)Remove warning notices.
(9)Remove safety clips and tags, and close circuit breakers 306CC1, 309CC1, 305CC1, 305CC2, 309CC2, 306CC2, 1CB and 2CB.
(10)Pressurize green and yellow hydraulic systems (Ref. 29-10-00, P. Block 301).
(11)Make certain that G and Y pushbutton switches on SERVO CTL section of panel 428VU are pressed in (legends off).
(12)To bleed valve blocks slowly rotate pitch trim control wheel to a NOSE UP and NOSE DOWN position to deflect THS.
(13)Repeat this operation three times and return THS to neutral 0° position.
(14)Check valve blocks and all hydraulic connections for leaks.
R NOTE : Leakage is not permissible.
(15)Release G and Y pushbutton switches on SERVO CTL section of panel 428VU.
R (16)If not already performed, cut and remove lockwire from protection sleeve of other valve block and screw protection sleeves into each other to gain access to other eccentric.
(17)Check synchronization of valve blocks as follows:
(a)Remove cap from manual-drive input to observe RH motor shaft rotation.
R (b)Press in G and Y pushbutton switches on SERVO CTL section of
R panel 428VU (legends off).
R (c)Check motor shaft for absence of rotation.
R - if motor shaft rotates permanently without any input order to the
R HSA, proceed with step (19).
R NOTE : Motor shaft rotates few turns and stops, is an acceptable
R behaviour.
R - if motor shaft does not rotate, proceed as follows:
R (d)Release G and Y pushbutton switch on SERVO CTL section of panel 428VU.
R CAUTION : MAKE CERTAIN THAT 3/8 INCH SOCKET IS PROPERLY SECURED ON THE
R EXTENDER AND WILL NOT FALL INSIDE THE HSA CASING DURING
R CONNECTION/DISCONNECTION OPERATION.
R (e)Remove breather and install brake testing tool P/N 0U190365 to check
R LH motor shaft rotation.
R NOTE : A 3/8 inch socket on a 150 mm (5.9 in.) extender may be
R used as alternative.
R (f)Press G and Y pushbutton switch on SERVO CTL section of panel 428VU.
R CAUTION : DO NOT OPERATE THS ACTUATOR AT HIGH SPEED WHEN THE BRAKE
R TESTING TOOL P/N 0U190365 (OR EXTENDER/SOCKET) IS FITTED
R OR ACTUATOR IS NEAR THE UPPER OR LOWER STOPS.
R (g)On horizontal stabilizer actuator, smoothly rotate mechanical input

R connecting shaft in the nose up direction (THS moves down) and
R determine which motor is running first.
R (h)Smoothly rotate mechanical input connecting shaft in the nose down
R direction (THS moves up) and check that same motor as determined
R in step (g) is running first and both motors rotate in same direction.
R - if not, the actuator is slightly desynchronized, proceed directly
R with adjustment procedure step (18).
R NOTE : Synchronization is also achieved when the two hydraulic
R motors are starting at the same time in nose up or nose down,
R or in both direction.
R - if yes, the actuator is correctly synchronized.
R (j)Release G and Y pushbutton switch on SERVO CTL section of panel 428VU.
R (k)Remove brake testing tool P/N OU190365 or 3/8 socket and extender.
R (l)Install breather.
R (m)Install cap on manual drive input.
R (n)Carry out functional test of trimmable horizontal stabilizer
R (Ref. 27-41-00, P. Block 501).
R (18)Adjustment procedure in case of slight desynchronization
R (Ref. Fig. 404)
R NOTE : Slight desynchronization is present when the same motor
R is not starting first in nose up and nose down direction when
R rotating smoothly the HSA mechanical input shaft.
R CAUTION : DURING THIS ADJUSTMENT ONLY THE RH ECCENTRIC MUST BE
R READJUSTED. THE LH ECCENTRIC MUST NOT BE ADJUSTED, IT IS USED
R AS REFERENCE FOR SYNCHRONIZATION ADJUSTMENT.
R (a)To gain access to RH transmission, proceed as follows:
R 1 Cut and remove lockwire from RH protection sleeve (1).
R 2 Screw protection sleeve (1) into protection sleeve (2) until thread
R disengages and slide protection sleeve (1) into protection
R sleeve (2), to gain access to eccentric (3).
R (b)On horizontal stabilizer actuator, smoothly rotate mechanical input
R connecting shaft in the nose up direction (THS moves down) and
R determine which motor is running first.
R (c)Smoothly rotate mechanical input connecting shaft in the nose down
R direction (THS moves up) and check that same motor as determined
R in step (c) is running first and both motor rotate in same direction.
R NOTE : Synchronization is also achieved when the two hydraulic
R motors are starting at the same time in nose up or nose down,
R or in both direction.
R - if not, slightly loose screw (4), slightly rotate RH eccentric and
R tighten screw (4).
R (d)Repeat steps (c) and (d), checking which motor is running first.
R (e)When the synchronization is correct, TORQUE screw (4) to between
R 0.3 and 0.4 m.daN (26.55 and 35.40 lbf.in).
R (f)Safety screw (4) with lockwire 0.6 mm (0.024 in) dia.
R (g)On RH transmission coupling/drive shaft assembly slide protection
R sleeve (1) outwards, then screw out protection sleeve (2) until
R contacting THS actuator housing and safety with
R lockwire 0.8 mm (0.031 in.) dia.
R (h)Remove brake testing tool P/N OU190365 or 3/8 socket and extender.
R (j)Install breather.

R (k)Install cap on manual-drive input.
R (l)Carry out functional test of trimmable horizontal stabilizer (Ref. 27-41-00, P. Block 501).
R (19)Adjustment procedure in case of significant desynchronization (Ref. Fig. 404)
R NOTE : Significant desynchronization is present in case a permanent rotation of the right hand hydraulic motor shaft is detected when the green and yellow hydraulic systems are pressurized without any input order to the HSA.
R (a)With hydraulic systems pressurized (G and Y pushbutton switches on SERVO CTL section of panel 428VU are pressed in) manually move the actuator to neutral position until rigging pin P/N 0U190360 can easily be installed in THS actuator input lever.
R (b)Release G and Y pushbutton switch on SERVO CTL section of panel 428VU and depressurize hydraulic systems.
R (c)Drain THS actuator oil (Ref. 12-13-27 P. Block 1).
R (d)Cut and remove lockwire from mechanical stops (5).
R (e)Remove mechanical stops (5), discard packings (6) and install rigging pins P/N 0U190514 in spool control gearbox outputs.
R (f)To gain access to RH transmission, if required, proceed as follows:
R 1 Cut and remove lockwire from RH and LH protection sleeve (1).
R 2 Screw protection sleeve (1) into protection sleeve (2) until thread disengages and slide protection sleeve (1) into protection sleeve (2), to gain access to sliding shaft (7).
R CAUTION : DO NOT DEFORM TRANSMISSION COUPLING (8) WHEN RETRACTING SLIDING SHAFT (7).
R (g)Disconnect RH sliding shaft (7) from yoke hinge (9) as follows:
R 1 Cut and remove lockwire from screw (10).
R 2 Loosen screw (10) and retract sliding shaft (7) into coupling (11) against spring (12).
R 3 Tighten screw (10) to hold sliding shaft (7) in the retracted position.
R (h)On RH side of the THS actuator (green system) slightly untighten screw (10) so that sliding shaft (7) is pushed out by spring (12).
R (j)Check that the sphere on the valve block control shaft is properly centered and engaged in the recess of sliding shaft (7) and that the fork of sliding shaft (7) fits to eccentric (3).
R - if yes, the RH valve block is considered at neutral position. TORQUE screw (10) to between 0.3 and 0.4 m.daN (26.55 and 35.40 lbf.in) and safety with lockwire 0.6 mm (0.024 in.) dia.
R NOTE : Would a slight rotation of the valve block input shaft/sliding shaft /fork be necessary to fit to the eccentric, it would cause a spool valve offset and THS actuator desynchronization:
R - if not, proceed as follows:
R 1 Unscrew again screw (10) and retract sliding shaft (7).
R 2 Tighten screw (10) to hold sliding shaft (7) in retracted position.
R 3 Slightly untighten screw (4) to allow free rotation of the eccentric (3).
R 4 Untighten screw (10) so that sliding shaft (7) is pushed out by

R spring (12).
R - check that the eccentric positioning is achieved by the
R fork of sliding shaft (Self aligning the eccentric).
R - if not, slightly rotate the eccentric so that the fork of sliding
R shaft (7) freely fits the eccentric.
R 5 TORQUE screws (4,10) to between 0.3 and 0.4 m.daN
R (26.55 and 35.40 lbf.in) and safety with lockwire 0.6 mm
R (0.024 in.) dia.
R (k)Repeat procedure in step (f) and (j) on the LH side.
R (l)Remove rigging pins P/N 0U190514 from spool control gearbox outputs.
R (m)Fit new packings (6) to mechanical stops (5).
R (n)Install mechanical stops (5) and secure with lockwire 0.8 mm
R (0.032 in.) dia.
R (o)Remove rigging pin P/N 0U190360.
R (p)Replenish THS actuator oil (Ref. 12-13-27 P. Block 1)
R (q)On horizontal stabilizer actuator, smoothly rotate mechanical input
R connecting shaft in the nose up direction (THS mover down) and
R determine which motor is running first.
R (r)Smoothly rotate mechanical input connecting shaft in the nose down
R direction (THS moves up) and check that same motor as determined
R in step (r) is running first and both motors rotate in same direction.
R NOTE : Synchronization is also achieved when the two hydraulic
R motors are starting at the same time in nose up or nose down,
R or in both direction.
R CAUTION : DURING THIS ADJUSTMENT ONLY THE RH ECCENTRIC MUST BE
R READJUSTED. THE LH ECCENTRIC MUST NOT BE ADJUSTED ANYMORE
R AS IT IS NOW USED AS REFERENCE FOR SYNCHRONIZATION ADJUSTMENT.
R - if not, loose screw (4), slightly rotate RH eccentric (3) and
R tighten screw (4).
R (s)Repeat steps (r) and (s), checking which motor is running first.
R (t)Release G and Y pushbutton switch on SERVO CTL section of panel 428VU.
R (u)When the synchronization is correct TORQUE screw (4) to between
R 0.3 and 0.4 m.daN (26.55 and 35.40 lbf.in) and safety with lockwire
R 0.6 mm (0.024 in.) dia.
R (v)On both transmission coupling/drive shaft assembly slide protection
R sleeve (1) outwards, then screw out protection sleeve (2) until
R contacting THS actuator housing and safety with
R lockwire 0.8 mm (0.031 in.) dia.
R (w)Remove brake testing tool P/N 0U190365 or 3/8 socket and extender.
(x)Install breather.
(y)Install cap on manual drive input.
(z)Carry out functional test of trimmable horizontal stabilizer
(Ref. 27-41-00, P. Block 501).

G. Close-Up
(1)Deactivate service interphone system (Ref 23-44-00, P. Block 1).
(2)Check coating of moisture-removing oil (Mat. No. 05-027) for good
condition on valve blocks and THS actuator housing and renew as
necessary (Ref. 51-75-10, P. Block 801).
(3)Remove fuselage tail section floor panels P/N 98A53207606000.
(4)Remove container for hydraulic fluid spillage.

(5)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(6)Close access door 312AR.
(7)Remove access platform.
(8)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) and disconnect electrical ground power unit.

PRIORITY VALVE 273179 - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18 ft.)
B. 97A27302009000	Locking Tool - Pitch Trim Control Wheel
C.	Warning Notices
D.	Circuit Breaker Safety Clips
E.	Container, Hydraulic Fluid Spillage
F.	Hydraulic Blanking Plugs
G.	O-Rings
H.	Square Seals
J. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
K. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Make certain that horizontal stabilizer pitch trim control is set at zero, and install locking tool P/N 97A27302009000 at pitch trim control wheel in flight compartment.
(3)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)On panel 428VU,
- release SERVO CTLS/Y pushbutton switch.
(5)Display warning notices in flight compartment prohibiting operation of flight controls.
(6)Open, safety and tag the following circuit breakers:

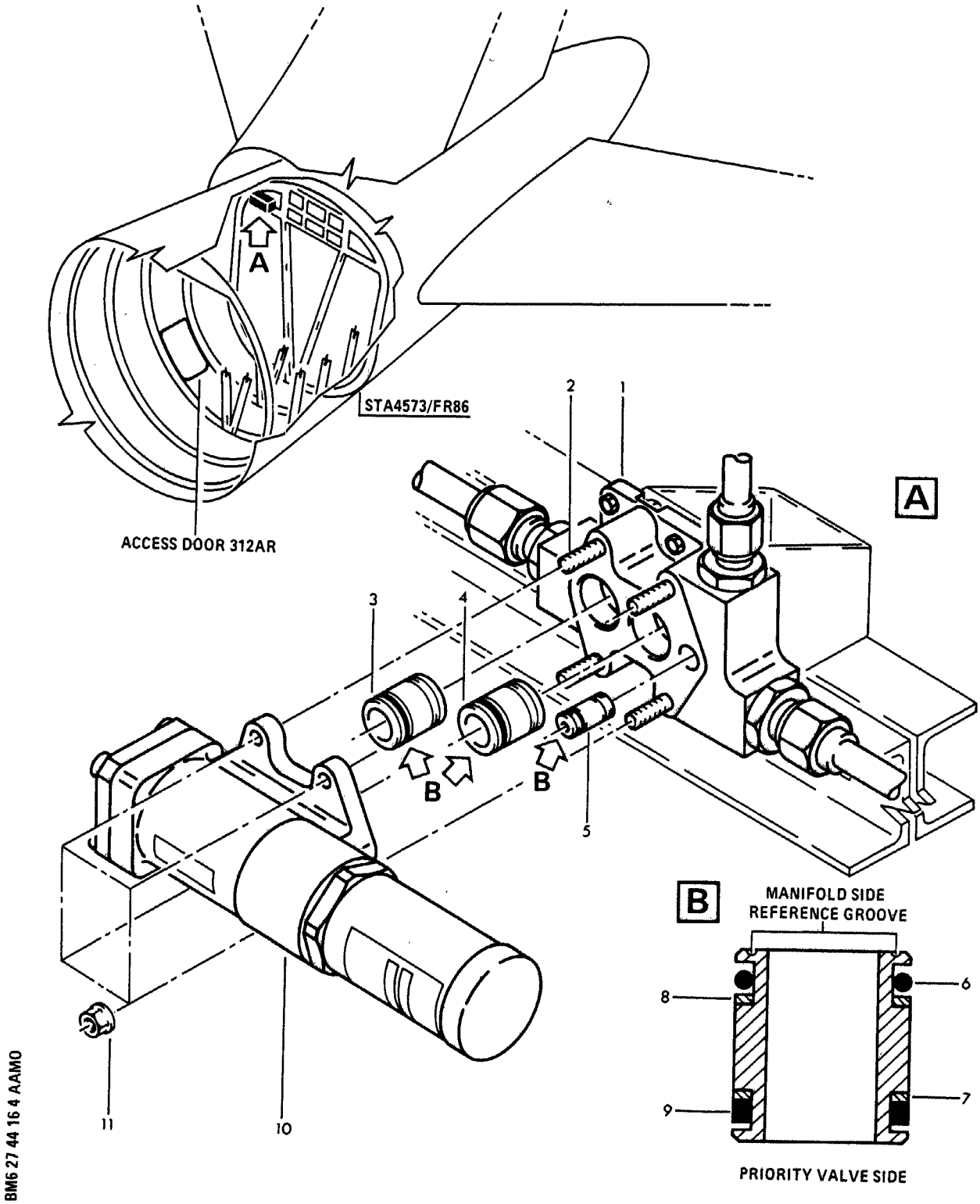
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(7)Display warning notices prohibiting repressurization of Yellow hydraulic system.
(8)Open access door 312AR.
(9)Position container for hydraulic fluid spillage.

B. Removal (Ref. Fig. 401)
(1)Remove nuts (11).
(2)Remove priority valve (10).
(3)Remove bobbins (3, 4, 5).
(4)Install blanking plugs in ports.
(5)Remove and discard O-rings (6) and square seals (9).

C. Preparation for Installation (Ref. Fig. 401)
(1)Clean interfaces of priority valve (10) and manifold (1) with cleaning agent (Mat. No. 11-002) and dry with dry compressed air.
(2)Apply hydraulic fluid (Mat. No. 02-003) to O-rings (6) and square seals (9).
(3)Make certain that thrust rings (7, 8) are in good condition and correctly positioned on bobbins (3, 4, 5) and install new O-rings (6) and square seals (9).
NOTE : O-rings (6) must be installed in recess on bobbins' grooved end (manifold side).
CAUTION : NON-GROOVED END OF BOBBINS MUST BE INSTALLED INTO PRIORITY VALVE PORTS.
(4)Insert bobbins (3, 4, 5) into priority valve (10).

D. Installation (Ref. Fig. 401)
(1)Remove blanking plugs from ports.
(2)Position priority valve (10) on bolts (2).
(3)Make certain that bobbins (3, 4, 5) engage correctly into ports of manifold (1) and press priority valve (10) and manifold (1) together.



Priority Valve
Figure 401

(4)Install nuts (11) and tighten nuts (11) in a diagonal sequence.
(5)Remove safety clips and tags and close circuit breakers 1CB and 2CB.
(6)Remove locking tool P/N 97A27302009000.

E. Test
(1)Initial Conditions
(a)Hydraulic ground power cart connected but hydraulic systems not pressurized (Ref. 29-10-00, P. Block 301).
(b)Aircraft electrical network energized (Ref. 24-41-00, P. Block 301).
(c)Overhead panel circuit breakers closed, particulary those associated with FLT CTL and EFCU.
(d)Pitch trim control wheel at zero.
(2)Carry out functional test of priority valve.
NOTE : Start test, using yellow hydraulic system pressure 1305.35 psi. (90 bar) minimum.

ACTION	RESULT
1. On SERVO CTL section of panel 428VU: - release B and G pushbutton switches.	- OFF legends of these switches comes on.
2. On center pedestal: - give an input to the pitch trim control wheel in nose down direction and hold the wheel in this position.	
3. Increase yellow system pressure.	- THS starts moving when pressure is between 1885 psi. (130 bar) and 2400 psi. (165 bar). - Full traveling speed is reached above 2400 psi. (165 bar).
4. Keep THS moving, if necessary in the opposite direction and reduce yellow system pressure.	- THS slows down and finally stops when pressure is between 2400 psi. (165 bar) and 1885 psi. (130 bar). - No THS movement below 1885 psi. (130 bar).

(3)Check that priority valve is free from leaks.
(4)Test completion
(a)Check fluid level in hydraulic tank. Replenish as required (Ref. 12-12-29, P. Block 1).
(b)Shut down and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(c)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(d)Restore aircraft system to normal operating condition.

F. Close-Up

(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)Remove hydraulic fluid container and make certain that all excess fluid is cleaned off all components.
(3)Close access door 312AR.
(4)Remove warning notices.
(5)Remove access platform.

THS ACTUATOR - SPHERICAL BEARINGS - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

CAUTION : THE TRIMMABLE HORIZONTAL STABILIZER (THS) ACTUATOR MAY BE DRIVEN MANUALLY BY SOCKET WRENCH USING THE MANUAL DRIVE INPUT, IF HYDRAULIC POWER IS NOT AVAILABLE. HOWEVER THE RH PRESSURE-OFF BRAKE MUST FIRST BE RELEASED AND THE SCREW STROKE MUST BE LIMITED.
POWER TOOLS ARE NOT TO BE USED. THE MECHANICAL INPUT MUST NOT BE RIGGED. FOR MANUAL ACTUATOR OPERATION REFER TO 27-41-00, P. BLOCK 301.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 5,5 m (18 ft.)
B.	Circuit Breaker Safety Clips and Tags
C.	Torque Wrench up to 10 m.daN (74 lbf.ft.)
D.	Warning Notices
E. 0U190358	Tool - 0° Location, THS Actuator
F. 0U190359	Screw - Fixing, 0° Tool P/N 0U190358
G. 0U190360	Rigging Pin - THS Actuator Mechanical Input Lever
H. 97A27302009000	Locking Tool- Pitch Trim Control Wheel
J. 98A53207606000	Panels - Floor, Fuselage Tail Section
K. 98A27407508001	Tool Set - Removal/Installation, Horizontal Stabilizer
R L. 98A27407514004	Fixture - Strut, Horizontal Stabilizer
M.	Cotter Pin
N.	Tab Washers

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-41-00, P. Block 501	Mechanical Control (THS)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 55-16-36, P. Block 401	THS Actuator Arm
- 55-16-36, P. Block 601	THS Actuator Arm

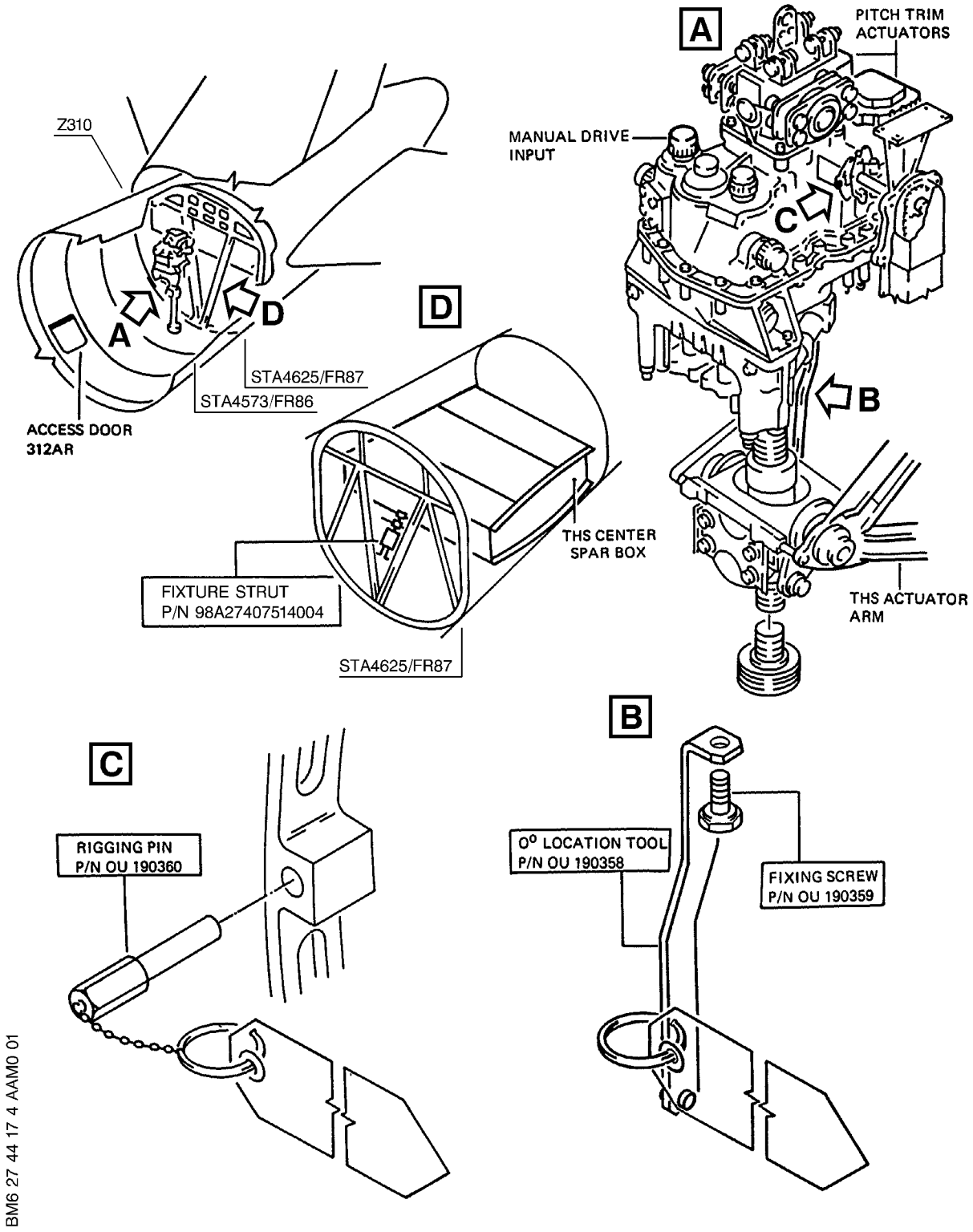
2. Procedure

A. Job Set-Up (Ref. Fig. 401)
(1)Position access platform and open access door 312AR.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(4)Move trimmable horizontal stabilizer (THS) to neutral position.
(5)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(6)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC 1/28VDC	306CC1	103/G3
21VU	FAC 1/115VAC	309CC1	103/G5
21VU	FAC 1/26VAC	305CC1	103/G7
21VU	FAC 2/26VAC	305CC2	103/G8
21VU	FAC 2/115VAC	309CC2	103/G10
21VU	FAC 2/28VDC	306CC2	103/G12
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

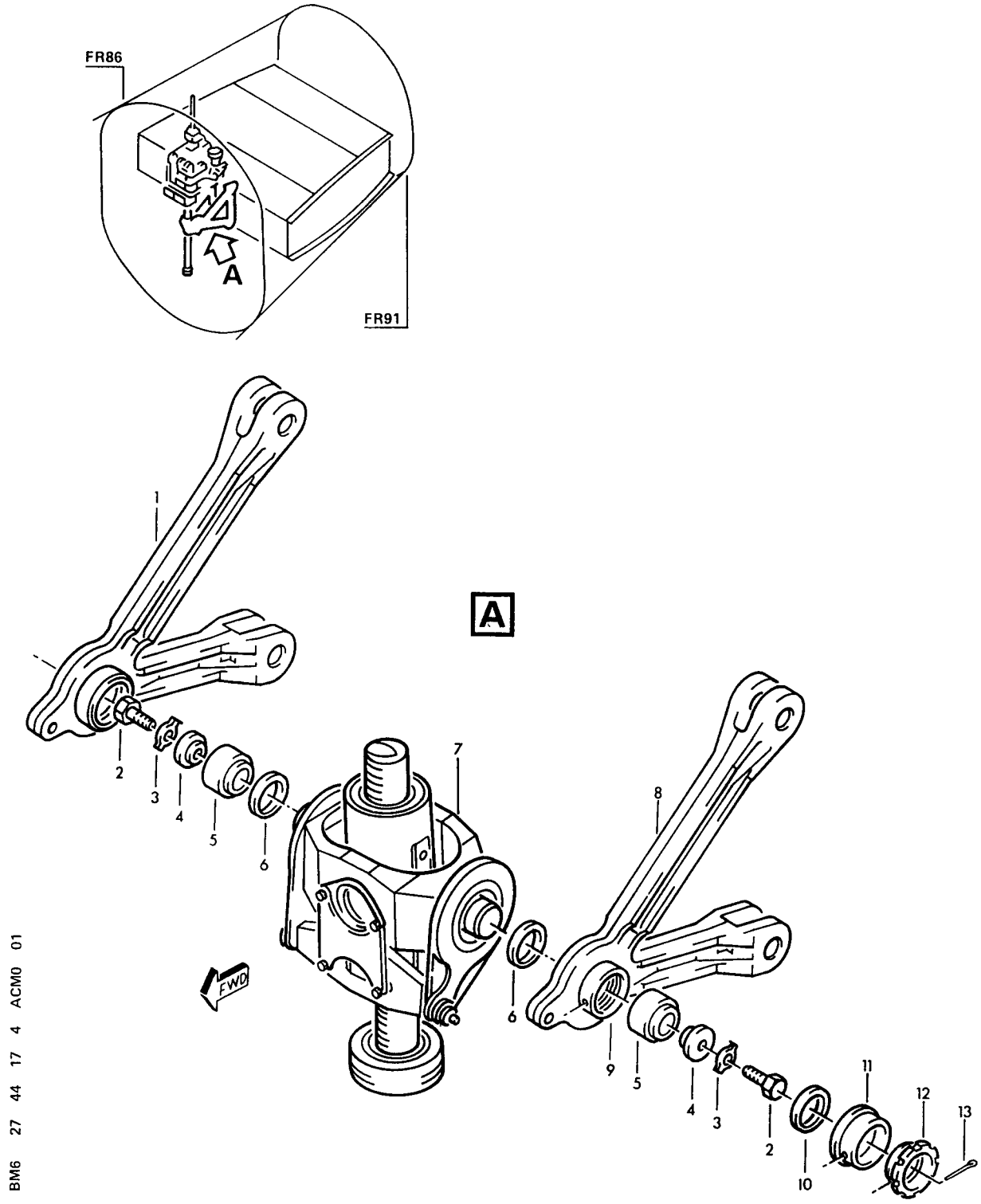
(7)Display warning notices in flight compartment prohibiting operation of pitch controls.
(8)Install fuselage tail section floor panels P/N 98A53207606000.
(9)Lock horizontal stabilizer.
(a)Manually move THS actuator to neutral position (Refer. 27-41-00, P. Block 301) until rigging pin P/N 0U190360 can be easily installed in THS actuator input lever.
(b)Install and adjust horizontal stabilizer fixture strut
R P/N 98A27407514004 to remove load from trim actuator screwshaft nut.
(c)Install 0° location tool P/N 0U190358 between THS actuator and screwshaft nut with fixing screw P/N 0U190359.
(d)Install locking tool P/N 97A27302009000 on pitch trim control wheel in flight compartment.

B. Removal (Ref. Fig. 402)
NOTE : Both spherical bearings (5) are identical, the only difference is in the method of installation. The LH bearing (5) is fixed to the actuator hinge arm (8). The RH bearing (5) floats in the actuator hinge arm (1).
(1)Remove RH spherical bearing (5) (floating bearing) as follows:
(a)Remove actuator hinge arm (1) (Ref. 55-16-36, P. Block 401).
(b)Release tab washer (3) and remove bolt (2), tab washer (3) and end cap (4).
(c)Remove spherical bearing (5) and washer (6) from bearing journal of trim actuator nut (7).
(2)Remove LH spherical bearing (5) (fixed bearing) as follows:
(a)Release tab washer (3) and remove bolt (2), tab washer (3) and end cap (4).
(b)Remove actuator hinge arm (8) (Ref. 55-16-36, P. Block 401).



Locking Points
Figure 401

R



Spherical Bearings
Figure 402

R

(c)Remove spherical bearing (5) from actuator arm (8) as follows:
1 Remove cotter pin (13) and discard.
2 Remove ring nut (12) using wrench from tool set P/N 98A27407508001.
3 Remove bush (11) and washer (10).
R 4 Remove spherical bearing (5) from bush (9) and washer (6) from
R bearing journal of trim actuator nut (7).

C. Preparation for Installation (Ref. Fig. 402)
(1)Inspect spherical bearings (5) (Ref. 55-16-36, P. Block 601).

D. Installation (Ref. Fig. 402)
CAUTION : SHOULD ONE SPHERICAL BEARING NEED REPLACING DUE TO WEAR, BOTH SPHERICAL BEARING MUST BE REPLACED.
NOTE : Both spherical bearings (5) are identical, the only difference is in the method of installation. The LH bearing (5) is fixed to the actuator hinge arm (8). The RH bearing (5) floats in the actuator hinge arm (1).
(1)Install LH spherical bearing (5) (fixed bearing) as follows:
(a)Install spherical bearing (5) in actuator arm (8) as follows:
1 Insert spherical bearing (5) into bush (9).
2 Install bush (11) and washer (10).
3 Make certain that cotter pin holes in bushes (9, 11) align.
NOTE : If cotter pin holes in ring nut (12) and bushes (9, 11) do not align proceed as follows:
Use existing holes in bushes (9, 11) and drill a 2.8 mm (0.11 in.) dia. hole in ring nut (12). Minimum distance between new and existing hole 10 mm (0.4 in.).
4 Install ring nut (12).
5 TORQUE ring nut (12) to 9.8 m.daN (72.4 lbf.ft.) using wrench from tool set P/N 98A27407508001 and safety with cotter pin (13).
R (b)Position washer (6) on bearing journal and install actuator hinge
R arm (8) (Ref. 55-16-36, P. Block 401).
(c)Install end cap (4) so that dowel in bearing journal of trim actuator nut (7) locates in hole of end cap (4).
(d)Install tabwasher (3) and bolt (2).
(e)TORQUE bolt (2) to between 2.28 and 2.52 m.daN (16.9 and 18.7 lbf. ft.) and safety with tab washer (3).
(2)Install RH spherical bearing (5) (floating bearing) as follows:
(a)Install spherical bearing (5) and washer (6) to bearing journal of trim actuator nut (7).
(b)Install end cap (4) so that dowel in bearing journal of trim actuator nut (7) locates in hole of end cap (4).
(c)Install tabwasher (3) and bolt (2).
(d)TORQUE bolt (2) to between 2.28 and 2.52 m.daN (16.9 and 18.7 lbf.ft.) and safety with tab washer (3).
(e)Install actuator hinge arm (1) (Ref. 55-16-36, P. Block 401).

(3)Remove locking tool P/N 97A27302009000 on pitch trim control wheel in flight compartment.
(4)Remove 0° location tool P/N 0U190358 and fixing screw P/N 0U190359 between THS actuator and screwshaft nut.
(5)Remove rigging pin P/N 0U190360 from THS actuator input lever.
R (6)Remove horizontal stabilizer fixture strut P/N 98A27407514004.
(7)Remove fuselage tail section floor panel P/N 98A53207606000.
(8)Remove warning notices in flight compartment prohibiting operation of pitch controls.
(9)Remove safety clips and tags, and close circuit breakers 306CC1, 309CC1, 305CC1, 305CC2, 309CC2, 306CC2, 1CB and 2CB.
(10)Make certain that travel ranges of all flight control surfaces are clear of obstruction.

E. Test
(1)Carry out functional test of trimmable horizontal stabilizer (Ref. 27-41-00, P. Block 501).

F. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)Close access door 312AR.
(3)Remove access platform.
(4)De-energize the aircraft electrical network (Ref. 25-41-00, P. Block 301) and disconnect electrical ground power unit.

THS ACTUATOR LOWER CLAW STOP - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

A. Replacement of degraded lower claw stop

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.5 m (18 ft.)
B.	Warning Notices
C.	Circuit Breaker Safety Clips
D.	Cotter Pin
E. Material No. 04-015	Common Greases (Ref. 20-31-00)

3. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Display warning notice in flight compartment prohibiting operation of pitch controls.
(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	FAC 1/28 V DC	306CC1	103/G 3
21VU	FAC 1/115 V AC	309CC1	103/G 5
21VU	FAC 1/26 V AC	305CC1	103/G 7
21VU	FAC 2/26 V AC	305CC2	103/G 8
21VU	FAC 2/115 V AC	309CC2	103/G10
21VU	FAC 2/28 V DC	306CC2	103/G12
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64

(4)Display warning notice, prohibiting repressurization of hydraulic systems.
(5)Open access door 312AR.

B. Removal (Ref. Fig. 401)
(1)Removal of THS actuator lower claw stop.
(a)Remove and discard cotter pin (1).

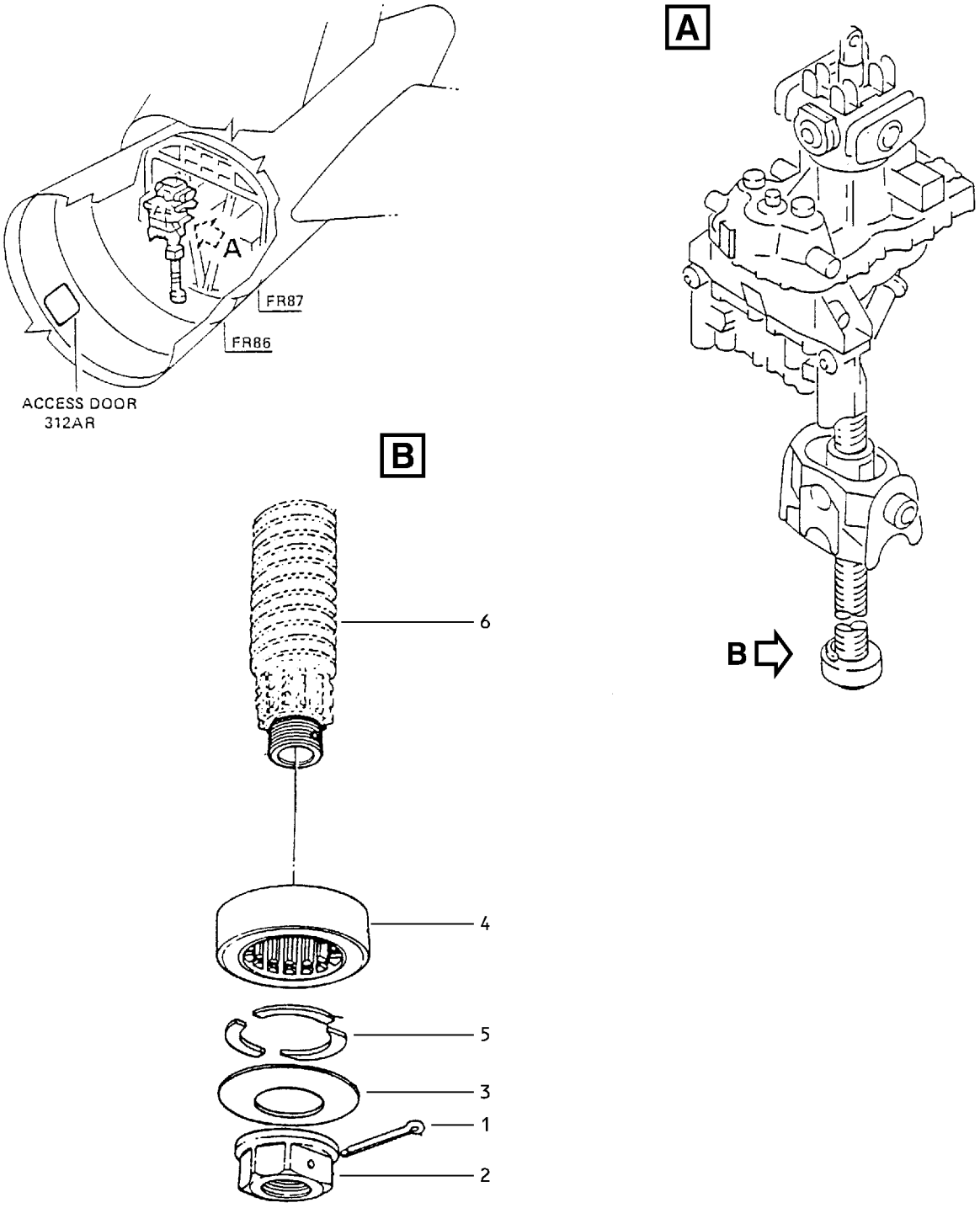
CAUTION : CHECK THERE IS A MARK FOR CORRECTLY LOCATING ELASTIC CLAW STOP (4) ON THE SCREW (6). IF THERE IS NO MARK, MAKE ONE BEFORE DISASSEMBLY, TO ENABLE CORRECT POSITIONING ON RE-INSTALLATION.

(b)Mark position on screw (6).
(c)Remove nut (2) ,spring tension washer (3) and claw stop (4).
(d)Remove the three components forming stop washer (5) from claw stop (4).

D. Installation (Ref. Fig. 401)
(1)Installation of THS actuator lower claw stop.
(a)Position the three components forming stop washer (5) in the related groove in claw stop (4).
(b)Position claw stop washer assambly to screw (6) and engage the latter in the splines.

NOTE : Claw stop must be positioned on screw (6) as marked on removal.

(c)Introduce the claw stop stop washer assembly to screw (6) until it bottoms on the flange of screw (6) and check that the dogs engage correctly.
(d)Install spring tension washer (3) and nut (2).



THS Actuator lower Claw Stop
Figure 401

NOTE : Spring tension washer must be installed with its convex side towards nut (2).

(e) TOURQE nut (2) to between 7 and 8 m.daN (51.6 and 59 lbf.ft) aligning cotter pin hole.
(f) Install new cotter pin (1) and bend the prongs in anchor fashion.

E. Close-Up
(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2) Close access door 312AR.
(3) Remove warning notices.
(4) Remove access platform.

CONTROL SURFACE POSITION INDICATING (THS)
DESCRIPTION AND OPERATION

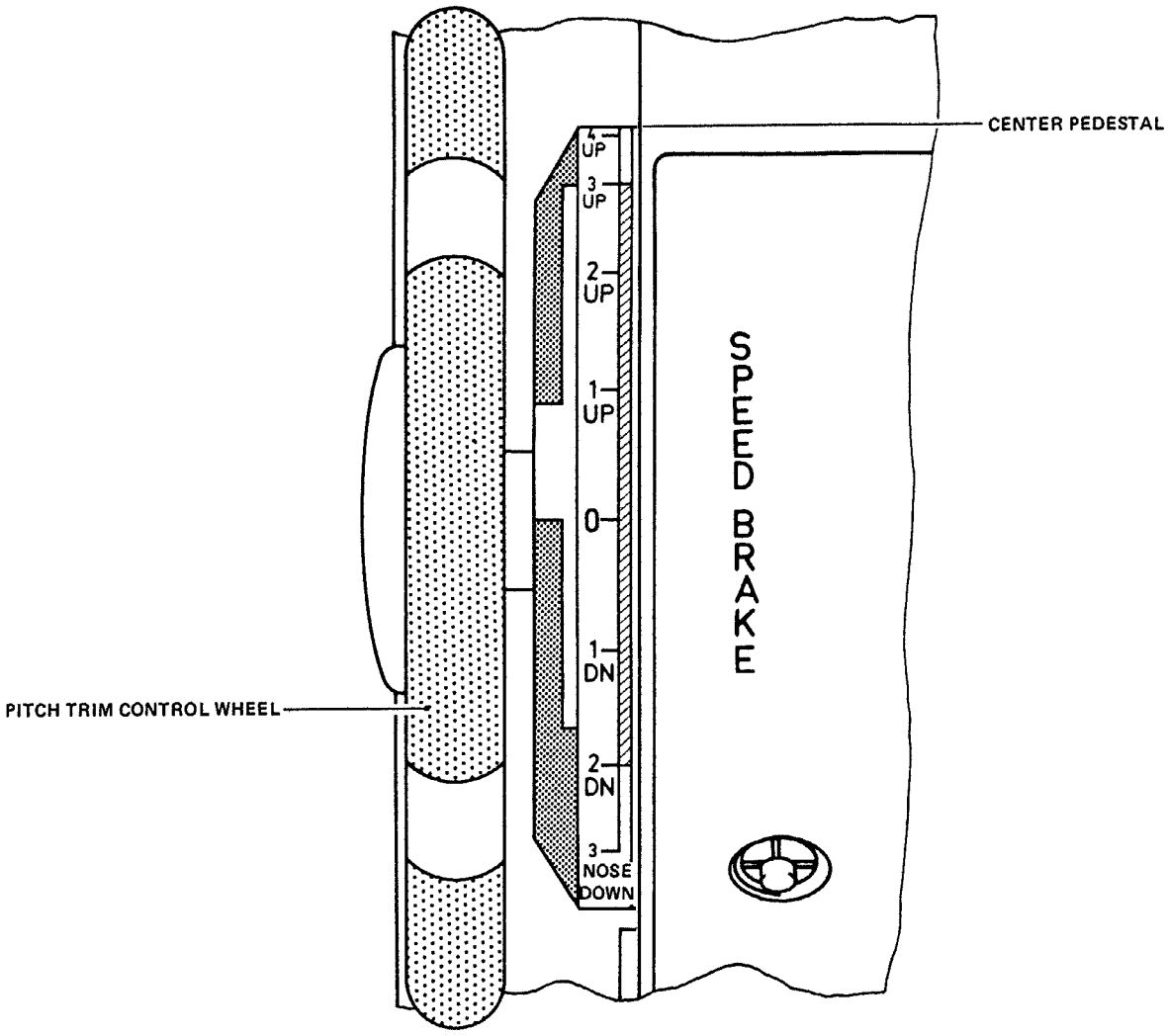
1. General

(Ref. Fig. 001, 002)

On the center pedestal, adjacent to each pitch trim control wheel, trimmable horizontal stabilizer position is indicated by an index on a scale which is painted green over the normal takeoff range (2° aircraft **NOSE DN** to 3° aircraft **NOSE UP**).

THS position is repeated on the right **ECAM** display unit, together with the hydraulic systems still available for the actuator (Ref. 27-15).

There is a special reference mark painted on the **THS** and on the adjacent structure.



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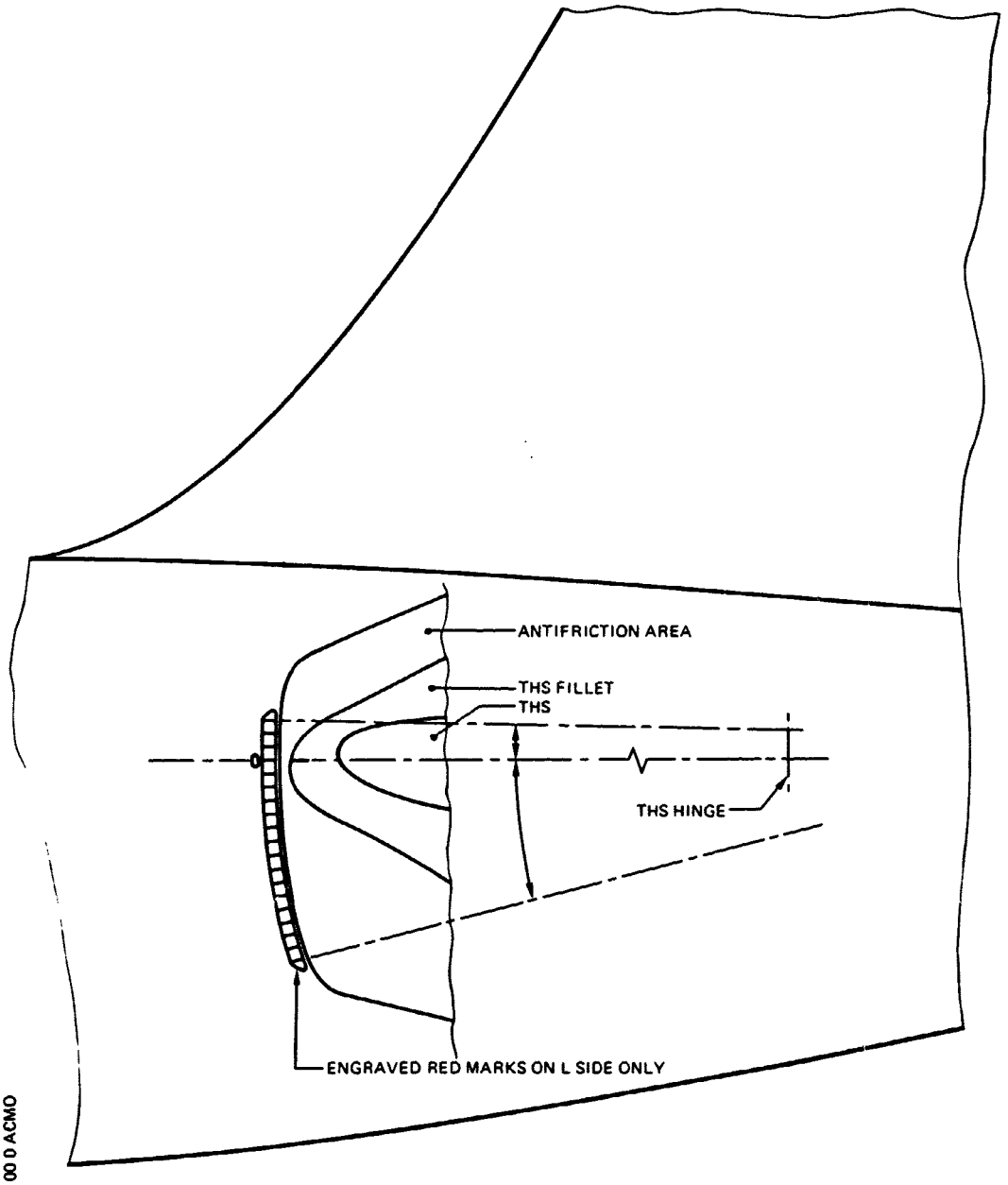
Center Pedestal - THS Position Indicating
Figure 001



Special Reference Marks
Figure 002

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

CAUTION : IF GREEN HYDRAULIC SYSTEM IS PRESSURIZED BY MEANS OF GREEN ELECTRIC PUMPS, THS DEFLECTION SPEED MUST NOT EXCEED 0.5 DEG/S.

1. Adjustment of Position Sensor with Zeroing Equipment

A. Reason for the Job
(1)Adjustment of THS position sensor 11CT

B. Equipment and Materials

ITEM	DESIGNATION
(1)31-590-100	Zeroing Equipment - Synchro - Resolvers Synchro - Transmitter and Wiring
(2)97A27302009000	Locking Equipment - Pitch Trim Control Wheel
(3)	Double Sided Adhesive Tape
(4)	Clinometer
(5)0U190360	Rigging Pin - THS Actuator Mechanical Input Lever
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-00-00, P. Block 501	General
- 27-45-11, P. Block 401	THS Position Sensor 11CT
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power

C. Procedure
(1)Job set-up
(a)Energizethe aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Pressurize Green and Yellow hydraulic systems either :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU
- make certain that G and Y pushbutton switches are pressed and legends off.

(d)Place pitch trim control wheel in zero position and install rigging pin OU190360 into the rigging hole of THS actuator mechanical input lever.

(e)Install pitch trim control wheel locking equipment 97A27302009000.

(f)Make certain that flap and slat control lever is in first notch position.

(g)Make certain that SPEEDBRAKE control lever is in the RET position, ground spoiler function not selected.

(h)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27
133VU	FLT CTL/AIL/TRIM	3CG	331/V63

(j)Position access platforms

(k)Make certain that selector switch of zeroing equipment 31-590-100 is in STANDBY position and that sensitivity selector is in 0 position.

(l)Supply zeroing equipment with 28VDC

(m)Open access door 312AR

(n)Remove connector 11CT-A from position sensor and connect sensor to zeroing equipment with the zeroing equipment harness.

D. Adjustement

(1)Adjustment of THS position sensor 11CT

(a)Place control switch of zeroing equipment 31-590-100 in ON position - AIRCRAFT/28VDC and INT/26V 400 Hz indicator lights come on

(b)Place selector switch in THS POS TRANS position

(c)Set sensitivity selector to the 30° position

(d)Cut and remove lockwire, loosen nuts and disengage washers. Adjust length of rod so that galvanometer pointer reads zero.

(e)Successively, increase sensitivity by placing selector in the 15°, 3° and 15' position and for each of these positions obtain final setting of sensor zero by adjusting length of rod. At end of adjustment, pointer must deflect within a ± 15' range.

(f)Engage washers and tighten nuts. Check that adjustment range value is still equal to ±15'. Wirelock.

(g)Set sensitivity selector to zero and selector switch in the STANDBY position.

(h)Place control switch in OFF position.

(j)Disconnect zeroing equipment harness connector from sensor and connect connector 11CT-A.

(2)Mechanical adjustment of THS position sensor 11CT

(a)Remove rigging pin OU190360 and locking equipment 97A27302009000.

(b)Perform THS T.O. CONFIG warning test (Ref. 27-00-00, P. Block 501).

(c)If you do not get the warning activation, replace the THS position sensor 11CT (Ref. 27-45-11, P. Block 401).

E. Close-up
(1)Switch off power supply to zeroing equipment 31-590-100.
(2)Close circuit breakers 1CG, 3CG and 1CT.
(3)Remove all rigging pins and locking equipment.
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(5)Close access doors
(6)Remove safety barriers and access platforms.
(7)Depressurize hydraulic system.If applicable disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(8)De-energize the aircraft electrical network. (Ref. 24-41-00, P. Block 301).

2. Adjustment of Position Sensor without Zeroing Equipment

A. Reason for the Job
Adjustment of THS position sensor 11CT

B. Equipment and Materials

ITEM	DESIGNATION
(1)97A27302009000	Locking Equipment - Pitch Trim Control Wheel
(2)	Digital Voltmeter
(3)	Double Sided Adhesive Tape
(4)	Clinometer
(5)0U190360	Rigging Pin - THS Actuator Mechanical Input Lever
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
R - 27-00-00, P. Block 501	General
- 27-45-11, P. Block 501	THS Position Sensor 11CT
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power

C. Procedure
(1)Job set-up
(a)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks are ventilated.
(b)Pressurize Green and Yellow hydraulic systems either :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
(c)On SERVO CTL section of panel 428VU
- make certain that G and Y pushbutton switches are pressed and legends off.
(d)Place pitch trim control wheel in zero position and lock with locking equipment 97A27302009000.
(e)Make certain that flap and slat control lever is in first notch position.
(f)Make certain that SPEEDBRAKE control lever is in the RET position, ground spoiler function not selected.
(g)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	RUD/TRIM/SLOW	1CG	201/J27
133VU	FLT CTL/AIL/TRIM	3CG	331/V63

(h)Position access platform.
(j)Open access door 312AR.

D. Adjustment

(1)Adjustment of THS position sensor 11CT

NOTE : Before connecting or disconnecting System Data Analog Converter 1WV, rack 90VU, open circuit breaker 1CT.

(a)Loosen attaching device and slowly turn sensor body to set STAB pointer on ECAM scale to zero.

(b)Immobilize sensor by tightening attaching device.

(c)Remove System Data Analog Converter 1WV, rack 90VU.

(d)Using a 15VAC voltmeter (1/100 reading, measure voltage across contacts of connectors at rear of rack.

SENSOR	CONNECTOR	VAC.A	VAC.B
11CT	AE	9E and 9F	9D and 9F

(e)When VAC.A = VAC.B with a difference ≤ 6/100VAC, sensor is considered as adjusted.
If necessary, adjust position sensor as follows :
- loosen screw securing sensor
- gradually turn sensor until VAC.A = VAC.B with a difference ≤ 6/100VAC
- tighten screw securing sensor
- repeat test to check values.

(f)Connect System Data Analog Converter 1WV, rack 90VU.

(g)Carry out functional test (Ref. Para.3).

(h)To avoid incorrect pick off installation (180°), a check of the adjustment using equipment 31-590-100 must be done at next A-check (Ref. Para. 1).

(2)Mechanical adjustment of THS position sensor 11CT

(a)Remove rigging pin 0U190360 and locking equipment 97A27302009000.

(b)Perform THS T.O. CONFIG warning test (Ref. 27-00-00, P. Block 501).

R (c)If you do not get the warning activation, replace THS position sensor 11CT (Ref. 27-45-11, P. Block 401).

E. Close-Up

(1)Remove all rigging pins and locking equipment.

(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3)Close access door.

(4)Remove safety barriers and access platform.

(5)Depressurize hydraulic system and, if applicable, disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).

(6)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

3. Operational/Functional Test

A. Reason for the Job
(1)On R ECAM display unit, check that bug on FLT CTL page, STAB scale operates correctly with respect to THS position.

B. Equipment and materials :

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power

C. Procedure
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
(1)Job set-up
(a)Initial conditions
- correct electrical power supply,
- forward services ventilation system in operation,
- overhead and rear panel circuit breakers closed, particularly those associated with FLT CTL,
- aircraft in ground configuration (LDG GEAR PROX DET & RELAYS circuit breakers closed),
- hydraulic power supply on (either Green and Yellow Auxiliary Power (Ref. 29-21-00 and 29-23-00, P. Block 301) or Main Hydraulic Power (Ref. 29-10-00, P. Block 301).
- on SERVO CTL section of panel 428VU, all pushbutton switches pressed and legends off.
- flap and slat control lever in first notch position,
- SPEEDBRAKE control lever in RET position, ground spoiler function not preselected.

(b)On panel 11VU, on ECAM control panel.
- press pushbutton switch F/CTL so that FLT CTL page on right ECAM display unit appears.

D. Test

ACTION	RESULT
1. Place pitch trim control wheel in full nose up position	On right ECAM display unit, on FLT CTL page, bug on STAB scale moves to NOSE UP
2. Return pitch trim control wheel to zero	On right ECAM display unit, on FLT CTL page, bug on STAB scale returns to zero

ACTION	RESULT
3. Place pitch trim control wheel in full nose down position	On right ECAM display unit, bug moves to DN
4. Return pitch trim control wheel to zero	On right ECAM display unit, bug returns to zero
5. Operational Test of THS Take Off Config. Test (Ref. 27-00-00, P. Block 501).	

E. Close-up
(1) Depressurize hydraulic systems. If applicable disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(2) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

TRIMMABLE HORIZONTAL STABILIZER POSITION SENSOR 11CT
REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES, INCLUDING WHEEL CHOCKS, ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 6 m (20 ft.)
B. 0U190360	Rigging Pin - THS Actuator Mechanical Input Lever
C. 97A27302009000	Locking Tool- Pitch Trim Control Wheel
D. 31-590-100	Zeroing Equipment - Synchro-Resolvers, Synchro-Transmitters and Wiring
E.	Torque Wrench, up to 0.56 m.daN (50.0 lbf.in.)
F.	Electrical Connector Blanking Caps
G.	Warning Notice
H.	Circuit Breaker Safety Clips
J.	Corrosion-Resistant Steel Lockwire, 0.5 mm (0.02 in.) dia.
K. Material No. 05-002	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-33-00, P. Block 501	Artificial Feel (Elevator)
- 27-45-00, P. Block 501	Control Surface Position Indicating (THS)

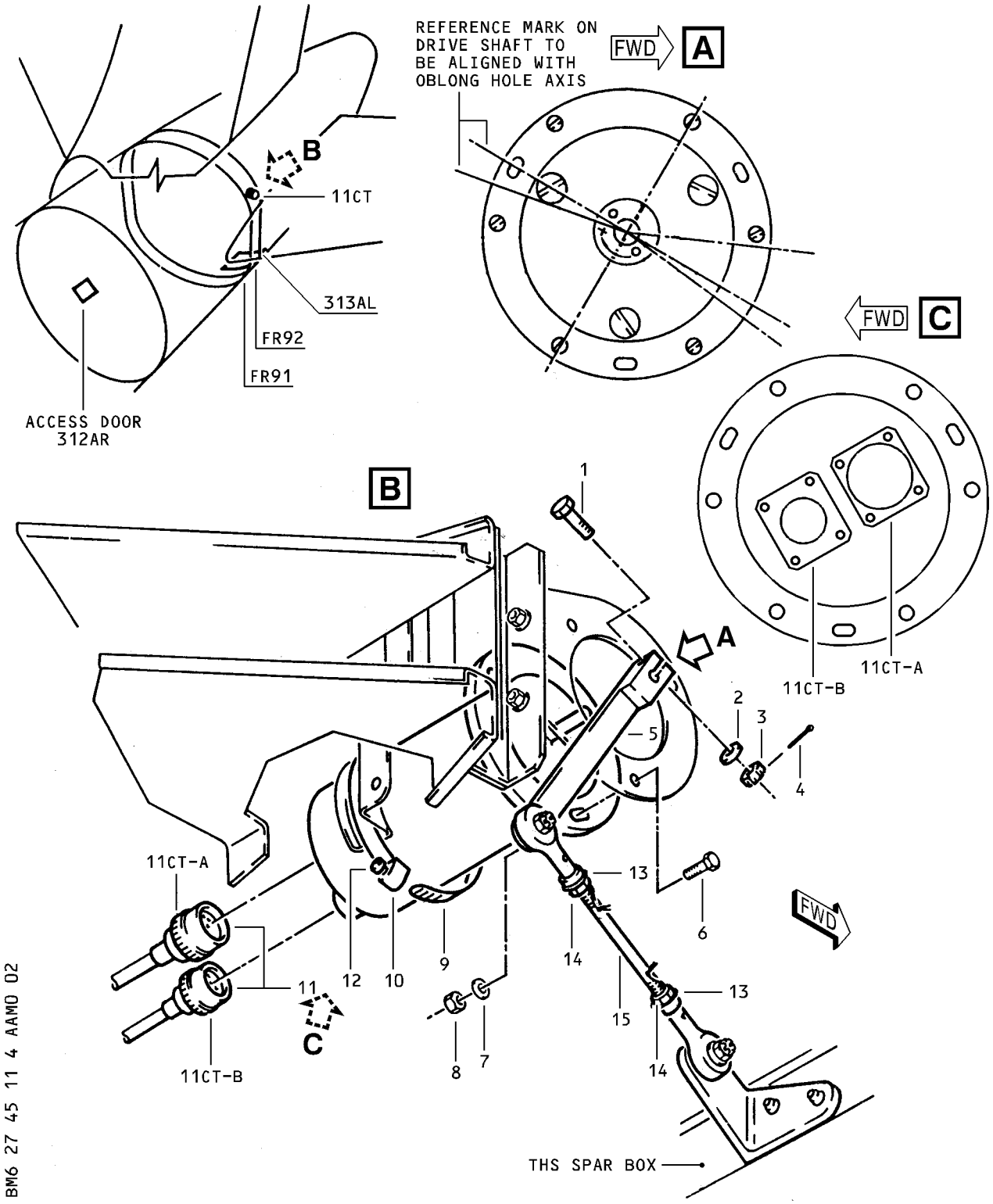
2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Make certain that trimmable horizontal stabilizer (THS) is set at zero.
(3)Open access door 312AR and install rigging pin P/N 0U190360 in THS actuator mechanical input.
(4)Install locking tool P/N 97A27302009000 on pitch trim control wheel in flight compartment.
(5)Display warning notice in flight compartment, prohibiting operation of flight controls.
(6)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SERVO CTL & THS/HYD SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM DET	2CB	332/U64
133VU	FLT CTL/SURF POS	1CT	334/S61

(7)Open access door 313AL.

B. Removal (Ref. Fig. 401)
(1)Disconnect electrical connectors (11) and install blanking caps.
(2)Cut and remove lockwire, and remove screw (12) and clamp (9).
(3)Remove cotter pin (4), nut (3), washer (2) and bolt (1).
(4)Remove nuts (8), washers (7), bolts (6) and THS position sensor (10).
(5)Temporarily attach lever (5) and pushrod (15) to nearby THS spar box.



Trimmable Horizontal Stabilizer Position Sensor
Figure 401

R

C. Installation with Zeroing Equipment (Ref. Fig. 401)

(1)Position THS position sensor (10) on its mounting, so that small connector 11CTB is under and forward of large connector 11CTA.

NOTE : Make certain that the position sensor is in the correct position to obtain correct output signals in respect to the THS positions.

(2)Install clamp (9) but do not fully tighten screw (12).

(3)Make certain that reference mark on end of THS position sensor drive shaft is aligned with oblong hole axis. If required, pre-adjust as follows:

(a)Install lever (5) on drive shaft with bolt (1), washer (2) and nut (3). Tighten nut (3) but do not safety.

(b)Install zeroing equipment P/N 31-590-100 and connect zeroing equipment harness to THS position sensor connector 11CTA.

(c)On zeroing equipment:

- Make certain that selector switch is in STANDBY position.
- Make certain that sensitivity selector is in 0 position.
- Supply 28 V DC.
- Set Control switch to ON:
  - AIRCRAFT/28 V DC and INT/26V, 400 Hz indicator lights come on.
- Set selector switch to THS POS TRANS position.
- Set sensitivity selector in 30- position.

CAUTION : GENTLY ROTATE BODY OF THS POSITION SENSOR. USE OF EXCESSIVE FORCE WILL CAUSE BREAKAGE OF THE STOP PIN ON THE DRIVE SHAFT.

(d)Rotate body of THS position sensor (10) until galvanometer pointer is near to zero. Do not finally adjust at this stage.

(e)Remove nut (3), washer (2), bolt (1) and lever (5).

NOTE : Reference mark on end of THS position sensor drive shaft must be aligned with oblong hole axis.

(4)Slightly rotate body of THS position sensor (10) to install bolts (6), washers (7) and nuts (8). Tighten nuts (8).

(5)Install lever (5) on drive shaft with bolt (1), washer (2) and nut (3).

(6)TORQUE nut (3) to between 0.33 and 0.37 m.daN (29.2 and 32.7 lbf.in.) and safety with cotter pin (4).

(7)Tighten clamp (9) with screw (12) and safety with lockwire.

(8)Using zeroing equipment, finally adjust position sensor 11CT, by adjusting length of rod (15) locked by nuts (14) and lockwashers (13) (Ref. 27-45-00, P. Block 501).

(9)Make certain that threads of rod (15) are visible through inspection holes in rod ends and apply corrosion-preventive paste (Mat. No. 05-002) to rod threads.

(10)Disconnect harness from THS position sensor connector 11CTA and remove zeroing equipment P/N 31-590-100.

(11)Remove protective caps and connect electrical connectors 11CT-A and 11CT-B.

(12)Remove safety clips and tags, and close circuit breakers 1CT, 1CB and 2CB.

(13)Remove locking tool P/N 97A27302009000 and rigging pin P/N 0U190360.

D. Installation without Zeroing Equipment (Ref. Fig. 401)

(1)Position THS position sensor (10) on its mounting, so that small
R connector 11CTB is under and forward of large connector 11CTA.
NOTE : Make certain that the position sensor is in the correct position to obtain correct output signals in respect to the THS positions

(2)Install clamp (9) but do not fully tighten screw (12).

(3)Make certain that reference mark on end of THS position sensor drive shaft is aligned with oblong hole axis.

(4)Install lever (5) on drive shaft with bolt (1), washer (2) and nut (3). Tighten nut (3) but do not safety.

(5)Adjust THS position sensor 11CT (Ref. 27-45-00, P. Block 501).

(6)TORQUE nut (3) to between 0.33 and 0.37 m.daN (29.2 and 32.7 lbf.in.) and safety with cotter pin(4).

(7)Tighten clamp (9) with screw (12) and safety with lockwire.

(8)Make certain that threads of rod (15) are visible through inspection holes in rod ends and apply corrosion-preventive paste (Mat. No. 05-002) to rod threads.

(9)Remove safety clips and tags, and close circuit breakers 1CT, 1CB and 2CB.

(10)Remove locking tool P/N 97A27302009000 and rigging pin P/N 0U190360.

E. Test

(1)Carry out functional test of THS position sensor (Ref. 27-45-00, P. Block 501).

(2)Carry out functional test of artificial feel (Ref. 27-33-00, P. Block 501).

F. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Close access doors 313AL and 312AR.

(3)Remove warning notice.

(4)Remove access platform.

TRIM ROTATION WARNING - DESCRIPTION AND OPERATION

1. General

THS motion, when the manual electric trim control lasts longer than one second, is indicated aurally by a "whooler"
No aural warning is provided for the other THS control modes.

THS out of the normal takeoff setting range is indicated at takeoff by :
On CAPT and F/O main instrument panels 3VU and 5VU
- MASTER WARN lights flashing
- Repetitive chime aural warning
- Wording PITCH TRIM NOT IN TAKE OFF RANGE on left ECAM display unit.

Any disengagement of electric trim is indicated by :
On CAPT and F/O main instrument panels 3VU and 5VU
- MASTER CAUTION lights flashing
- Single chime aural warning
- Wording on left ECAM display unit, which depends on the failure case (Ref. Chap. 22).

PITCH TRIM ROTATION DETECTOR (1CD) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

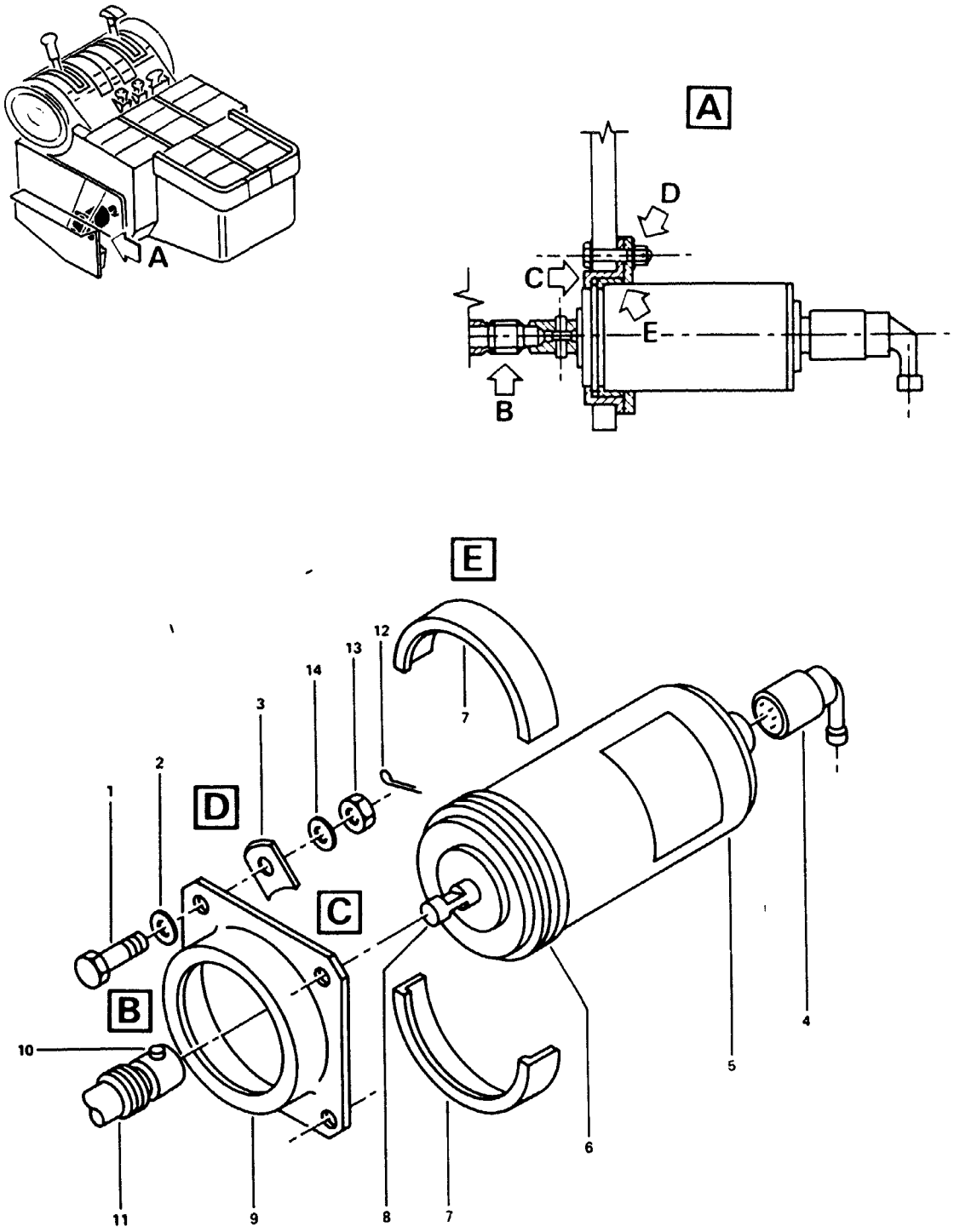
ITEM	DESIGNATION
A. 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
B.	Circuit Breaker Safety Clips
C.	Blanking Caps
D.	Warning Notices.
E. Material No. 04-004	Common Greases (Ref. 20-31-00)
F. Material No. 08-002	Bonding and Adhesive Compounds (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power

2. Procedure

A. Job Set-Up
(1)Open access door 121BL
(2)Make certain that pitch trim control wheels are in zero position. Lock control wheels in this position with equipment 97A27302009000.
(3)Display warning notice prohibiting operation of mechanical controls.
(4)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
21VU	PITCH/TRIM/AURAL/WARN	3CD	101/J06

B. Removal
(Ref. Fig. 401)
(1)On detector (5) installed at lower section of center pedestal second rib
- remove electrical plug (4), cap plug and receptacle.
(2)On bellows drive (11)
- by means of an Allen wrench, loosen the two locking socket screws (10) in order to remove shaft (8) from drive (11) at the end of removal



Pitch Trim Rotation Detector
Figure 401

procedure.
(3)On center pedestal
- remove and discard the four cotter pins (12) remove and retain the four nuts (13), the four washers (14).
- remove and retain the four mounting screws (1), washers (2) and clamps (3).
- remove detector (5) taking care not to damage bellows drive (11).
(4)On detector (5)
- remove and retain support (9) from detector.
- remove and retain the two half shells (7).

C. Preparation of Replacement Component
(1)On detector
- make certain that unit is clean, free of dents or corrosion.
(2)Clean and inspect component interface and adjacent area.
NOTE : Lubricate nuts, screws and parts with Material No. 04-004.

D. Installation
(1)On detector (5)
- install the two shells (7) in groove (6).
- slide the detector fitted with its half shells (7) into support cover (9).
(2)On center pedestal rib
- install detector assembly, inserting shaft (8) into bellows drive (11).
- install the four screws (1) fitted with their washers (2) and clamps (3).
- install the four washers (14), the four nuts (13), tighten slightly making certain that clamps (3) are in correct position.
(3)On bellows drive (11)
- by means of an Allen wrench, tighten the two locking socket screws (10), making certain that the two screws rest on flat of shaft (8).
- safety screws (10) with Material No. 08-002.
(4)On detector (5)
- install detector in such a way that electrical plug (4) can be fitted properly.
- tighten screws (13) and safety with cotter pins (12).
(5)On center pedestal
- remove warning notice prohibiting operation of mechanical controls.
- remove locking equipment from pitch trim control wheels.
(6)On panel 21VU
- remove safety clip and tag and close circuit breaker 3 CD.

E. Test
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEMS UNDER MAINTENANCE HAVE BEEN ISOLATED.
(1)Job set-up
(a)Initial conditions
R - connect electrical power supply (Ref. 24-41-00, P. Block 301)

- forward services ventilation system in operation
- hydraulic power available (GREEN) (Ref. 29-10-00, P. Block 301)
  NOTE : As an alternative, it is possible to pressurize hydraulic systems using Green system electric pumps (Ref. 29-21-00, P. Block 301).
- overhead panel circuit breakers closed, particularly those associated with AFS and ADS
- aircraft on ground (L/G PROX DET & RELAYS SYS1 and SYS2 circuit breakers on panel 133VU closed)
- ADS operating
- AP not engaged
- pitch trim control wheel in neutral position.

(b)Test.

ACTION	RESULT
1. On overhead panel - place PITCH TRIM 1 lever in ON position	Lever remains in engaged position.
2. On Captain (First Officier) control wheel - place pitch trim control switch in nose down direction then in nose up direction (without reaching limits)	On center pedestal - Pitch trim control wheel rotates in nose down direction then in nose up direction. - After 1s WHOOLER aural warning sounds during pitch trim control wheel rotation.
3. Rotate pitch trim control wheel manually to neutral position	WHOOLER aural warning does not sound. PITCH TRIM 1 lever returns to OFF position.

F. Close-Up.

(1)Shut down and disconnect hydraulic ground power cart. (Ref. 29-10-00, P. Block 301)

(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301)

(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment

(4)Close access door.

AURAL WARNING BOX (2CD) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
B.	Circuit Breaker Safety Clips
C.	Blanking Caps
D. Material No. 04-004	Common Greases (Ref. 20-31-00)
Referenced Procedure - 27-46-15, P. Block 401	Pitch Trim Rotation Detector

2. Procedure

A. Job Set-Up
(1)Position warning notice prohibiting operation of mechanical controls.
(2)Open, safety and tag the following circuit breaker :

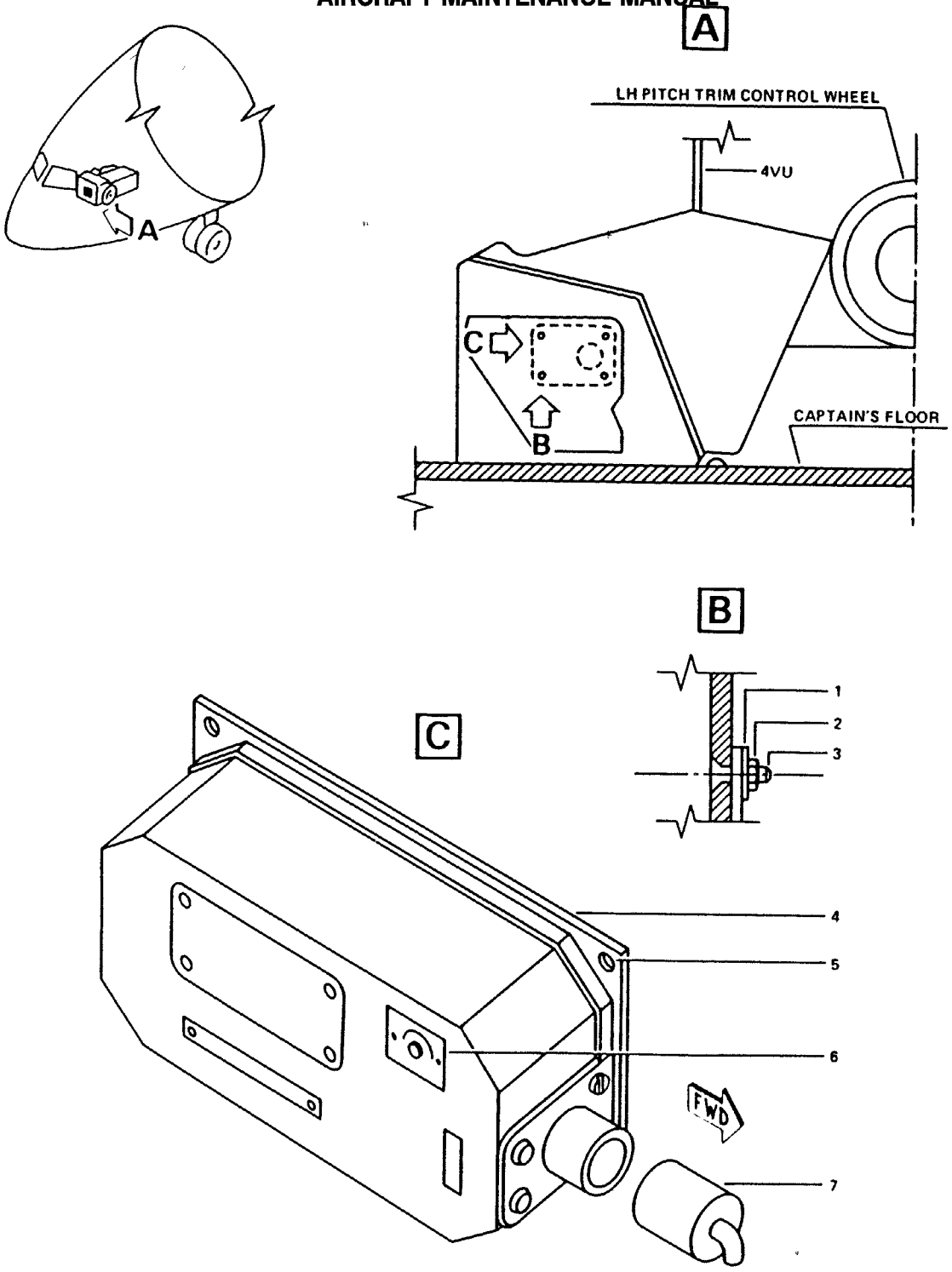
PANEL	SERVICE	IDENT.	LOCATION
21VU	PITCH/TRIM/AURAL/WARN	3CD	101/J06

B. Removal
(Ref. Fig. 401)
(1)On aural warning box (4), in zone 211, on left inner face of control pedestal :
- disconnect electrical connector (7) and cap plug and receptacle.
- loosen the four nuts (2), remove the four washers (1) and the four screws (3).

(2)Remove aural warning box

C. Preparation of Replacement Component.
(1)On new aural warnin box (4)
- Make certain that box is clean and free of scratches and corrosion.

(2)Clean and inspect component interface and adjacent area.



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Aural Warning Box
Figure 401

NOTE : Lubricate nuts, screws and parts with Material No. 04-004

D. Installation.
(1)On control pedestal mechanical section left lateral panel :
- install the four mounting screws (3) and maintain them in position.
(2)In zone 211 under control pedestal mechanical section
- position box (4), install screws (3) in mounting holes (5).
- install the four washers (1), the four nuts (2) and tighten nuts.
- remove blanking caps and install electrical connector (7).
(3)On control pedestal mechanical section :
- remove warning notice.

E. Test.
(1)Remove safety clip and tag and close circuit breaker 3CD
(2)Carry out pitch trim rotation detector test (Ref. 27-46-15, P. Block 401).
NOTE : It is possible to adjust warning sound level by adjusting potentiometer (6).

F. Close-Up.
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

1. General

The trailing edge flap control surfaces are electrically controlled and hydraulically actuated via a power transmission. They provide lift augmentation for take-off, approach and landing.

Lift augmentation is achieved on each wing by:
- one inner, double-element, trailing edge flap
- one outer, single-element, trailing edge flap,

working in conjunction with:
- three leading edge slats
- one Krueger flap
- the all-speed aileron which droops when the Krueger flaps are extended.

The trailing edge flaps are rearward moving Fowler types. Each inner flap comprises one main flap surface complete with a spring-loaded, retractable vane. Each outer flap is a single slotted type without a vane. The trailing edge flaps are supported by carriages which run on tracks; the inner flap on two tracks, the outer flap on three tracks. The tracks are curved at the rear end, causing an increase in the effective camber of the wing as the flaps are extended.

Each flap is driven by two screw jacks installed adjacent to the tracks.

NOTE : There is no screw jack installed adjacent to the center track of the outer flap.

2. Description

(Ref. Fig. 001)

A. Mechanical and Electrical Control (Ref. 27-51-00)

(1)The flap mechanical control system comprises:
- a slat/flap control lever located on the center pedestal
- a command sensor unit (CSU) located in the electronics bay.

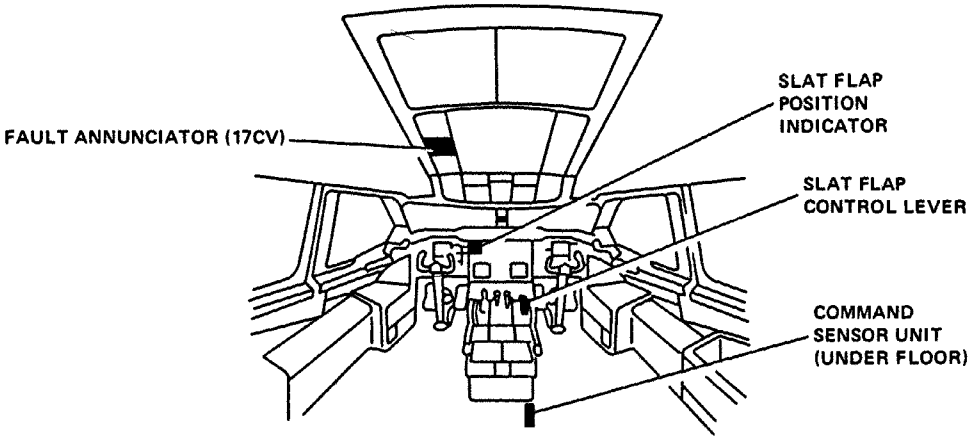
(2)The flap electrical control system comprises:
- two slat flap control computers (SFCC 1 and SFCC 2) located in the electronics bay
- a feedback position pick-off unit (feedback PPU) located on the power control unit (PCU) (Ref. Para. B)
- two valve blocks located on the PCU
- FLAPS SYS 1 FAULT and FLAPS SYS 2 FAULT annunciators (17CV) located on the overhead panel.

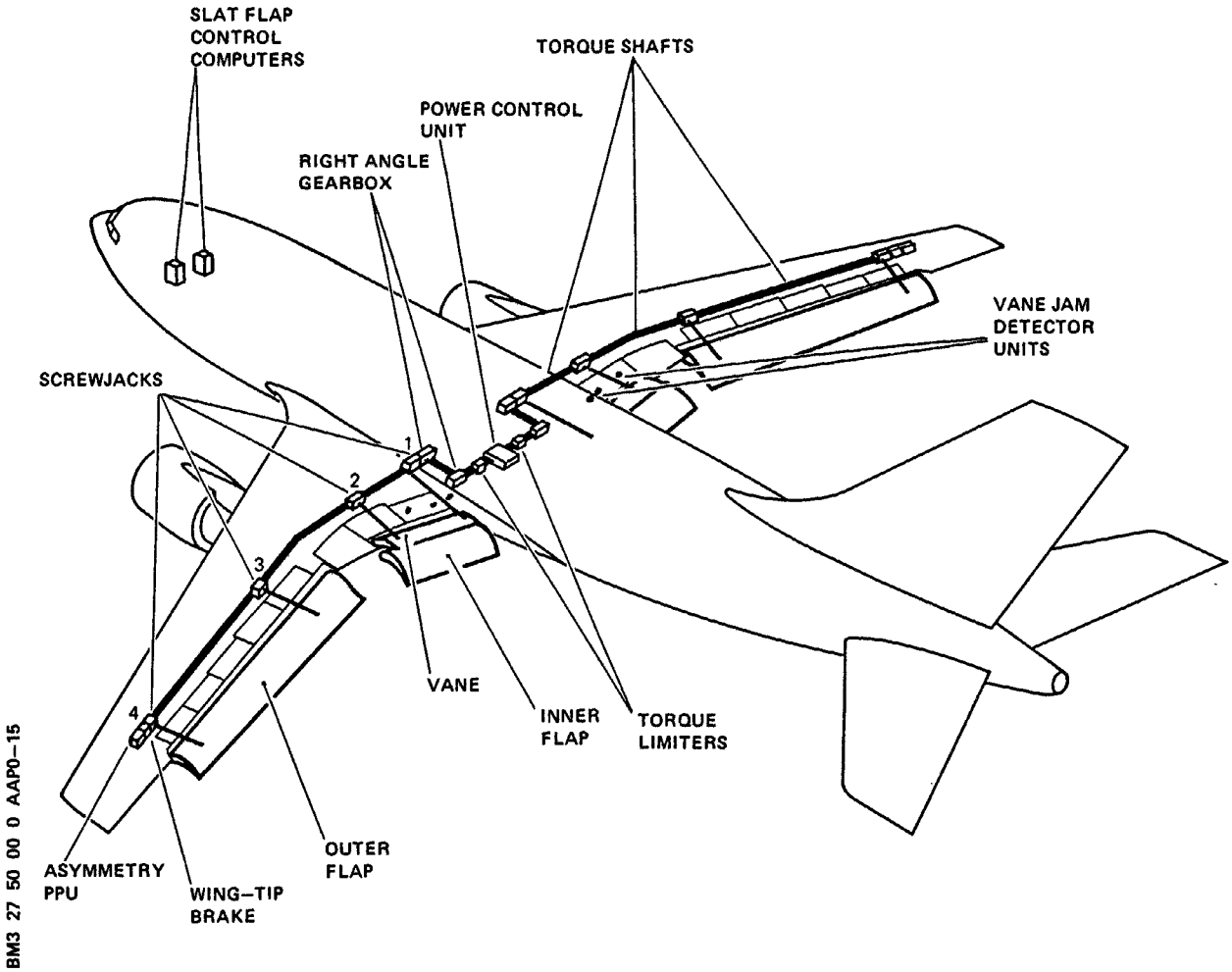
B. Hydraulic Actuation and Power Transmission (Ref. 27-54-00)

Hydraulic actuation and power transmission comprises a PCU, located in the hydraulic compartment, which is mechanically linked to the flaps by:
- torque shafts, torque limiters, right-angle gearboxes and joints
- screw jacks and flap track carriages which provide the final drive to the flap control surfaces.

C. Position Indicating (Ref. 27-55-00)

Position indicating is provided by:
- an instrumentation PPU, located on the PCU
- a slat/flap position indicator located on the center main instrument





System Components
Figure 001

panel.

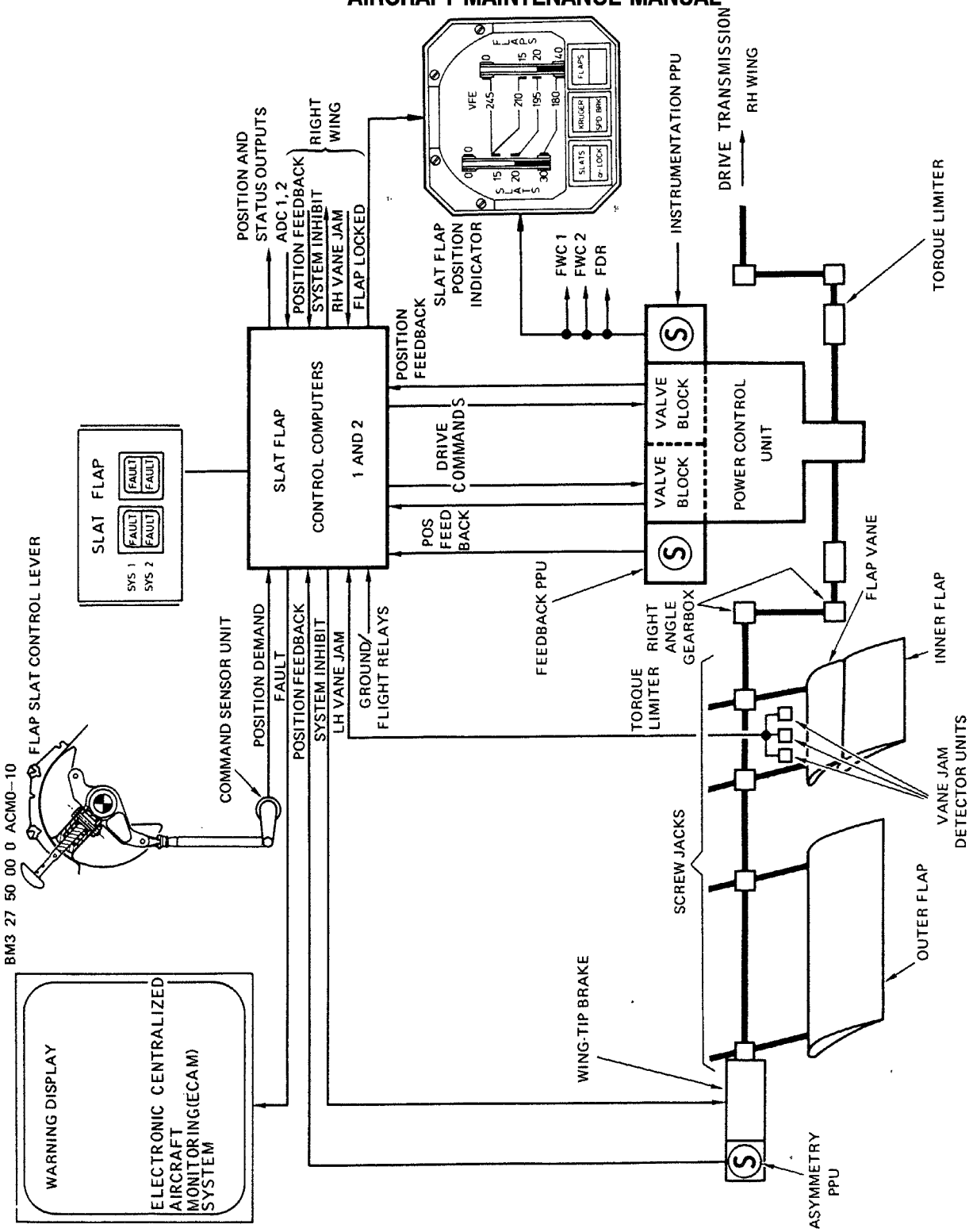
D. Asymmetry and Power Transmission Monitoring (Ref. 27-56-00)
Asymmetry and power transmission monitoring is achieved by:
- an asymmetry PPU, attached to a wing tip brake and located outboard of screw jack 4 in each wing
- vane jam detector units located in the inner flap shroud in each wing.

3. Operation
(Ref. Fig. 002)
(Ref. Fig. 003)

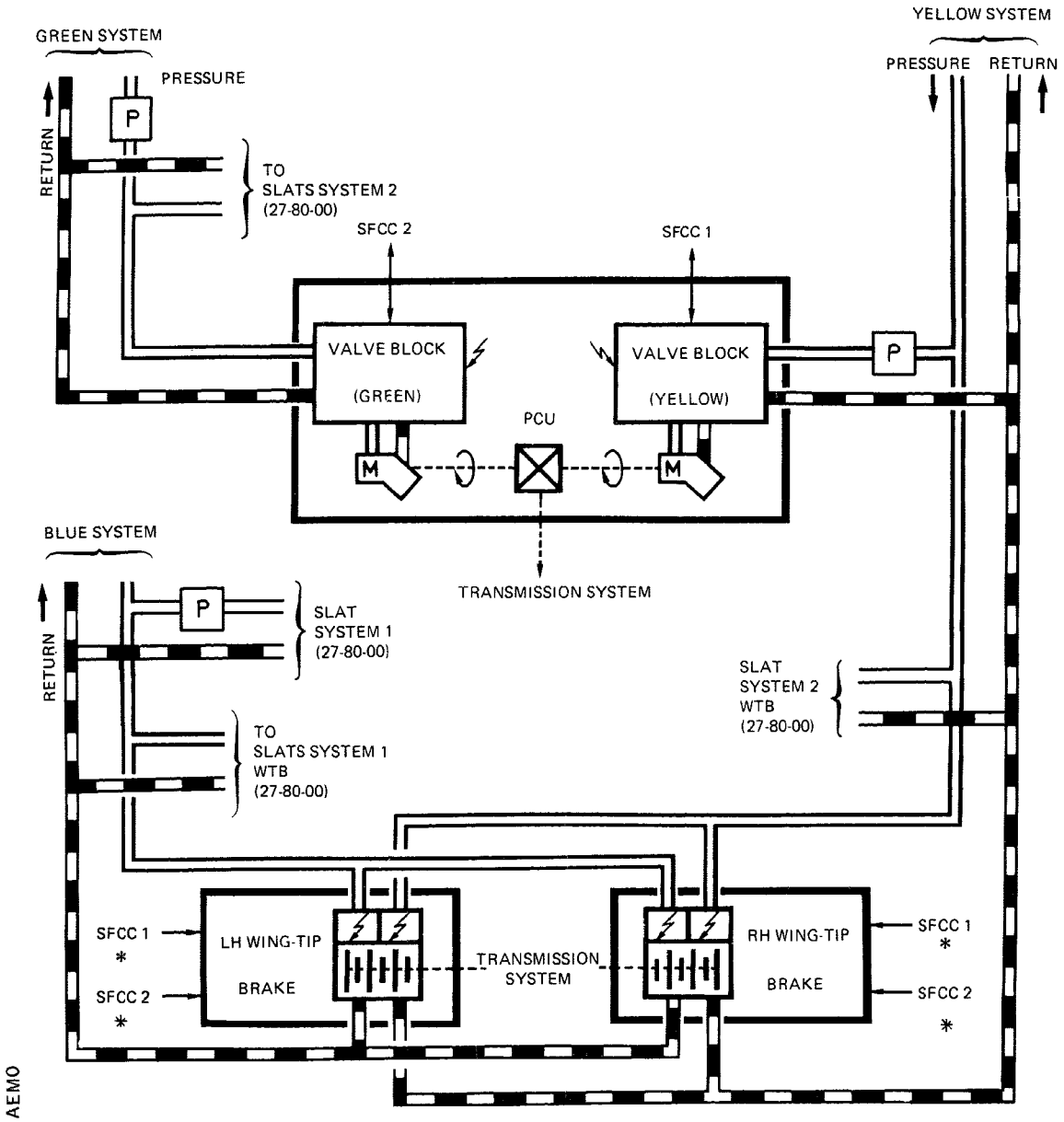
A. Mechanical and Electrical Control
(1)Mechanical control of the flaps is achieved by operation of the slat/flap control lever. Movement of the control lever is transmitted to the CSU which converts the lever position into electrical position demand signals.
(2)The electrical position demand signals are passed to SFCC 1 and SFCC 2 for comparison with feedback signals supplied by the feedback PPU and the PCU valve blocks.
(3)The SFCC generate appropriate drive command signals which are transmitted to the PCU valve blocks. The valve blocks initiate hydraulic actuation.
(4)Electrical control includes continuous and interruptive test facilities using the SFCC BITE circuits. The interruptive test routine is initiated using the SPLR ! SLATS/FLAPS selector. System status is indicated by the following:
- Electronic Centralized Aircraft Monitoring (ECAM) system (Warning CRT)
- FLAPS SYS 1 FAULT and FLAPS SYS 2 FAULT annunciators
- slat/flap position indicator
- SFCC front panel BITE display.
(5)An SFCC removed warning relay 91CV, system 1, (93CV system 2) receives DC power when the system is on and is energized through an internal link within the SFCC. If the SFCC is removed, the relay is de-energized and the appropriate system fault annunciator comes on.

B. Hydraulic Actuation and Power Transmission
(1)Hydraulic actuation is achieved by two hydraulic motors installed in the PCU. Each hydraulic motor is powered by a particular hydraulic system (YELLOW or GREEN). The valve blocks control the speed and direction of the hydraulic motors by regulating the supply of hydraulic fluid.
(2)The two hydraulic motors drive the transmission system via a differential gearbox, causing the flap control surfaces to move to the selected position.
(3)In the event of a single hydraulic failure, or failure of one SFCC, the transmission system will operate at approximately half the normal speed.

C. Position Indicating
(1)Flap position is indicated to the flight crew by the FLAPS vertical bar display on the slat/flap position indicator. The display is driven



Flap Drive - Schematic Diagram
Figure 002



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Hydraulic System - Schematic Diagram
Figure 003

by inputs from the instrumentation PPU which also provides independent flap position information to other systems.

(2)Flap position discretes and digital data are provided by the SFCC.

D. Asymmetry and Power Transmission Monitoring

(1)The asymmetry and feedback PPU enable the SFCC to monitor the transmission for asymmetry, runaway and overspeed conditions. The vane jam detector units enable the SFCC to monitor for inner flap vane jamming during flap extension and retraction.

(2)If an asymmetry, runaway or overspeed condition is detected, the wing tip brakes are applied and PCU operation is inhibited, preventing further movement of the transmission system. If jamming of the inner flap vane is detected, further movement towards the selected position is inhibited; drive in the reverse direction remains available.

4. Interfaces

(Ref. Fig. 004)

The flap drive system interfaces with the following systems:

A. Maintenance Indicator Resetting

The read and reset functions interface with the slat/flap maintenance indicators.

B. Rudder Artificial Feel

Feel and limitation computers 1 and 2 receive a flaps $\geq$ 20 deg. signal from the slat/flap control computers.

C. Ground Proximity Warning

The ground proximity warning computer (GPWC) receives a flaps $\geq$ 17 deg. or $\geq$ 30 deg. signal depending on ground proximity warning landing switch (23WZ) position.

D. Spoilers and Speedbrakes

Flap BITE control and indicators are shared with the spoiler test circuits.

E. Roll Control Function

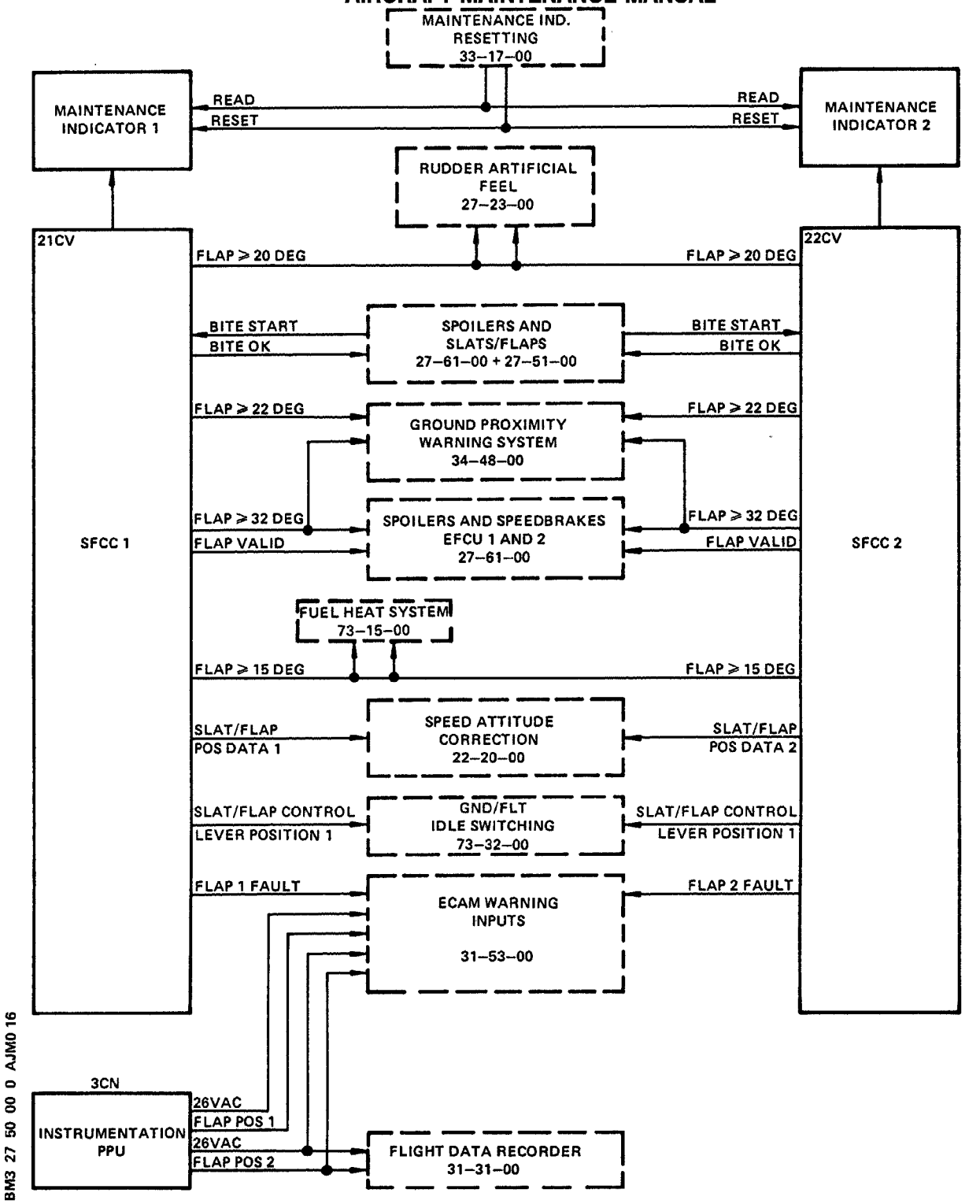
In order to change the roll control function in the electronic flight control units (EFCU) when the aircraft is in the landing configuration, a flap $\geq$ 30 deg. position discrete is provided from both SFCC1 and SFCC2. The EFCU also receive a discrete from SFCC1 and SFCC2 when the flaps are travelling between the 0 deg. and 20 deg. positions.

F. Speed Attitude Correction

Flight augmentation computers (FAC 1 and FAC 2) receive slat and flap position data from SFCC1 and SFCC2.

G. Electronic Centralized Aircraft Monitoring

Flight warning computers 1 and 2 receive status and position information from the slat/flap control computers, control switches and instrumentation PPU.



Interfaces - Block Diagram
Figure 004

H. Ground/Flight Idle Automatic Change-Over
A SLAT/FLAP control lever position discrete is provided from both SFCC 1 and SFCC 2. This discrete is used to override the Thrust Control Computer (TCC) for automatic change-over to "min idle" when the SLAT/FLAP control lever is in any position other than position 1.

J. Pitch Feel
Refer to 27-85-00.

K. Fuel Heat System
Fuel heat relay 23EE receives a flap ≥ 15 deg. signal from both SFCC1 and SFCC2.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Extension and Retraction of Flaps with Aircraft System

A. Reason for the Job

(1)Operation of flaps to extended or retracted position to gain access to components for maintenance.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Safety Barriers
(2)	Circuit Breaker Safety Clips and Tags

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power

C. Procedure

(1)Job Set-Up

(a)Position safety barriers.

(b)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(c)Make certain that electronics racks ventilation is correct.

(d)Pressurize GREEN hydraulic system (Ref. 29-21-00 or 29-10-00, P. Block 301).

NOTE : The flap system can be operated by the GREEN and/or YELLOW hydraulic system. If required use alternative hydraulic system.

(e)To avoid slat operation, open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/SLATS/SYS 1	9CV	335/R66

(f)Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/FLAPS/WTB 1	11CV	336/Q66
133VU	FLT CTL/FLAPS/WTB 2	12CV	336/Q67

(2)Positioning of Flaps to Gain Access for Maintenance

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.

NOTE : For some maintenance tasks it is necessary to stop the system in a position between 0° and 15° when the front and rear carriage rollers lie on the horizontal part of the flap track. Stop the hydraulic supply during movement of flaps when this position is reached.

(a)Extension of flaps
1 On center pedestal, set slat/flap control lever to required flap position (15°, 20° or 40°). Check that flap surfaces move to selected position.

(b)Retraction of flaps
1 On center pedestal, set slat/flap control lever to SLATS 0/FLAPS 0 position. Check that flap surfaces move to fully retracted position.

(3)Close-Up
(a)Depressurize GREEN hydraulic system (Ref. 29-21-00 or 29-10-00, P. Block 301).
(b)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(c)Remove safety clips and tags and close circuit breakers 7CV, 9CV, 8CV and 45CV.
(d)Remove safety barriers.

2. Retraction of Flap and Slats to Zero Position using Wing-Tip Brake Test Tool

A. Reason for the Job

To retract flaps and slats using wing tip brake test tool

B. Equipment and Materials

ITEM	DESIGNATION
(1) 98A27508053002	Wing Tip Brake Test Tool
(2) 98A27508015001	Check Pin Set - Flap Neutral Setting
(3)	Safety Barriers
(4)	Circuit Breaker Safety Clips and Tags

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-51-18, P. Block 401	Slat/Flap Control Computer
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power

C. Procedure

NOTE : The wing tip brake test tool should only be used if the flaps or slats are in any extended position and moving with the aircraft system is not possible. The transmission system must be in a serviceable condition.

(1)Job Set-Up
(a)Position safety barriers.
(b)Open access door 121BL.
(c)Open access doors 523DB or 623DB at slat screwjacks 3.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS & SLATS/POS/ECAM	2CN	334/S65
133VU	FLT CTL/FLAPS & SLATS/POS/IND	1CN	334/S66
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SLATS/26 V AC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/FLAPS/SYS 1	10CV	335/R67

R (e)Remove SFCC1 and SFCC2 (Ref. 27-51-18, P. Block 401).
R (f)Connect wing-tip brake test tool to aircraft connector 92VU or 93VU
R in place of SFCC1 or SFCC2.
R (g)Route cables with test tool below LH or RH wing.
R (h)Connect electrical ground power unit and energize the aircraft
R electrical network (Ref. 24-41-00, P. Block 301).
R (j)Make certain that electronics racks ventilation is correct.
R (k)Pressurize GREEN hydraulic system (Ref. 29-21-00 or 29-10-00,
R P. Block 301).
R (l)Remove safety clips and tags and close circuit breakers
R 2CN, 1CN, 1CV, 10CV, 5CV, 6CV, 2CV, 3CV, 7CV, 9CV, 8CV and 4CV.

R (2)Retract flaps to zero position
R (a)Set SELECTOR SWITCH on test tool to FLAP position
- FLAP indicator light comes on.

CAUTION : RETRACTION OF FLAPS CLOSE TO ZERO POSITION MUST BE PERFORMED VERY CAREFULLY, OTHERWISE FLAPS COULD RETRACT OVER ZERO AND APPLY EXCESSIVE LOAD TO SCREWJACKS.

R (b)Use COMMAND SWITCH, retract the flaps until the check pin from check
R pin set PN 98A27508015001 can be installed in carriages 2 LH or RH
R (zero position).

R (3)Retract slats to zero position
R (a)Set selector switch on test tool to SLAT position
- SLAT indicator light comes on.

CAUTION : RETRACTION OF SLATS CLOSE TO ZERO POSITION MUST BE PERFORMED VERY CAREFULLY, OTHERWISE SLATS COULD RETRACT OVER ZERO AND APPLY EXCESSIVE LOAD TO SCREWJACKS.

R (b)Using COMMAND SWITCH retract the slats until the angle at screwjack 3,
R LH or RH between claw stops at ball screw nut and screwjack housing
R is 270° ±15° (slat zero position).

R (4)Close-Up
R (a)Depressurize GREEN hydraulic system (Ref. 29-23-00 or 29-10-00,
R P. Block 301).
R (b)Open, safety and tag circuit breakers 2CN, 1CN, 1CV, 10CV, 5CV, 6CV,
R 2CV, 3CV, 7CV, 9CV, 8CV and 4CV.
R (c)Disconnect test tool connector and install SFCC1 and SFCC2
R (Ref. 27-51-18, P. Block 401).
R (d)Remove wing-tip brake test tool from aircraft.
R (e)Check that the slat/flap lever on center pedestal is at zero position.

R 3. Manual Operation of Flap Transmission System

R A. Reason for the Job
R To operate the flap transmission system manually
R B. Equipment and Materials

ITEM		DESIGNATION
(1)	98A27508003001	Rigging Pin Set - Flap Adjustment
(2)	98A27508050000	Turning Device - Flap Drive Shaft
(3)	98A27508061000	Adapter - Flap Drive Shaft LH/RH Wing
(4)	98A27508060000	Locking Device - Flap Drive Shaft
(5)		Torque Wrench, 7-9 Nm (62-80 lbf.in.)
(6)		Wiper Ring
(7)		Circuit Breaker Safety Clips and Tags
(8)		Safety Barriers
(9)		Warning Notice Prohibiting Pressurization of Hydraulic Systems
(10)		Pneumatic Motor
(11)		Lockwire Corrosion Resistant Steel, dia 0.8 mm (0.032 in.)
Referenced Procedures		
- 27-54-00, P. Block 501		Hydraulic Actuation and Power Transmission (Flaps)
- 27-56-11, P. Block 401		Asymmetry Position Pick-Off Unit
- 29-10-00, P. Block 301		Main Hydraulic Power - Pressurization/Depressurization
- 32-12-11, P. Block 301		Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure

(1)Job Set-up

(a)Position safety barriers.

(b)Make certain that flaps are in fully retracted position.

NOTE : If possible, the manual operation of flaps should always be started from flaps fully retracted position. This avoids adjustment of the Position Pick-Off Units.

(c)Open the main doors of the main gear (Ref. 32-12-11, P. Block 301).

(d)Depressurize the Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).

(e)Position warning notices prohibiting pressurization of the hydraulic systems.

(f)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/FLAPS/SYS1	10CV	335/R67

(g)Remove Asymmetry Position Pick-Off Unit (APPU) Ref. 27-56-11,

P. Block 401).

(h)Remove the transmission shaft 5470 (5513) as follows :
(Ref. Fig. 301)

1 Cut and discard lockwire. Remove nut (2) and bolt (7) thru splined connection at outboard end of shaft.

2 Cut and discard lockwire. Remove nut (3) and bolt (6) securing telescopic section of shaft.

3 Collapse telescopic section of shaft and disengage splined connections at both ends.

4 Remove shaft from aircraft.

5 Remove and discard wiper ring (4).

(2)Manual Operation of the Flap System

(a)Connect flap drive shaft adapter (9) PN98A27508061000 to torque limiter (1) input.

(b)Install a pneumatic motor (8) or any other power source to flap drive shaft adapter (9).

NOTE : The power source should not have more than 1000 rpm.

WARNING : MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

(c)Extend the flaps to the required position by operating the pneumatic motor (8).

NOTE : If maintenance actions have to be performed, safety the transmission system with the flap drive shaft locking device PN98A27508060000 in position.

CAUTION : RETRACTION OF FLAPS CLOSE TO ZERO POSITION MUST BE PERFORMED VERY CAREFULLY, OTHERWISE FLAPS COULD RETRACT OVER ZERO AND APPLY EXCESSIVE LOAD TO SCREWJACKS.

(d)If installed remove flap drive shaft locking device.

(e)Fully retract the flaps.

(f)Install rigging pin PN98A27508003001 in flap carriage No. 2.

(g)Install the transmission shaft 5470 (5513) as follows:

1 Install new wiper ring (4) in PCU (5).

2 Apply grease (Material No. 04-004) to splined surfaces of shaft.

3 Insert outboard end of shaft into splined coupling making certain that bolt holes thru male and female portions are aligned.

4 Secure outboard splined connection with bolt (7) and nut (2).

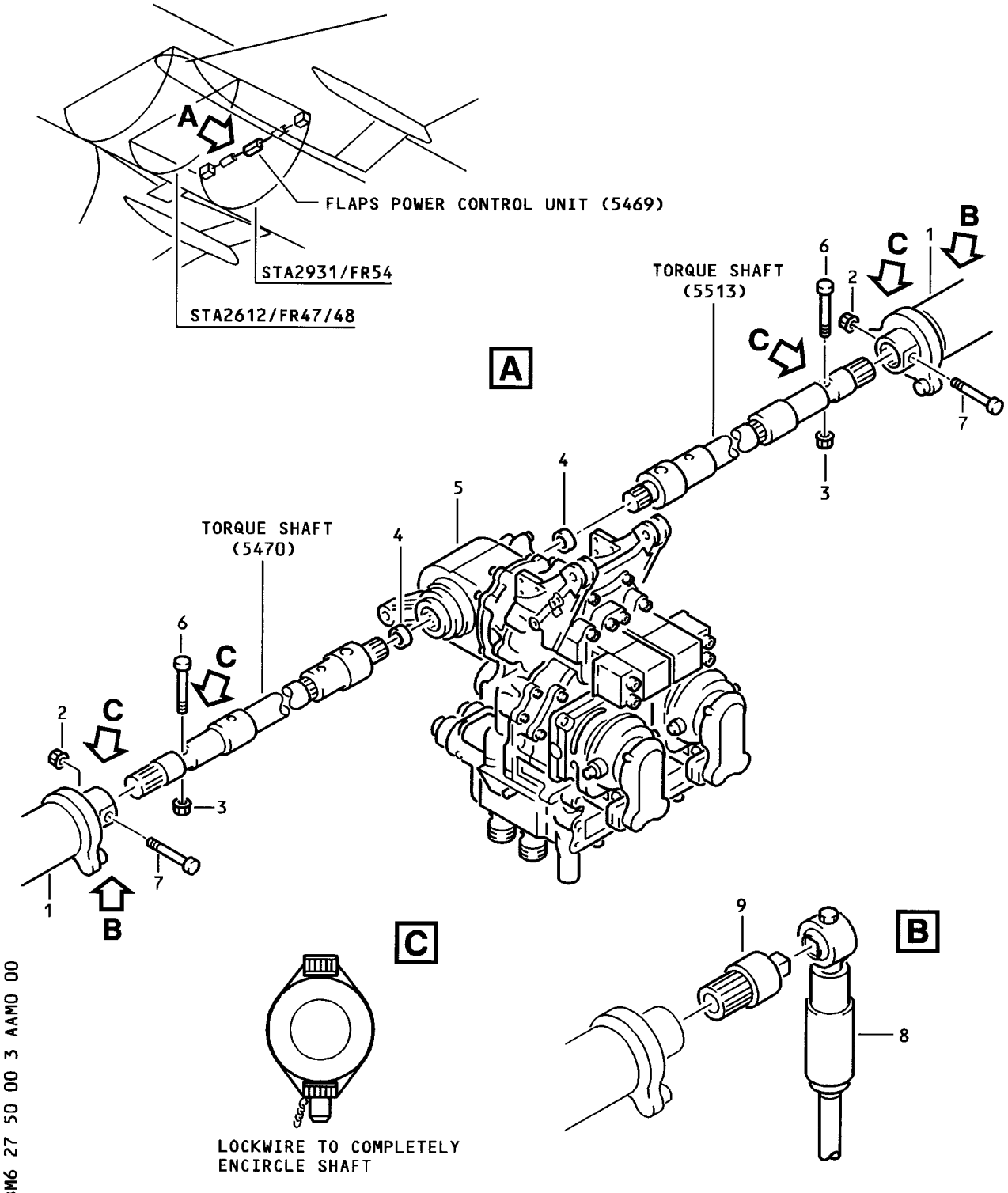
5 TORQUE nut (2) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).

6 Safety the connection with lockwire.

NOTE : Lockwire is to completely encircle shaft.

7 Apply corrosion preventive (Material No. 05-005) to bolt (7) and nut (2).

8 Extend telescopic section of shaft and insert inboard end of shaft



Removal of Transmission Shafts
Figure 301

R

R into PCU connection.
R 9 If splines at PCU connection are not aligned, rotate shaft by the minimum amount necessary using turning device PN98A27508050000 if required.
R 10 Carefully align holes in male and female portions of telescopic sections.

R CAUTION : BY EXTENDING TELESCOPIC SECTION OF SHAFT TOO MUCH, IT IS POSSIBLE TO INSTALL THE BOLT BEHIND THE OUTBOARD SHAFT SECTION. MAKE SURE THAT HOLES IN BOTH SHAFT SECTIONS ARE CORRECTLY ALIGNED.

R 11 Install bolt (6) and nut (3) thru telescopic section of shaft.
R 12 TORQUE nut (3) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
R 13 Safety the connection with lockwire.

R NOTE : Lockwire is to completely encircle shaft.

R 14 Apply corrosion preventive (Material No. 05-005) to bolt (6) and nut (3).
R 15 Make certain that indicator groove on male portion of inboard splined connection is not visible, indicating adequate engagement.
R (h)Install the APPU (Ref. 27-56-11, P. Block 401).
R (j)Remove the rigging pin PN98A27508003001.
R (3)Test
R (a)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV and 10 CV.
R (b)Do the operational test of the flap system (Ref. 27-54-00, P. Block 501).
R (4)Close-up.
R (a)Make certain that work area is clean and clear of miscellaneous items of equipment.
R (b)Close main gear main doors (Ref. 32-12-11, P. Block 301).
R (c)Remove safety barriers.
R (d)Remove warning notices.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Reason for the Job

A. Adjustment of Flap Drive System.

B. Adjustment of Clean Wing Configuration.

2. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3 m to 5 m (10 ft. to 16 ft.)
	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27508003001	Rigging Pin Set - Flap Adjustment
	D. 98A27508010000	Oversize Eccentric Pin - Flap Carriage 2
	E. 98A27508013000	Drive Tool - Flap Torque Shaft
	F. 98A27508015001	Check Pin Set - Flap Neutral Setting
	G. 98A27508022000	Measuring Device - Overtravel, Flap Screwjacks 1 thru 4
	H. 98A27508027000	Templates - Outboard Flap, Tracks 3 thru 5
R	or	
R	98A27508688000	
R	J. 98A27508030000	Templates - Inboard Flap, Track 2
R	K. 98A27508050000	Turning Jig - Flap Drive Shaft
R	L. 98A27508052000	Feeler Gage - Fail Safe Spigot Ring, Carriage 2
R	M.	Torque Wrenches, Range 0.35 to 9.5 m.daN (2.6 to 70 lbf.ft.)
R	N.	Pneumatic Motor
R	P.	Safety Barriers
R	Q.	Circuit Breaker Safety Clips and Tags
R	R.	Cotter Pins
R	S.	Washers (for shimming)
R	T.	Tab Washers
R	U.	Lockwire, Corrosion Resistant Steel, Dia. 0.8 mm (0.032 in.)
R	V. Material No. 05-002	Special Materials (Ref. 20-31-00)
R	W. Material No. 05-005	Special Materials (Ref. 20-31-00)
R	X. Material No. 08-007	Bonding and Adhesive Compounds (Ref. 20-31-00)

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-50-21, P. Block 401	Flap Track Fairings
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-54-36, P. Block 401	Flap Screwjack 1 Support Spring
- 27-56-11, P. Block 401	Asymmetry Position Pick-Off Unit
- 57-20-35, P. Block 401	Fillets and Fairings

3. Procedure

NOTE : The adjustment procedure of the flaps can be carried out:
- with the aircraft on jacks,
- with the aircraft on landing gear,
- with/or without engines,
- with remaining fuel in tanks.

A. Job Set-Up

(1)Position safety barriers.
(2)Extend flaps to 15° (Ref. 27-50-00, P. Block 301).
(3)Open, safety and tag the following circuit breakers:

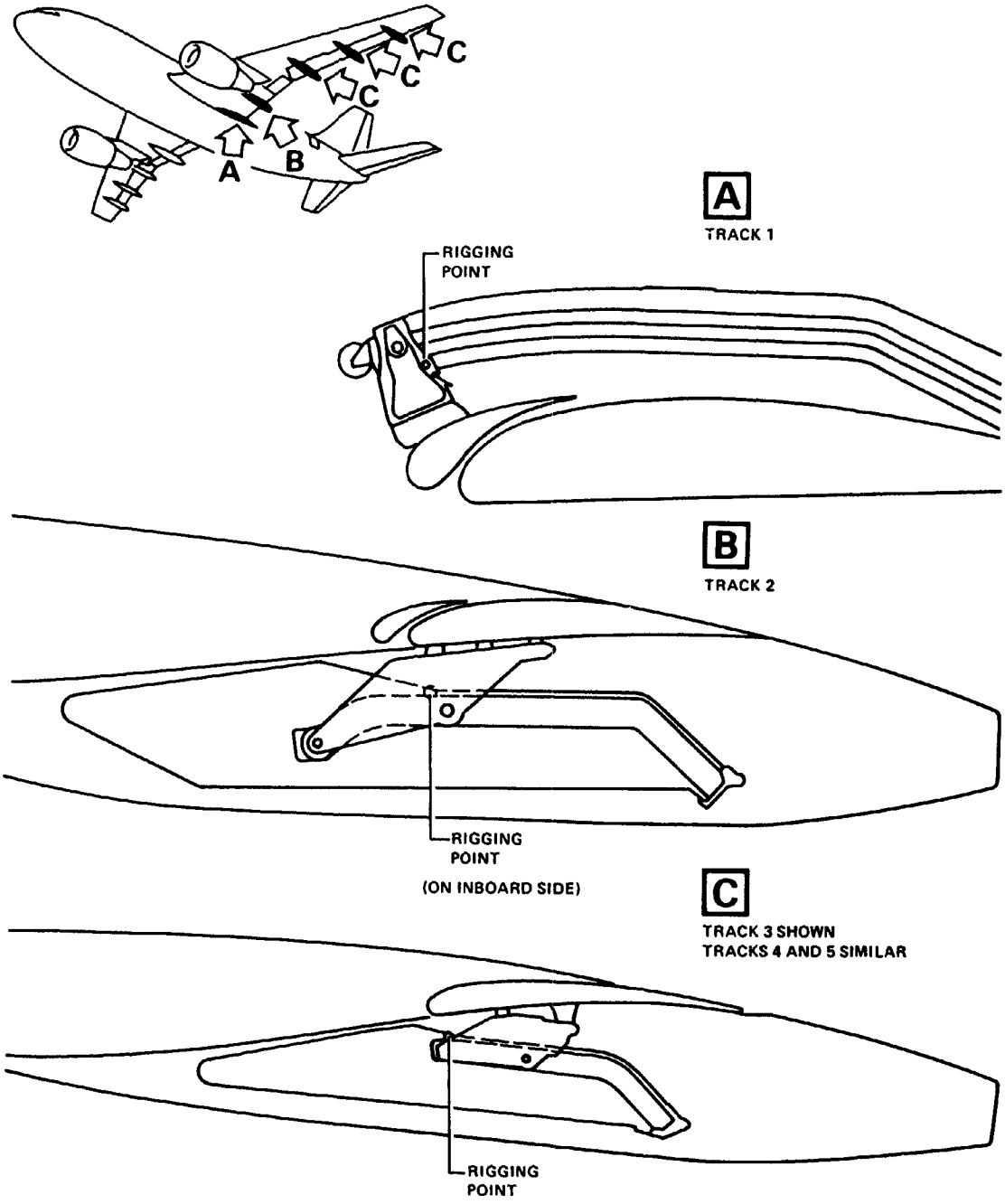
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(4)Position access platform.
(5)Open all lower flap shroud access panels in zones 572, 581 (672,681) and panel 576AB (676AB).
(6)Remove safety clips and tags and close circuit breakers 10CV, 6CV and 5CV.
(7)Retract flaps (Ref. 27-50-00, P. Block 301).
(8)Open, safety and tag circuit breakers 10CV, 6CV and 5CV.
R (9)Install safety guard 98A27503003000 on flap/slat control lever quadrant.

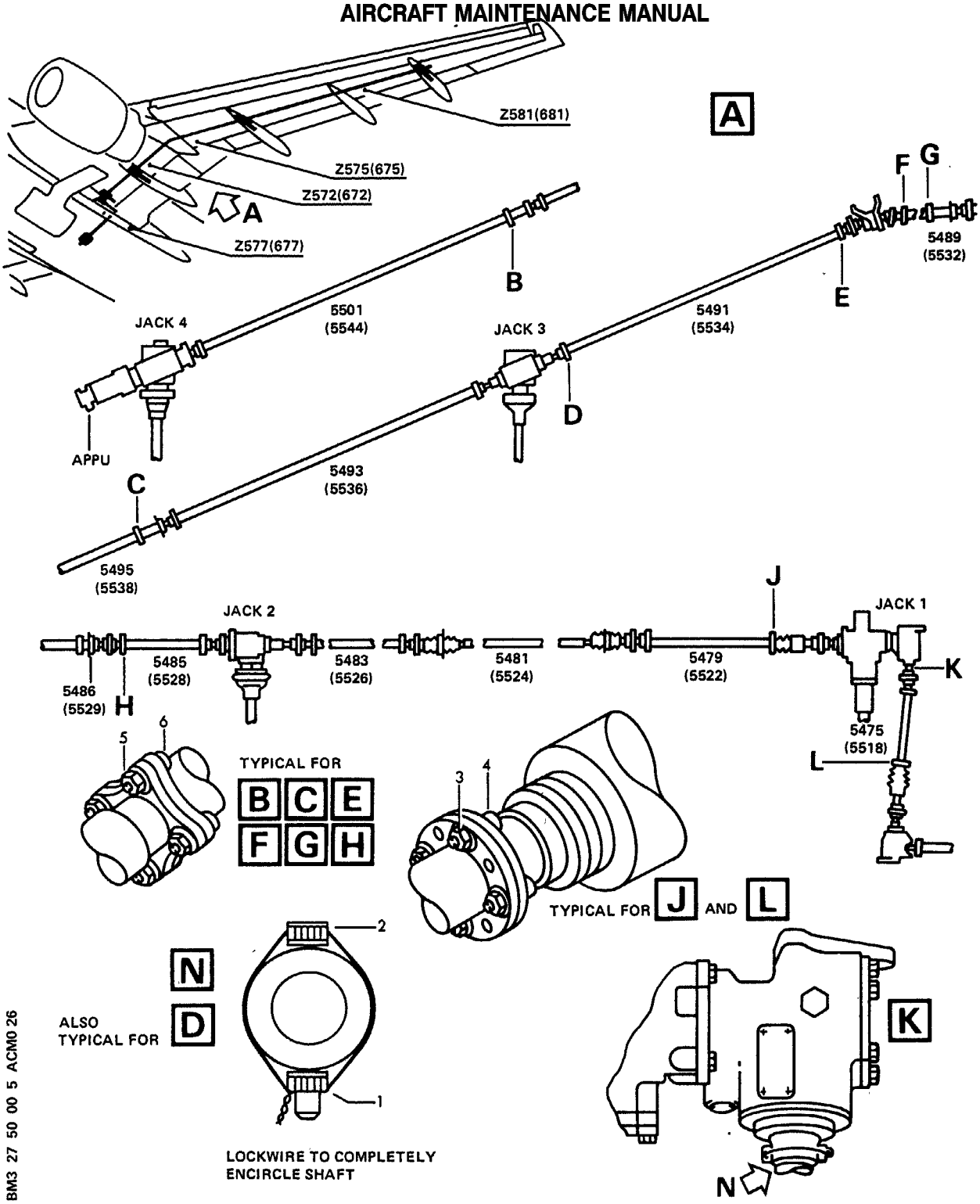
B. Adjustment of Flap Drive System
(Ref. Fig. 501)
(Ref. Fig. 502)

NOTE : Flap system adjustment is carried out on one wing at a time. The procedure for the left wing is described, variations for adjustment of right wing are given in brackets.

R
(1)Remove fairing plugs 535BL, 534BL, 533BL, 532BR (635BL, 634BL, 633BL, 632BL), access panels 577AB,BB (677AB,BB), 575CB (675CB) and attempt
R to install flap adjustment rigging pin set PN 98A27508003001 in all
R carriages.
(2)If rigging pins can be installed at all carriages, proceed to adjustment of clean wing configuration.
(3)If no carriage rigging pins can be installed, proceed as follows:
(a)Remove Asymmetry Position Pickoff Unit (APPU) (Ref. 27-56-11, P. Block 401).
(b)Cut and discard lockwire, remove nut (1), bolt (2) from transmission shaft 5475 (5518) / right angle gearbox connection.
(c)Remove nuts (3) and bolts (4) from 8/12 hole splitter flange connecting transmission shaft 5475 (5518) and plunging joint.
(d)Remove transmission shaft 5475 (5518) from aircraft.
(e)Insert torque shaft driving tool in right angle gearbox input connection and, using pneumatic motor, drive flap system until carriage 2 rigging pin can be inserted.
(f)Install rigging pin in carriage 2/track 2.
(g)Attempt to install rigging pin in carriage 1/track 1.
(h)If rigging pin cannot be installed in carriage 1/track 1 proceed as follows:
1 Remove nuts (3) and bolts (4) securing 8/12 hole splitter flange at inboard end of transmission shaft 5479 (5522), split transmission and support free end of shaft.
2 Drive screwjack 1 by means of the pneumatic motor until carriage 1 attains a position where the rigging pin may be installed.
3 Install rigging pin in carriage 1/track 1.
4 Connect transmission at 8/12 hole splitter flange at inboard end of transmission shaft 5479 (5522), secure with bolts (4) and nuts (3).
5 TORQUE nuts (3) to between 10.0 and 12.5 Nm (7.4 and 9.2 lbf.ft.).



Flap Rigging Points Location
Figure 501



Flap Transmission
Figure 502

(i)Remove pneumatic motor and drive tool from right angle gearbox connection.
(j)Install shaft 5475 (5518), making certain that bolt hole is aligned with hole in right angle gearbox input.
(k)Secure with bolts (2),(4) and nuts (1),(3).
(l)TORQUE nut (1) to between 7.33 and 8.95 Nm (5.4 and 6.6 lbf.ft.).
(m)TORQUE nuts (3) to between 10.0 and 12.5 Nm (7.4 and 9.2 lbf.ft.).
(n)Safety bolt (2) with lockwire; lockwire must completely encircle shaft.
(o)With carriage 1 and 2 rigging pins in position, attempt to insert rigging pins in all other carriages.
(p)If rigging pins can be inserted in all other carriages, install APPU (Ref. 27-56-11, P. Block 401), remove all rigging pins and proceed with adjustment of clean wing configuration.
(q)If rigging pins cannot be installed in all carriages, proceed with adjustment of remaining carriages/screwjacks individually in the order detailed below.

1 Adjustment of screwjack 4/carriage 5
a Remove nuts (5) and bolts (6) securing splitter flange on inboard end of transmission shaft 5501 (5544), split transmission and support free end of shaft.
b Using turning jig, rotate shaft as required until a rigging pin can be inserted in carriage 5/track 5.
c Insert rigging pin.
d Connect transmission at inboard end of transmission shaft 5501 (5544), secure with bolts (6) and nuts (5).
e TORQUE nuts (5) to between 10.0 and 12.5 Nm (7.4 and 9.2 lbf.ft.).
NOTE : If screwjack 3/carriage 3 is also to be adjusted, it may be more convenient to leave transmission disconnected at shaft 5501 (5544) rather than disconnect at another location as detailed in procedure for screwjack 3/carriage 3.
f Install APPU (Ref. 27-56-11, P. Block 401).

2 Adjustment of screwjack 3/carriage 3
a Remove nuts (5) and bolts (6) securing splitter flange at inboard end of transmission shaft 5491 (5534), split transmission and support free end of shaft.
NOTE : Transmission may already be split between screwjacks 3 and 4, in which case do not carry out step b below.
b Remove nuts (5) and bolts (6) securing splitter flange at inboard end of transmission shaft 5495 (5538), split transmission and support free end of shaft.
c Using turning jig, rotate shaft as required until rigging pin can be inserted in carriage 3/track 3.
d Insert rigging pin.
e Connect transmission at inboard end of shaft 5491 (5534), secure with bolts (6) and nuts (5).
f TORQUE nuts (5) to between 10.0 and 12.5 Nm (7.4 and 9.2 lbf.ft.).

g Connect transmission at inboard end of transmission shaft 5495 (5538), secure with bolts (6) and nuts (5).
h TORQUE nuts (5) to between 10.0 and 12.5 Nm (7.4 and 9.2 lbf.ft.).
NOTE : Transmission may be split between screwjacks 3 and 4 at inboard end of shaft 5501 (5544), in which case carry out steps 1d and 1e above.

3 Adjustment of carriage 4 (Ref. Fig. 505) Sheet 2/3
NOTE : Fore and aft positioning of carriage 4 is accomplished by adjustment of aft eccentric only.
a Remove nuts (10), washers (11) and toothplates (12).
b Remove and discard cotter pin (13) and slacken nut (14).
c Adjust eccentric bolt (15) and eccentric bush (16) until carriage is positioned on track with rigging pin holes in track and carriage aligned.
d Install rigging pin.
e Install toothplates (12), secure with washers (11), nuts (10).
f TORQUE nut (14) to 5.5 ±0.5 m.daN (40.5 ±3.7 lbf.ft.).
g Safety nut (14) with cotter pin (13).

(4)If some but not all rigging pins can be installed, proceed as follows:
(a)Install those rigging pins which can be inserted.
(b)Adjust the remaining carriages in the order given below:

1 Adjustment of screwjack 2/carriage 2
a Remove nuts (3) and bolts (4) securing 8/12 hole splitter flange at inboard end of transmission shaft 5479 (5522), split transmission and support free end of shaft.
b Remove nuts (5) and bolts (6) securing splitter flange at outboard end of transmission shaft 5485 (5528), split transmission and support free end of shaft.
c Using turning jig if necessary, rotate transmission shaft such that carriage 2 is driven to a position where the rigging pin can be inserted.
d Insert rigging pin.
e Connect transmission at outboard end of shaft 5485 (5528), secure with bolts (6) and nuts (5).
f TORQUE nuts (5) to between 10.0 and 12.5 Nm (7.4 and 9.2 lbf.ft.).
g Connect transmission at inboard end of shaft 5479 (5522), secure with bolts (4) and nuts (3).
h TORQUE nuts (3) to between 10.0 and 12.5 Nm (7.4 and 9.2 lbf.ft.).

2 Adjustment of carriage 1/screwjack 1
a Cut and discard lockwire, remove nut (1), bolt (2) at connection between transmission shaft 5475 (5518) and right angle gearbox.
b Remove nuts (3) and bolts (4) securing 8/12 hole splitter flange between shaft 5475 (5518) and plunging joint.
c Remove shaft 5475 (5518) from aircraft.
d Remove nuts (3) and bolts (4) securing 8/12 hole splitter flange at connection of shaft 5479 (5522) and plunging joint, support free end of shaft.
e Insert torque shaft driving tool in right angle gearbox input and, using pneumatic motor, drive screwjack 1 until carriage 1 reaches a position where the rigging pin can be installed.
f Insert rigging pin in carriage 1 /track 1.
g Remove torque shaft driving tool from right angle gearbox.
h Install transmission shaft 5475 (5518), making certain that bolt hole thru right angle gearbox connection is aligned.
i Secure shaft 5475 (5518) using bolts (2),(4) and nuts (1),(3).
j TORQUE nuts (3) to between 10.0 and 12.5 Nm (7.4 and 9.2 lbf.ft.).
k TORQUE nut (1) to between 7.33 and 8.95 Nm (5.5 and 6.5 lbf.ft.).
l Safety bolt (2) with lockwire.
NOTE : Lockwire must completely encircle shaft.
m Connect transmission at inboard end of shaft 5479 (5522), secure with bolts (4) and nuts (3).
n TORQUE nuts (3) to between 10.0 and 12.5 Nm (7.4 and 9.2 lbf.ft.).

3 If carriage 5 requires adjustment, remove APPU (Ref. 27-56-11, P. Block 401).

4 Adjust the positions of carriages 5, 3 and 4 in accordance with the procedures and order described in step (3)(q) above, to enable rigging pins to be installed.

(5)Remove all rigging pins from carriages/tracks.
(6)Proceed with adjustment of clean wing configuration.

C. Adjustment of Clean Wing Configuration
(Ref. Fig. 502)
(Ref. Fig. 503)
(Ref. Fig. 504)

(1)Make certain that the transmission is correctly set to zero, and that it is possible to insert rigging pins in all carriages/tracks.

(2)Remove all rigging pins.

(3)Remove the following access panels:
- 532AR, HR (632AL, GL)
- 533AL, DL (633AR, DL)
- 534AL, DL (634AR, DL)
- 535AL, DL (635AR, DL).

(4)Cut and discard lockwire, remove pivot bolt (7) and washer (8) from outboard side of fairings 3, 4 and 5 and from inboard side of fairing 2.
NOTE : Pivot bolt (7) is installed thru a hollow bolt. During removal of pivot bolt (7) care must be taken to make certain that hollow bolt is not rotated as this will affect fairing adjustment.

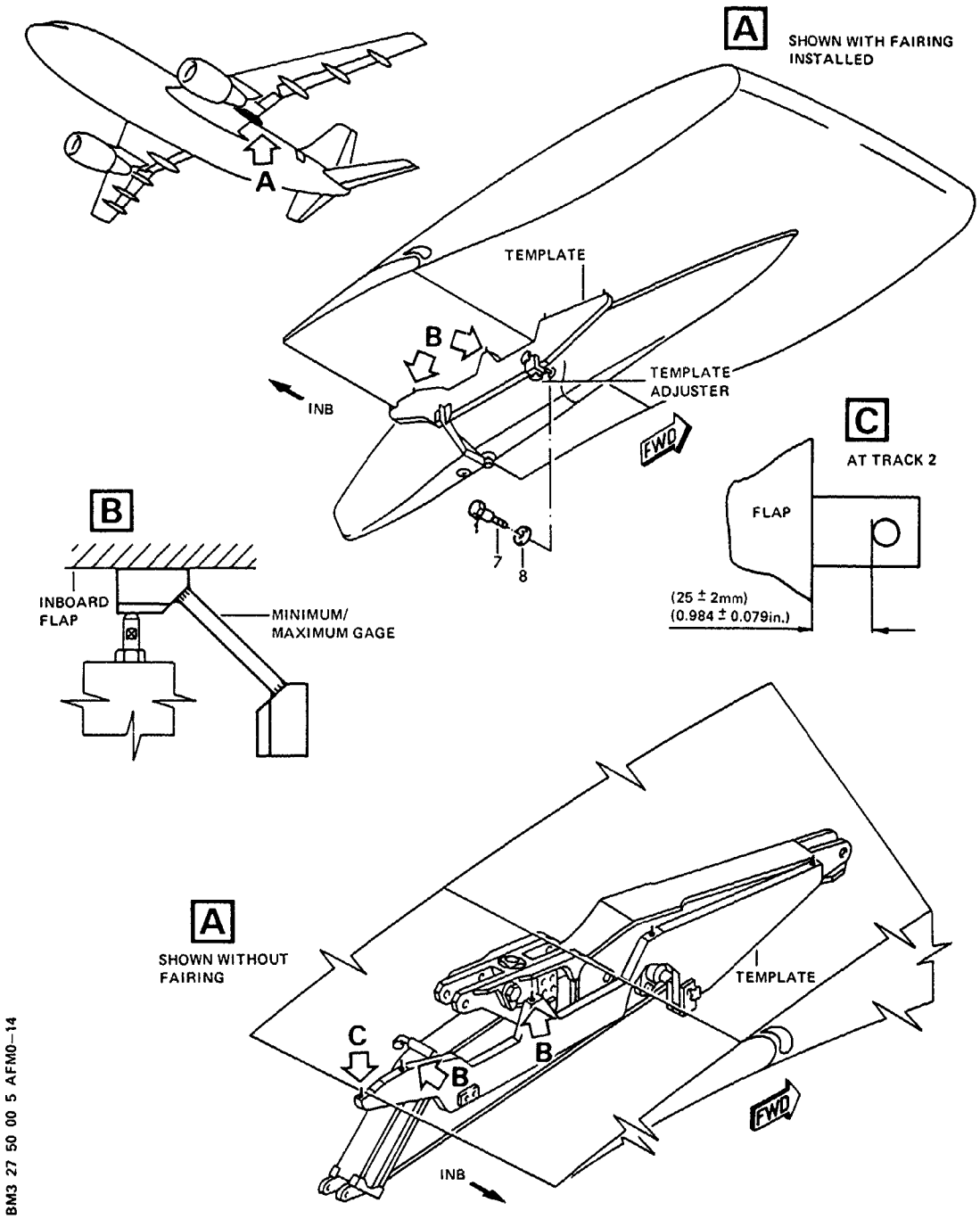
(5)Install rigging templates on fairings attaching at pivot bolt hole and fairing upstop.
NOTE : Take care not to rotate hollow bolt during template installation.

(6)Adjust templates using adjuster until two forward pins are in contact with wing lower surface.

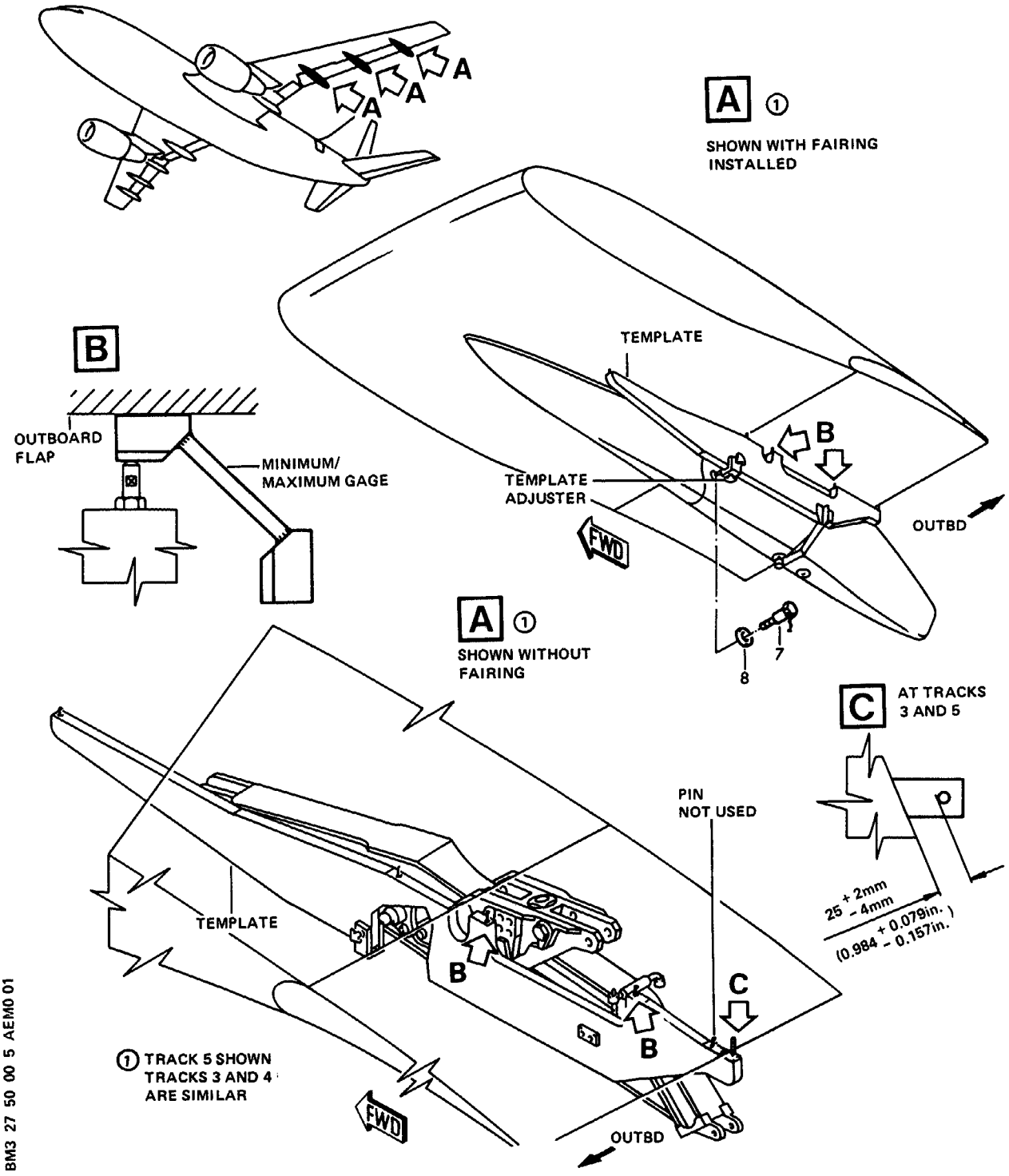
(7)Measure (using minimum/maximum gages supplied with templates where appropriate) distances between template datum points and flap, which should be within limits stated below:

	Between template pins and flap lower surface (min/max gage)	Between rear template pin and flap trailing edge
Outboard flap (All fairings)	25 mm ±0.4 mm (0.984 ±0.016 in.)	25 mm +2/-4 mm (0.984 +0.079/-0.157 in.)
Inboard flap	25 mm ±0.5 mm (0.984 ±0.020 in.)	25 mm ±2 mm (0.984 ±0.079 in.)

NOTE : When checking above dimensions, rigging pin should be installed in appropriate carriage, but removed for adjustment of eccentrics.



Rigging Template - Inboard Flap
Figure 503



Rigging Template - Outboard Flap
Figure 504

(8)If above conditions are satisfied, proceed as follows:
(a)Remove rigging templates from all fairings, taking care not to rotate hollow bolt.
(b)Remove fixed fairings from flap tracks 2, 3 and 5 (Ref. 57-20-35, P. Block 401).
(c)Using the overtravel measuring device PN 98A27508022000 and check that available screwjack overtravel is within the limits detailed below.
NOTE : Overtravel is the screwjack spindle angular displacement available in the retract direction from the flap zero position before screwjack claw stops come into contact.

SCREWJACK	OVERTRAVEL	
	MIN	MAX
1	270°	820°
2	180°	650°
3	135°	540°
4	90°	450°

(d)Install fixed fairings on flap tracks 2, 3 and 5 (Ref. 57-20-35, P. Block 401).
(e)Install washers (8) and pivot bolts (7) on outboard side of fairings 3, 4 and 5, and on inboard side of fairing 2.
NOTE : Take care not to rotate hollow bolt during installation of pivot bolt as this will disturb fairing adjustment.
(f)TORQUE pivot bolts (7) to between 1.4 and 1.6 m.daN (10.4 and 11.8 lbf.ft.).
(g)Safety pivot bolts (7) with lockwire.
(h)Install access panels
- 532AR, HR (632AL, GL)
- 533AL, DL (633AR, DL)
- 534AL, DL (634AR, DL)
- 535AL, DL (635AR, DL).
(i)Proceed to test procedure (Ref. Para. D).

(9)If template/flap distances do not agree with those detailed above, carry out adjustment of outboard and/or inboard flap as described below.

(a)For adjustment of outboard flap proceed as follows:

(Ref. Fig. 502)
(Ref. Fig. 505) (Sheet 1/3)
(Ref. Fig. 505) (Sheet 2/3)
(Ref. Fig. 505) (Sheet 3/3)

1 Remove nuts (5) and bolts (6) securing splitter flange at outboard end of transmission shaft 5485 (5528), deflect end of shaft to clear universal joint (without subjecting crown spline joint at inboard end to undue strain), withdraw shaft from screwjack 2, and remove universal joint from steady bearing 5486 (5529).

2 Remove rigging templates from fairings 3, 4 and 5.

3 Remove movable fairings 3, 4 and 5 (Ref. 27-50-21, P. Block 401).

4 Install rigging templates on tracks 3, 4 and 5, using alternative center pin at fairing pivot attachment and supporting aft end of template on rear of track.

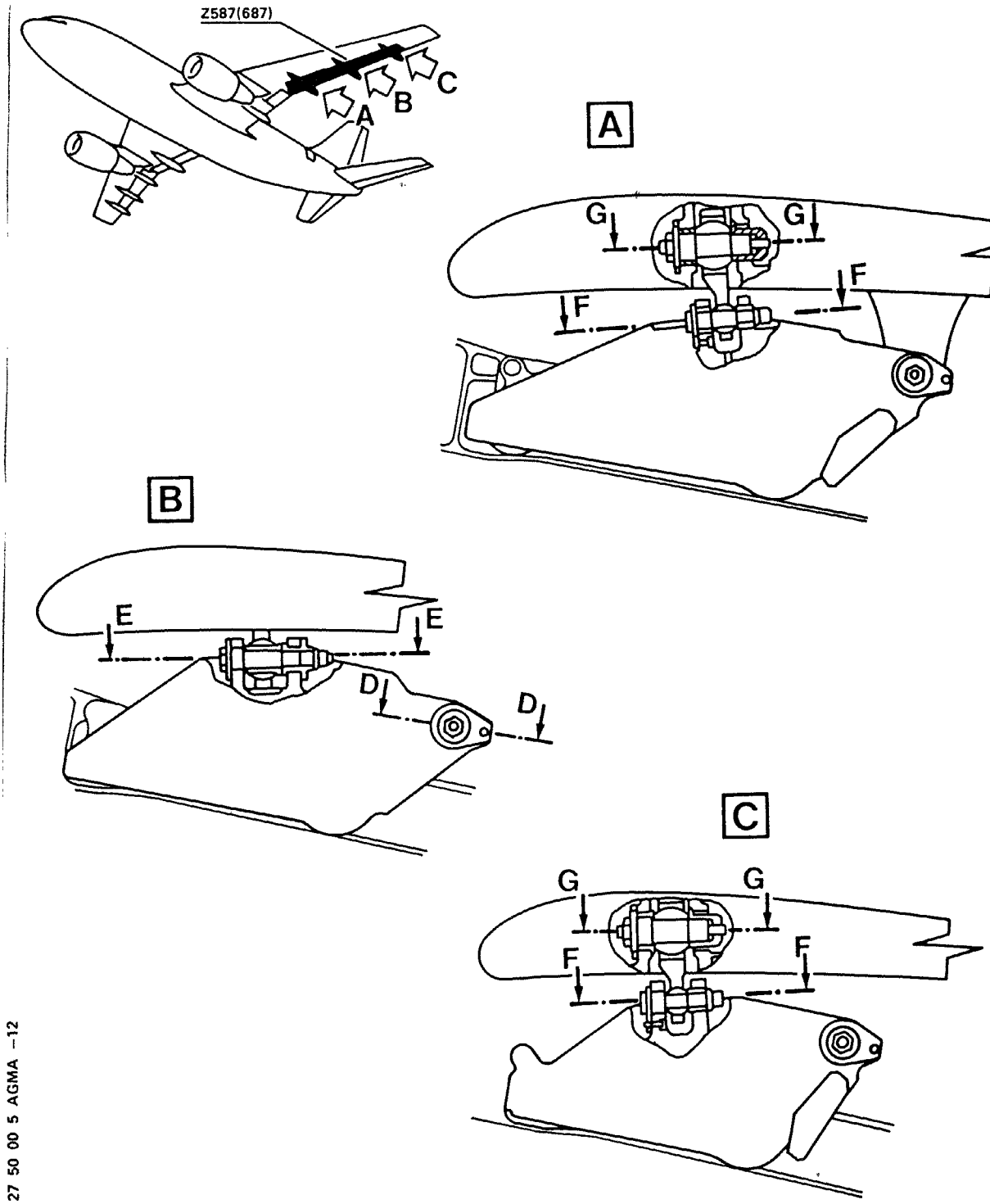
5 Make certain that carriage 5 is in correct zero position by inserting rigging pin and remove APPU (Ref. 27-56-11, P. Block 401).

6 Remove rigging pin from carriage 5.

7 Remove nuts (5) and bolt (6) securing splitter flange at inboard end of transmission shaft 5501 (5544) and support free end of shaft.

8 With reference to table below decide which carriage eccentric(s) require adjustment and proceed with their adjustment as follows:

NOTE : If difficulty is experienced in obtaining correct flap setting, it may be advantageous to set all eccentrics to their zero position (indicated by the punch marks on the eccentrics and toothplates being in conjunction) and carry out adjustment of the flap from that position in the order carriage 3, carriage 5, carriage 4.



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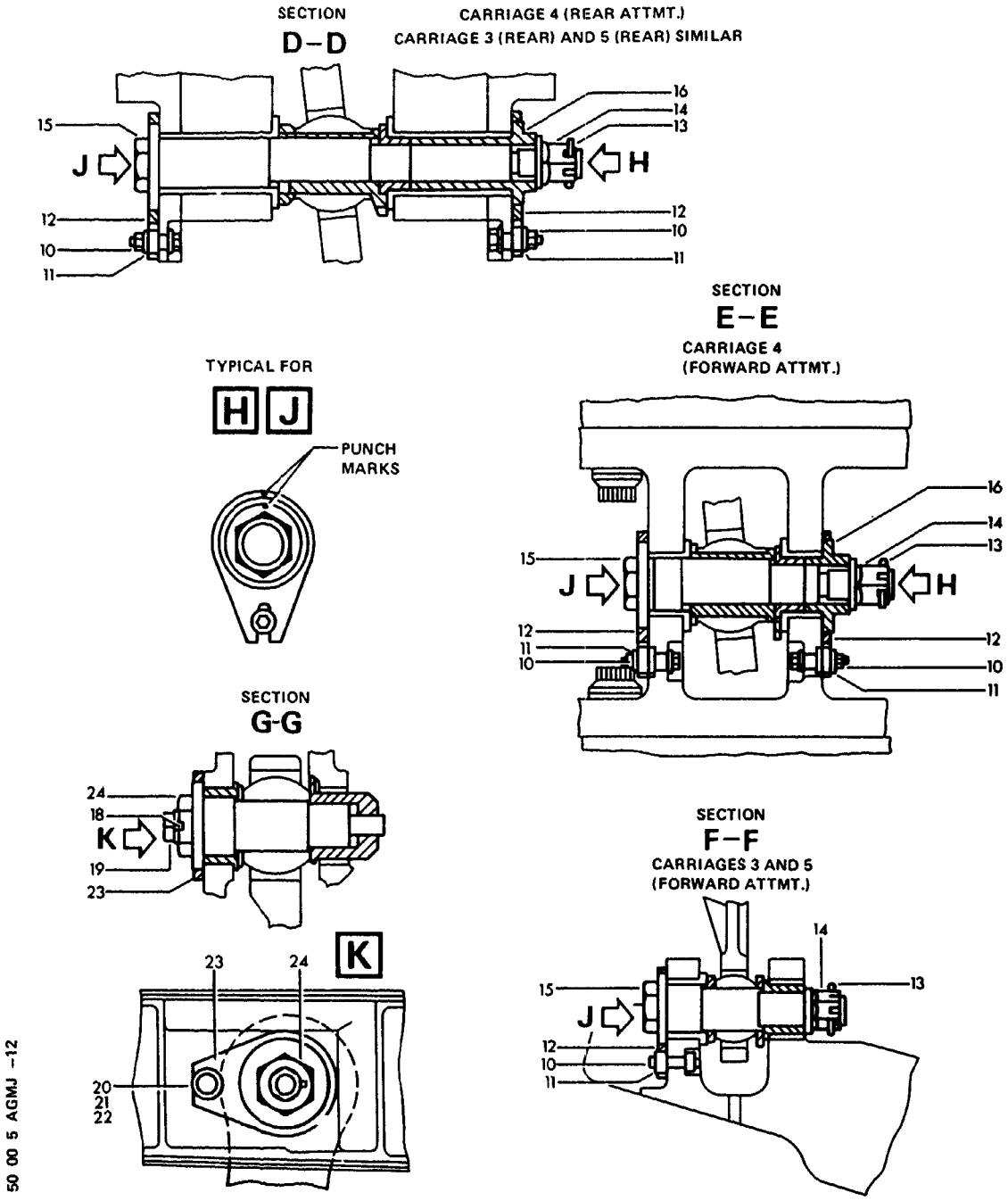
Outboard Flap Adjustment (Sheet 1/3)
Figure 505



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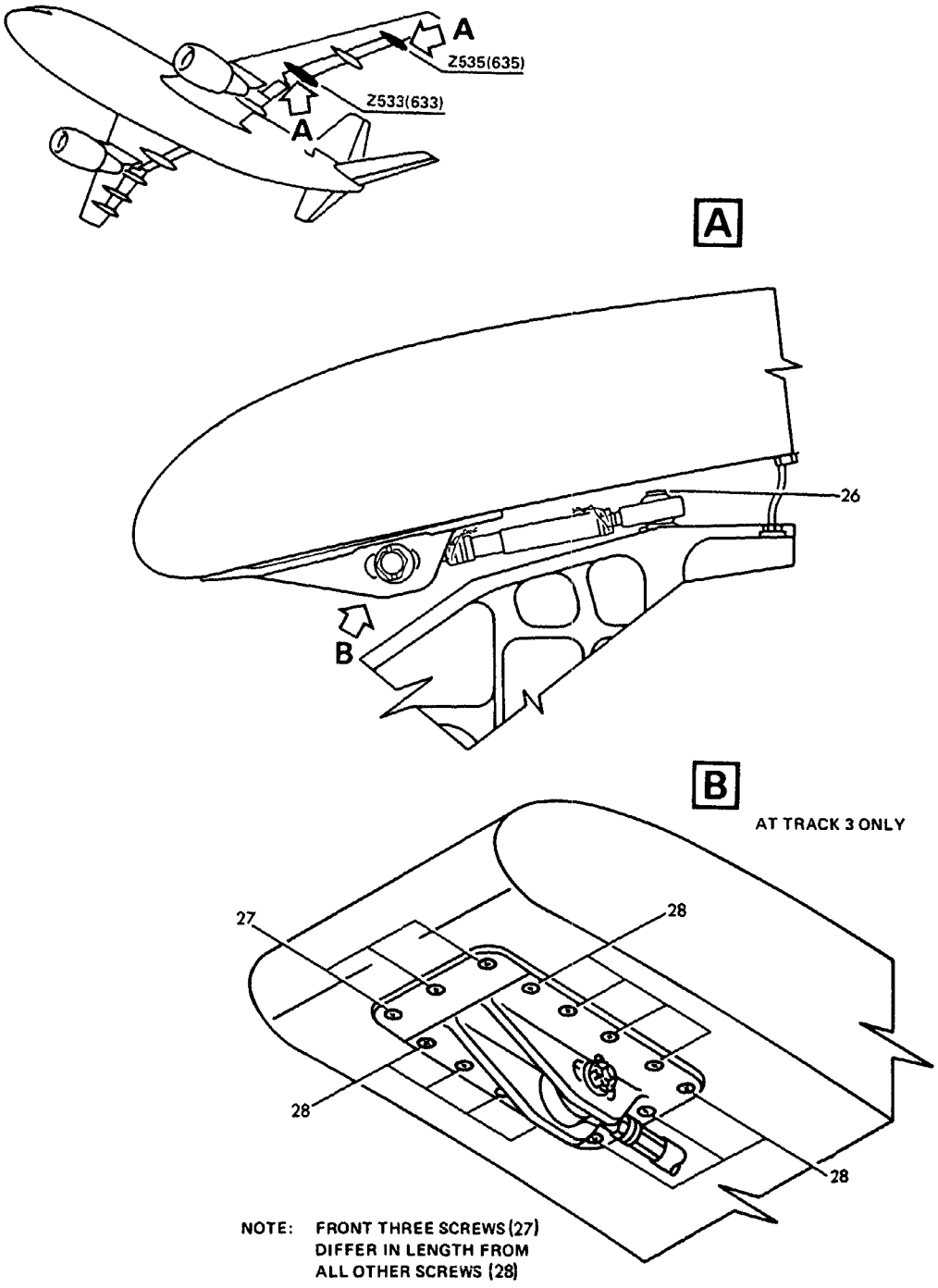
Outboard Flap Adjustment (Sheet 2/3)
Figure 505



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Outboard Flap Adjustment (Sheet 3/3)
Figure 505

	Direction in which flap position is affected	Adjustment governed by:
Carriages 3 and 5		
Forward Connection (Single Eccentric)	- Vertically	- Template
	- Angular Deflection	- Template
Aft Connection (Double Eccentric)	- Vertically	- Template
	- Fore/Aft	- Template and Screwjack Spindle (Overtravel)
	- Angular Deflection	- Template
Carriage 4		
Forward Connection (Double Eccentric)	- Inboard/Outboard	- Spindle/Carriage Clearance and Flap End Clearances
	- Vertically	- Template
	- Angular Deflection	- Template
Aft Connection (Double Eccentric)	- Vertically	- Template
	- Fore/Aft	- Carriage 4 Rigging Pin
	- Angular Deflection	- Template

9 Remove nuts (10), washers (11) and toothplates (12).
10 Remove and discard cotter pin (13) and slacken nut (14).
11 Adjust eccentric bolt (15) and eccentric bush (16) (if applicable) until flap is correctly positioned in relation to rigging template as detailed in C.(7) above.
NOTE : If more than one eccentric is adjusted, temporarily install toothplates after each adjustment.

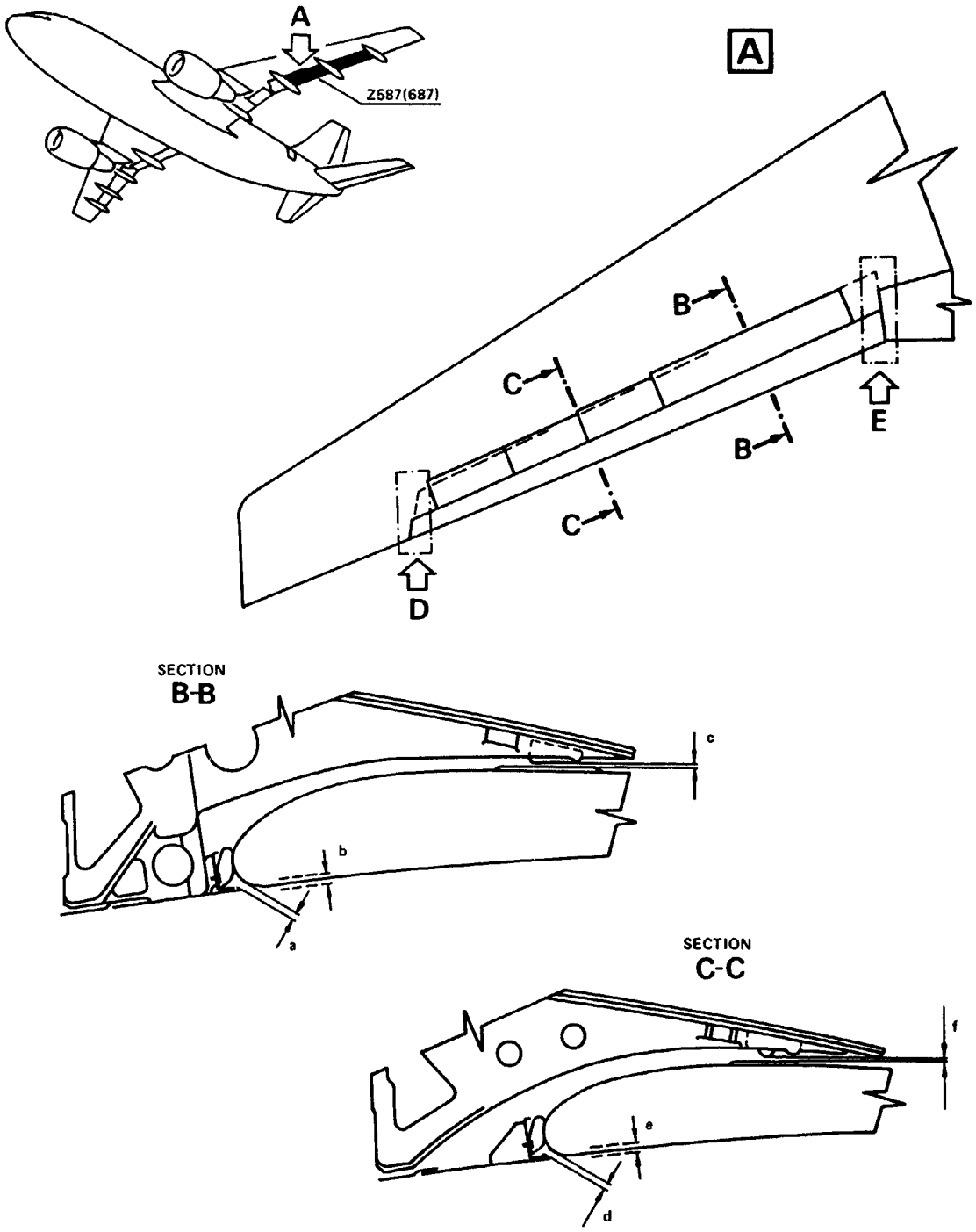
12 If insufficient adjustment is available at carriage 5 forward eccentric, proceed as follows:
- a Remove access panel 587ET (687ET).
- b Straighten tab washer (18) and remove bolt (19), discard tab washer (18).
- c Remove nut (20) and bolt (21) and two washers (22), remove toothplate (23).
- d Rotate eccentric (24) 90° and temporarily install toothplate (23).
- e Check if sufficient adjustment is now available at lower forward eccentric, if not, repeat steps 12c thru 12e.
- f Install toothplate (23), secure with washers (22), bolt (21), nut (20).
- g TORQUE nut (20) to between 0.35 and 0.45 m.daN (31 to 40 lbf.in.).
- h Position new tab washer (18) on bolt (19) and install bolt (19).
- i TORQUE bolt (19) to 5.0 m.daN (37 lbf.ft.).
- j Safety bolt (19) with tab washer (18).
- k Install panel 587ET (687ET).

13 If sufficient adjustment is not available at carriage 3 forward eccentric, proceed as follows:
- a Connect transmission at splitter flange at inboard end of shaft 5501 (5544), secure with bolts (6) and nuts (5).
- b TORQUE nuts (5) to between 10.0 and 12.5 Nm (7.4 and 9.2 lbf.ft.).
- c Remove rigging templates from tracks 3, 4 and 5.
  NOTE : Take care not to rotate hollow bolts during removal of templates as this will affect fairing adjustment.
- d Remove retaining ring (26) and disconnect cross brace from attachment pin on carriage 3.
- e Install torque shaft driving tool in steady bearing 5486 (5529), and using pneumatic motor, extend outboard flap making certain that cross brace does not become trapped during flap movement.
- f Remove screws (27),(28) securing cross brace attachment bracket and remove bracket complete with cross brace from lower surface of flap.
- g Straighten tab washer (18) and remove bolt (19), discard tab washer (18).
- h Remove nut (20), bolt (21) and two washers (22), remove toothplate (23).
- i Rotate eccentric 90° and temporarily install toothplate (23) and bolt (19).
- j Retract flap.
- k Install rigging template on track 3.
  NOTE : Do not rotate hollow bolt on installation of rigging template.
- l Check if sufficient adjustment is now available at lower forward eccentric, if not, repeat steps e thru l.
- m Remove rigging template from track 3.
  NOTE : Do not rotate hollow bolt on template removal.

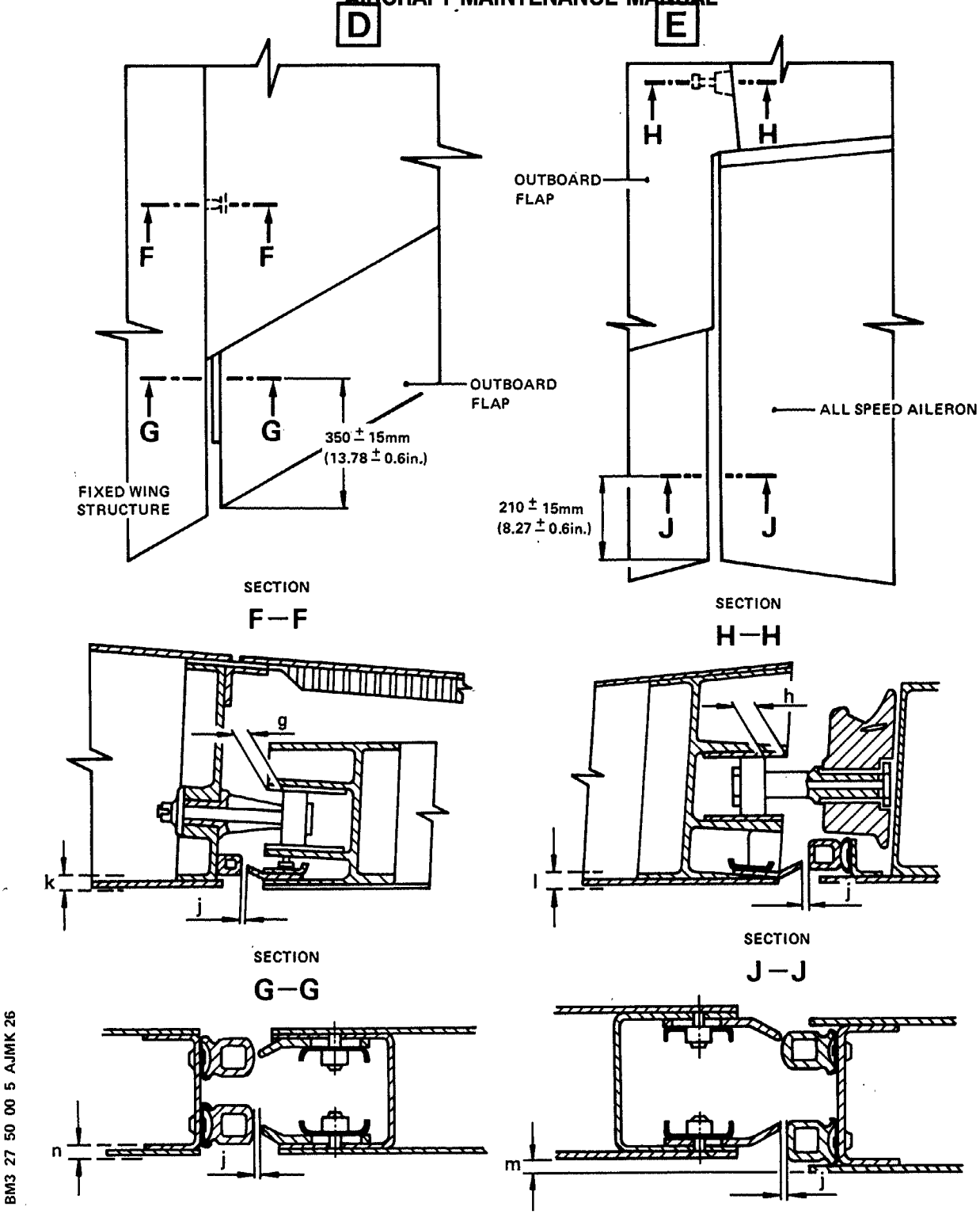
n Extend flap.
o Remove bolt (19).
p Install toothplate (23), secure with bolt (21), washers (22) and nut (20).
q TORQUE nut (20) to between 0.35 and 0.45 m.daN (31 and 40 lbf.in.).
r Position new tab washer (18) on bolt (19) and install bolt (19).
s TORQUE bolt (19) to 5.0 m.daN (37 lbf.ft.).
t Safety bolt (19) with tab washer (18).
u Apply thread locking compound (Material No. 08-007) to threads of three screws (27).
v Apply anti-corrosion compound (Material No. 05-002) to shanks of screws (27),(28).
w Install cross brace attachment bracket complete with cross brace on flap, secure with screws (27),(28).
NOTE : Three longer screws (27) are installed in forward three holes in brackets.
x TORQUE screws (27),(28) to between 0.8 and 0.9 m.daN (5.9 and 6.6 lbf.ft.).
y Retract flap, making certain that cross brace does not become trapped during flap retraction.
z Connect aft end of cross brace to attachment pin on carriage 3, secure with retaining ring (26).
aa Make certain that flap is in correct zero position, insert rigging pin in carriage 3 to confirm, if necessary, drive flap to correct location.
ab Remove pneumatic motor and drive tool from steady bearing 5486 (5529).
ac Remove nuts (5) and bolts (6) securing splitter flange at inboard end of transmission shaft 5501 (5544), support free end of shaft.
ad Install rigging templates at tracks 3, 4 and 5.
NOTE : Do not rotate hollow bolts during installation of templates.

14 Check that rigging pins can be inserted at carriages 3, 4 and 5, if necessary adjust transmission to bring carriages to correct zero position and recheck flap neutral setting with reference to rigging templates.

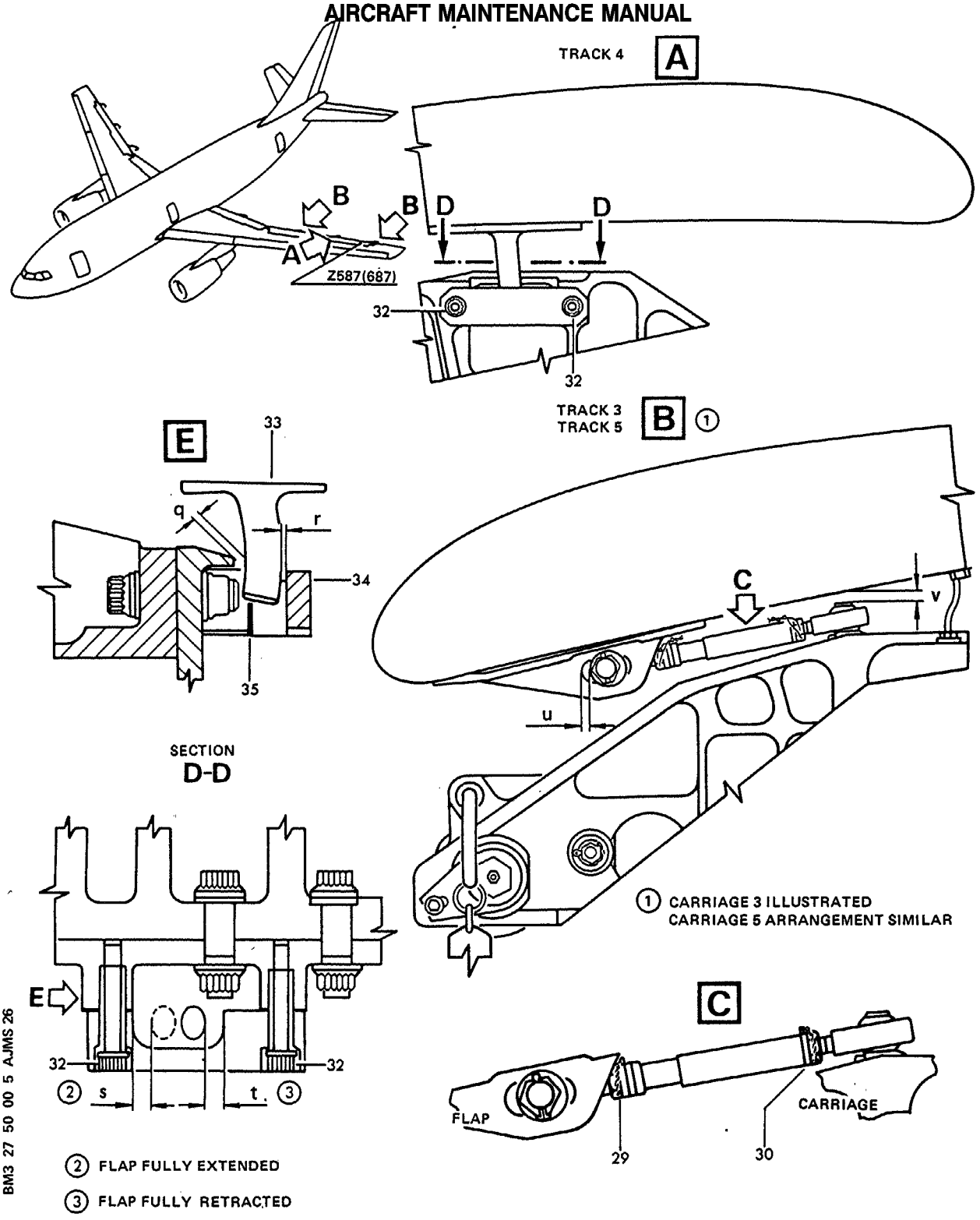
15 Make certain that toothplates are temporarily installed, nuts (10) tightened but not torqued, at all positions where eccentrics have been adjusted.
16 Tighten nut(s) (14) but do not torque or safety at this stage.
17 Connect transmission at splitter flange at inboard end of transmission shaft 5501 (5544), secure with bolts (6), nuts (5).
18 TORQUE nuts (5) to between 10.0 and 12.5 Nm (7.4 and 9.2 lbf.ft.).
19 Remove rigging templates from tracks 3, 4 and 5.
NOTE : Do not rotate hollow bolt during template removal.
20 Install drive tool in steady bearing 5486 (5529) and connect pneumatic motor.
21 Extend flap sufficiently to enable lower shroud access panels to be closed.
22 Close all lower shroud access panels in area of outboard flap.
23 Retract flap.
24 Install rigging pins in carriages 3, 4 and 5.
25 Check that gaps/clearances detailed below are within specified limits
(Ref. Fig. 506) (Sheet 1/3)
(Ref. Fig. 506) (Sheet 2/3)
(Ref. Fig. 506) (Sheet 3/3)
(Ref. Fig. 507)



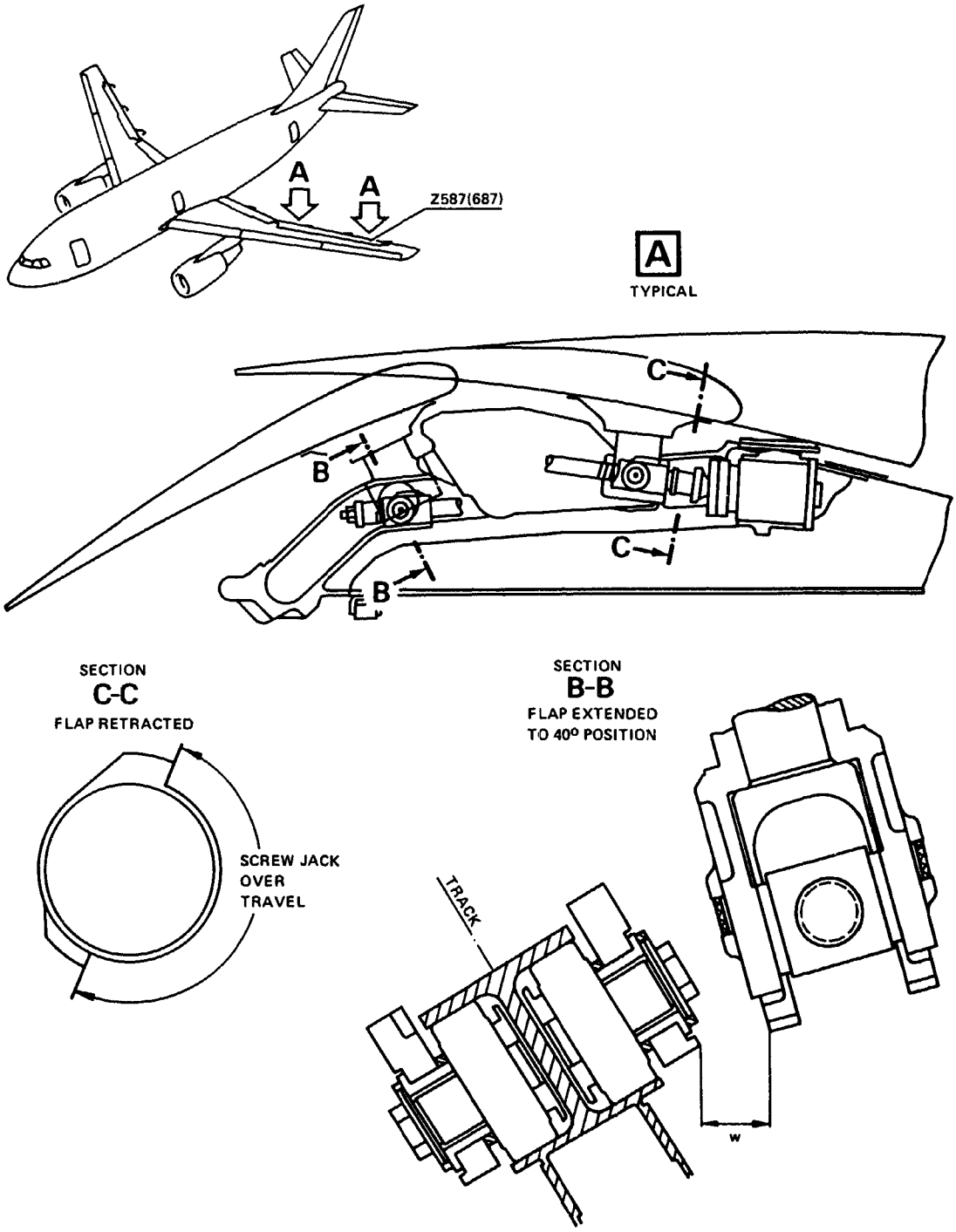
Outboard Flap Clearances (Sheet 1/3)
Figure 506



Outboard Flap Clearances (Sheet 2/3)
Figure 506



Outboard Flap Clearances (Sheet 3/3)
Figure 506



Screwjack Clearances - Outboard Flap
Figure 507

OUTBOARD FLAP CLEARANCES (flap retracted)

Index	Description	Dimension
a	Between flap and lower wing skin	7.0 ±3.0 mm (0.276 ±0.118 in.)
b	Flap lower surface "into" and "out of" wind	0 ±2.6 mm (0 ±0.102 in.)
c	Between teflon block and flap skin reinforcing plate	3.7 ±2.6 mm (0.146 ±0.102 in.)
d	Between flap and lower wing skin	7.0 +3.0, -4.0 mm (0.276+0.118 -0.157 in.)
e	Flap lower surface "into" and "out of" wind	0 ±2.6 mm (0 ±0.102 in.) *
f	Between roller and flap upper surface	2.4 + 2.6, -2.3 mm (0.095+0.10, -0.091 in.)
g	Roller engagement in flap outer end rib track	9.0 ±6.0 mm (0.354 ±0.236 in.)
h	Roller engagement in flap inner end rib track	10.8 ±6.0 mm (0.425 ±0.236 in.)
j	Between adjustable seals on inboard and outboard ends of flap and adjacent fixed structure or aileron	0.5 ± 0.5 mm (0.02 ± 0.02 in.)
k	Skin line of flap lower surface relative to skin line of wing lower surface	0 ±3.3 mm (0 ±0.13 in.)
l	Skin line of flap lower surface relative to skin line of wing lower surface	0 ±3.3 mm (0 ±0.13 in.)
m	Skin line of flap lower surface relative to aileron lower surface	13 ±5 mm (0.512 ±0.197 in.) **

OUTBOARD FLAP CLEARANCES (flap retracted) (cont.)

Index	Description	Dimension
n	Skin line of flap lower surface relative to skin line of wing lower surface	0 ±5 mm (0 ±0.197 in.)
r	Between fail-safe claw and cage	2.0 to 4.0 mm (0.079 to 0.157 in.)
t	Between fail-safe claw and cage	≥ 2.0 mm (≥ 0.079 in.)
u	Between roller and end of slot	2.4 to 3.6 mm *** (0.094 to 0.142 in.)
v	Between cross brace attachment pin and flap surface	≥ 2.0 mm (≥ 0.079 in.)

NOTES : * May be +5.1 mm (+0.2 in.) at this position provided that 50% of flap is within 0 ±2.6 mm (0 ±0.102 in.)
** Must be measured with aileron at correct 0° position
*** This gap to be checked at both sides of attachment bracket

26 If gap between cross brace roller and slot in attachment bracket (index 'u') is not as specified, adjust length of cross brace as follows:
a Cut and discard lockwire and slacken nuts (29) and (30).
NOTE : Nut (29) has a left-hand thread.
b Extend cross brace by rotating barrel until roller contacts end of slot.
c Shorten cross brace by between 1 and 1.5 turns of barrel, ending with the eye ends at 90° to each other.
d TORQUE nuts (29),(30) to 3.0 m.daN (22.2 lbf.ft.) and secure with lockwire.

27 If clearance between fail-safe claw (33) and cage (index 'r') is not as specified, proceed as follows:
- a Measure existing gap between fail-safe claw (33) and cage and record positions of any washers (35) installed between fail-safe cage halves.
- b Slacken and remove bolts (32) and remove fail-safe cage fitting (34).
- c Increase or decrease quantity of washers (35) as required to obtain correct clearance.
- d Smear bolts (32) with anti-corrosion compound (Material No. 05-002).
- e Install cage fitting (34) and washers (35) if required and secure with bolts (32).
- f TORQUE bolts to 4.6 m.daN (33.9 lbf.ft.).
- g Check that clearance between fail-safe claw (33) and cage is within specified limits.

28 Check that fail-safe cross braces at carriages 3 and 5 are free to rotate a minimum of 6° about their longitudinal axis.

29 Using the overtravel measuring device PN 98A27508022000 and check that available screwjack overtravel is within the limits deailed below.

NOTE : Overtravel is the screwjack angular displacement available in the retract direction from the flap zero position before screwjack claw stops come into contact.

SCREWJACK	OVERTRAVEL	
	MIN	MAX
3	135°	540°
4	90°	450°

30 Remove rigging pins from carriages 3, 4 and 5.

31 Using pneumatic motor, fully extend outboard flap.

32 Check that gaps/clearances detailed below are within specified limits.

OUTBOARD FLAP CLEARANCES (flap extended)

Index	Description	Dimension
q	Between fail-safe claw and cage	2.0 to 5.0 mm (0.079 to 0.197 in.)
s	Between fail-safe claw and cage	≥ 2.0 mm (≥ 0.079 in.)
w	Between screwjack trunnion and flap carriage	≥ 6.5 mm (≥ 0.256 in.)

33 Check that fail-safe cross braces at carriages 3 and 5 are free to rotate a minimum of 6° about their longitudinal axis.
34 TORQUE nuts (10),(14) at all positions where eccentrics have been adjusted in accordance with following table.

ECCENTRIC ADJUSTER TORQUE VALUES (Outboard Flap)

LOCATION	ITEM	FIG. IDENT.	REQUIRED TORQUE
Carriages 3 and 5 rear	nut	14	5.5 ±0.5 m.daN (40.5 ±3.7 lbf.ft.)
	nut	10	0.6 +0.1 m.daN (4.4 +0.74 lbf.ft.)
Carriages 3 and 5 forward lower	nut	14	5.5 ±0.5 m.daN (40.5 ±3.7 lbf.ft.)
	nut	10	0.3 +0.1 m.daN (2.2 +0.74 lbf.ft.)
Carriage 4 rear lower	nut	14	5.5 ±0.5 m.daN (40.5 ±3.7 lbf.ft.)
	nut	10	0.3 +0.3 m.daN (2.2 +2.2 lbf.ft.)
Carriage 4 forward	nut	14	5.5 ±0.5 m.daN (40.5 ±3.7 lbf.ft.)
	nut	10	0.6 +0.1 m.daN (4.4 +0.74 lbf.ft.)

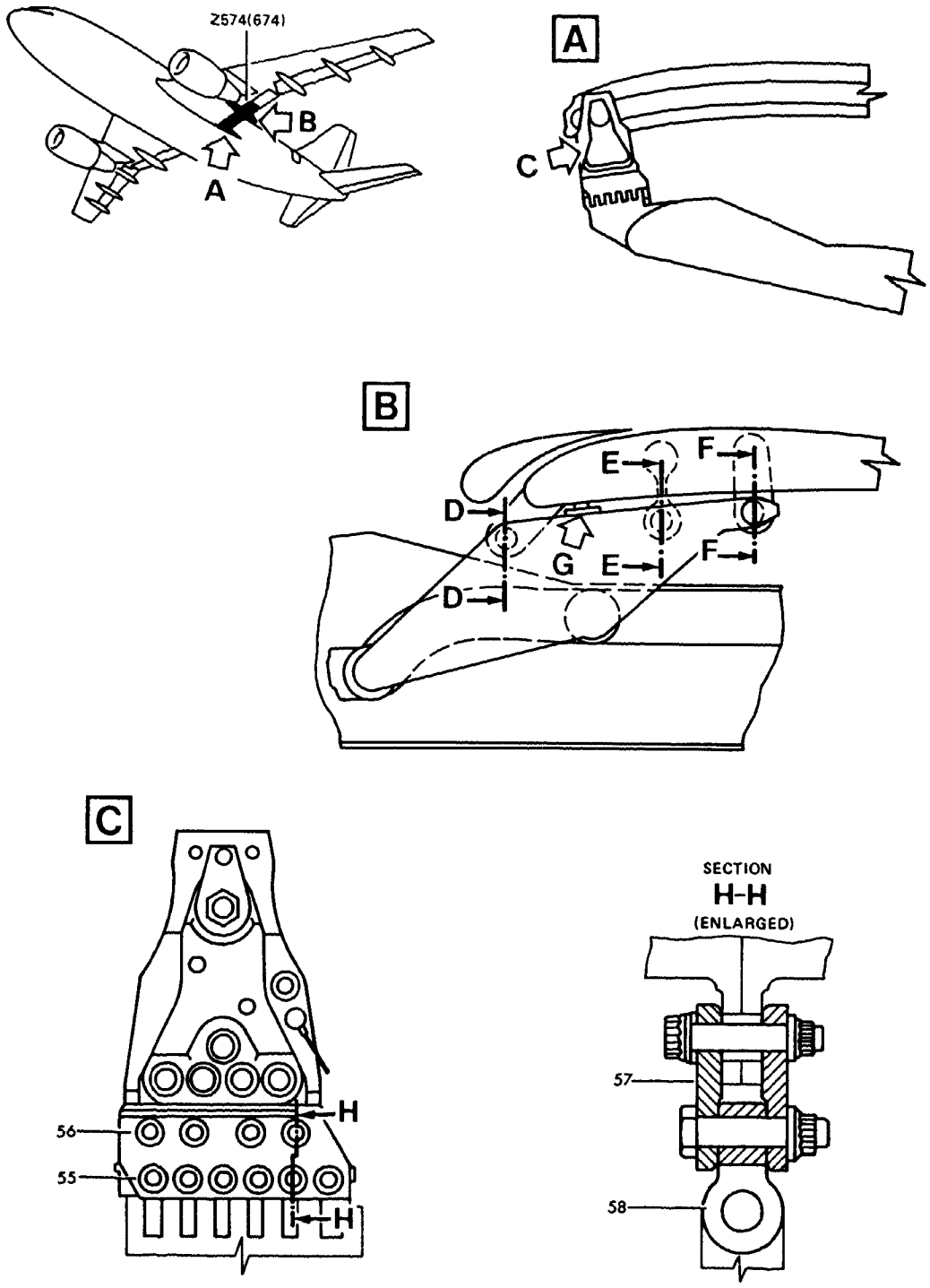
35 Secure nuts (14) at all positions where adjustment has been performed with cotter pins (13).
36 Install movable fairings at tracks 3, 4 and 5 (Ref. 27-50-21, P. Block 401).
37 Retract outboard flap.
38 Install rigging pins in carriages 3 and 5 and install APPU (Ref. 27-56-11, P. Block 401).
39 Remove pneumatic motor and drive tool from steady bearing 5486 (5529).

40 Install transmission shaft 5485 (5528) in screwjack 2 connection.
41 Without subjecting crown spline joint at inboard end to undue strain deflect shaft sufficiently to allow universal joint to be inserted in steady bearing.
42 Install universal joint in steady bearing 5486 (5529) positioning it such that splitter flange bolt holes align.
43 Secure splitter flange connection with bolts (6) and nuts (5).
44 TORQUE nuts (5) to between 10.0 and 12.5 Nm (7.4 and 9.2 lbf.ft.).

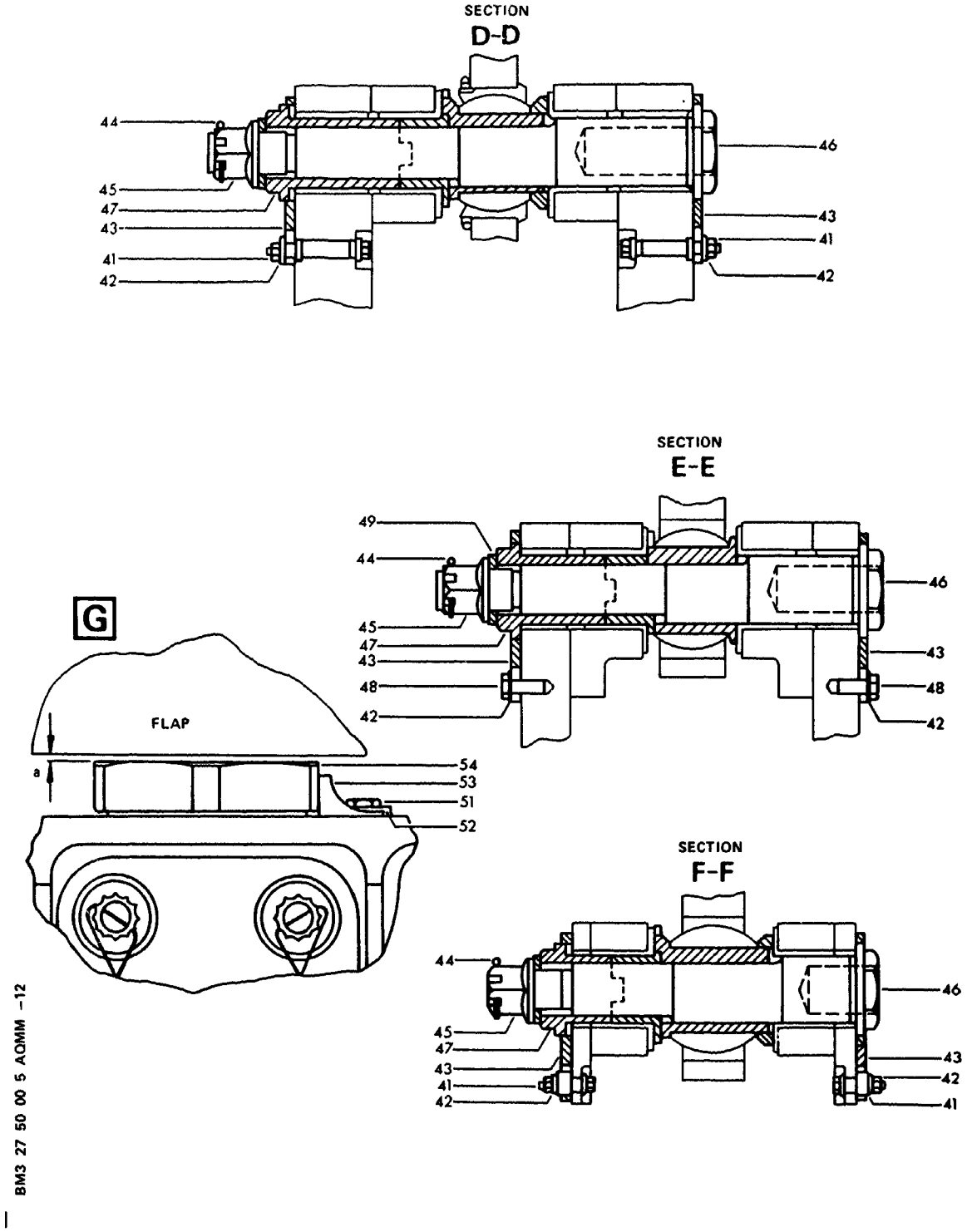
(b)For adjustment of inboard flap proceed as follows:
(Ref. Fig. 503, 502)
(Ref. Fig. 508) (Sheet 1/2)
(Ref. Fig. 508) (Sheet 2/2)

1 Remove nuts (5) and bolts (6) securing splitter flange at outboard end of transmission shaft 5485 (5528), deflect end of shaft to clear universal joint (without subjecting crown spline joint at inboard end to undue strain), withdraw shaft from screwjack 2, and remove universal joint from steady bearing 5486 (5529).
2 Remove nuts (3) and bolts (4) securing 8/12 hole splitter flange at plunging joint outboard of screwjack 1.
3 Remove nuts (3) and bolts (4) securing 8/12 hole splitter flange at plunging joint inboard of screwjack 1.
4 Remove rigging template from track 2.
5 Remove movable fairing from track 2 (Ref. 27-50-21, P. Block 401).
6 Install rigging template on track 2, using alternative center pin at fairing pivot attachment and supporting aft end of template on rear of track.
7 At center (fail-safe) flap connection on carriage 2 remove bolts (48), washers (42) and toothplates (43), remove and discard cotter pin (44) and remove nut (45), washer (49) and eccentric bolt (46).
8 Refer to table below and decide which eccentric(s) require adjustment.

NOTE : It is usually possible to adjust flap by means of carriage 2 eccentrics only. Adjustment of carriage 1 is necessary only if insufficient adjustment is available at carriage 2.



Inboard Flap Adjustment (Sheet 1/2)
Figure 508



Inboard Flap Adjustment (Sheet 2/2)
Figure 508

	Direction in which flap position is affected	Adjustment governed by:
Carriage 1		
Toothed plate connection	- Fore/Aft	Screwjack 1 stop and vertical clearance
	- Vertical	
Carriage 2		
Forward Connection (Double Eccentric)	- Fore/Aft	Screwjack stops and rigging template
	- Vertically	
	- Angular Deflection	
Aft Connection (Double Eccentric)	- Vertically	Rigging template
	- Angular Deflection	
Center Connection (Double Eccentric)	- Does not normally affect flap positioning	Is adjusted in accordance with other two connections

9 On eccentric(s) requiring adjustment remove nuts (41), washers (42) and toothplates (43), remove and discard cotter pin (44) and slacken nut (45).

10 Adjust eccentric bolt(s) (46) and eccentric bush(es) (47) as necessary to correctly position the flap in relation to the rigging template as follows:

	Between template pins and flap lower surface (min/max gage)	Between rear template pin and flap trailing edge
Inboard flap	25 mm ±0.5 mm (0.984 ±0.020 in.)	25 mm ±0.5 mm (0.984 ±0.020 in.)

NOTE : When checking above dimensions, rigging pins should be installed in carriages, but removed for adjustment of eccentrics. Due to vane spring effect it may be necessary to return carriages to correct position by manually rotating transmission shafting, using turning jig if required.
If both forward and rear eccentrics are adjusted temporarily install toothplates on eccentric after each adjustment.

11 If sufficient adjustment is not available on carriage 2 to correctly position the flap, adjust the setting of carriage 1 as follows
(Ref. Fig. 502),
(Ref. Fig. 508) (Sheet 1/2 and 2/2):
a Determine in which direction adjustment is required at carriage 1.
b Connect transmission at plunging joint outboard of screwjack 1, secure with bolts (4) and nuts (3).
c Tighten nuts (3) but do not torque at this stage.
d Remove rigging template from track 2.
e Insert drive tool in outboard side of screwjack 2 connect pneumatic motor.
f Make certain that rigging pins are not installed in carriages 1 or 2 and extend flap until vane is clear of wing structure.
g Slacken nuts (55) and (56) sufficiently to disengage the serrations on the side plates (57).
h Adjust the flap complete with hinge (58) and side plates (57) until it reaches the desired position in relation to the upper section of carriage 1.
i Make certain that the serrations on the side plates (57) are engaged and tighten nuts (55) and (56).
j TORQUE nuts (55) to 3.6 m.daN (26.6 lbf.ft.).
k TORQUE nuts (56) to 4.8 m.daN (35.4 lbf.ft.).
l Retract flap and install rigging pins in carriages 1 and 2.
m Install rigging template on track 2.
n Remove nuts (3) and bolts (4) securing 8/12 hole splitter flange on plunging joint outboard of screwjack 1.
o Remove pneumatic motor and drive tool from screwjack 2.
p Continue adjustment of flap carriage 2 eccentrics as detailed in steps (9)(b)8 thru (9)(b)11 above.

12 Adjust position of eccentric bush (47) at center flap attachment on carriage 2 until it is possible to insert the oversize eccentric pin PN 98A27508010000.

13 Insert the oversize eccentric pin and note the exact position of the punch marks on eccentric bush (47) and oversize eccentric pin.

14 Install toothplate (43) on eccentric bush (47), secure with washer (42) and bolt (48). Tighten bolt (48) but do not torque at this stage.

15 Withdraw oversize eccentric pin from connection and install eccentric bolt (46) with punch mark in exactly the same position as was the punch mark on the oversize eccentric pin.

16 Install toothplate (43) on eccentric bolt (46), secure with washer (42) and bolt (48). Tighten bolt (48) but do not torque at this stage.

17 Install washer (49) and nut (45). Tighten nut (45) but do not torque at this stage.
18 Install rigging pins in carriages 1 and 2, if necessary positioning carriages by manually turning transmission.
19 Connect transmission at 8/12 hole splitter flange on plunging joint outboard of screwjack 1, secure with bolts (4)and nuts (3).
20 TORQUE nuts (3) to between 10.0 and 12.5 Nm (7.4 and 9.2 lbf.ft.).
21 Insert drive tool in outboard side of screwjack 2 and connect pneumatic motor.
22 Remove rigging template from track 2.
23 Remove rigging pins from carriages 1 and 2.
24 Extend flap enough to ease closing of shroud panels.
25 Close lower wing shroud panels in area of inboard flap
26 Retract flap and install rigging pins in carriages 1 and 2.
27 Check that available flap screwjack overtravel is within limits detailed below.
NOTE : Overtravel is the screwjack spindle angular displacement available in the retract direction from the flap zero position before screwjack clawstops come into contact.

SCREWJACK	OVERTRAVEL	
	MIN	MAX
1	270°	820°
2	180°	650°

28 Record actual value of overtravel available at screwjack 1 for reference later.
29 Temporarily install access panels 577AB, BB (677AB, BB).
30 Check that clearance between inboard guide roller and flap (dimension 'p') is as detailed in table (Ref. Fig. 510) (Sheet 2/3).
31 If clearance between inboard guide roller and flap (dimension 'p') is not correct, proceed as follows:
a Slacken nuts (60).
b Adjust position of roller until required clearance is obtained and tighten nuts (60).
c TORQUE nuts (60) to between 1.8 and 2.0 m.daN (13.25 and 14.75 lbf.ft.).
32 Check, using feeler gage PN 98A27508052000, that clearance between carriage 2 fail-safe spigot nut and lower surface of flap (dimension 'a') is within specified limits (Ref. Fig. 508) (Sheet 2/2).

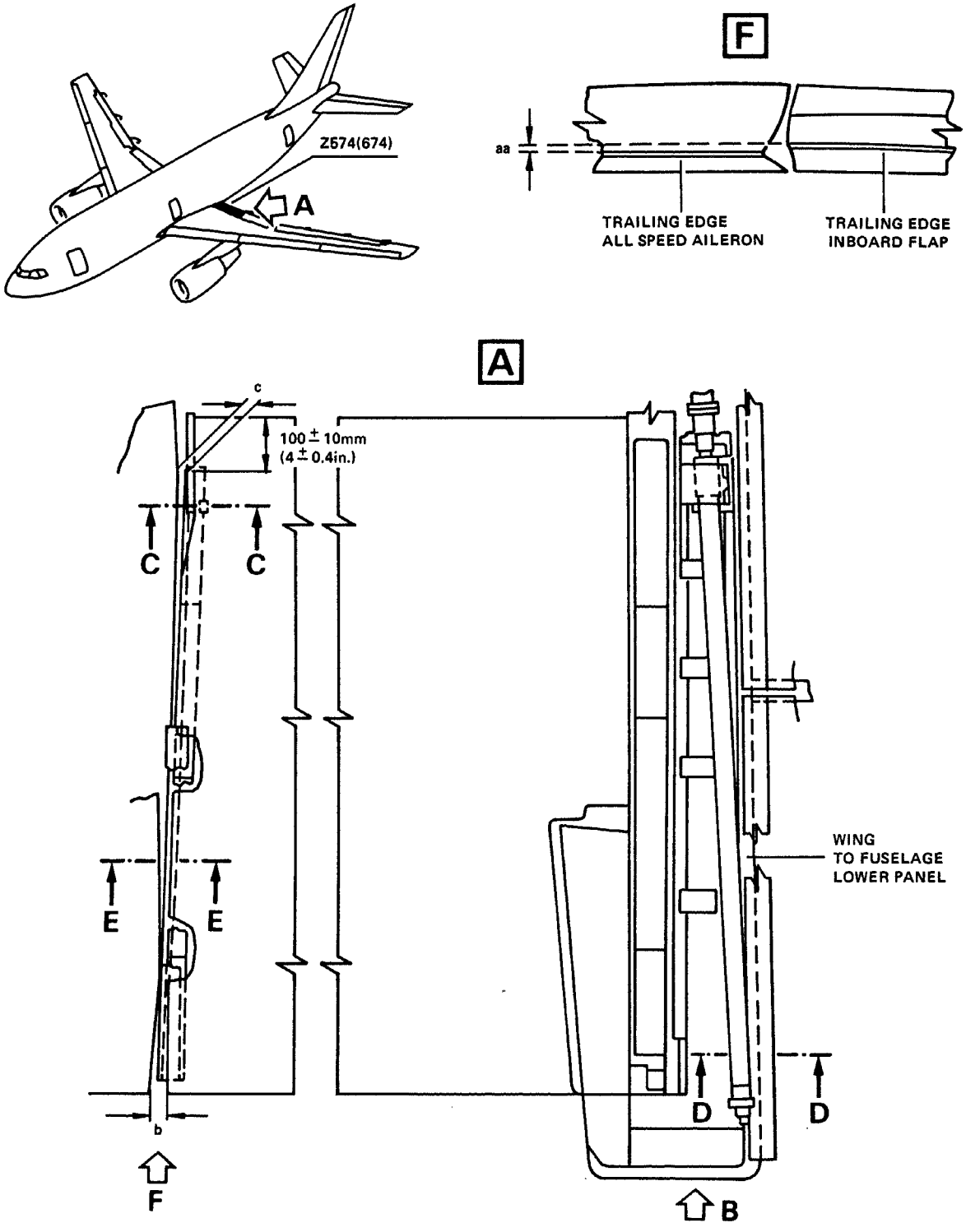
33 If spigot nut/flap clearance (dimension 'a') is not correct, proceed as follows:
   a Remove bolt (51), washer (52) and angle (53).
   b Rotate nut (54) until correct clearance is obtained.
   c Install angle (53), secure with washer (52) and bolt (51).
   d TORQUE bolt (51) to between 2.35 and 2.55 m.daN (17.3 and 18.80 lbf.ft.).

34 Make certain that outboard flap guide roller is positioned in flap guide such that it is free to rotate during flap travel within 100 mm (4.0 in.) of flap zero position.

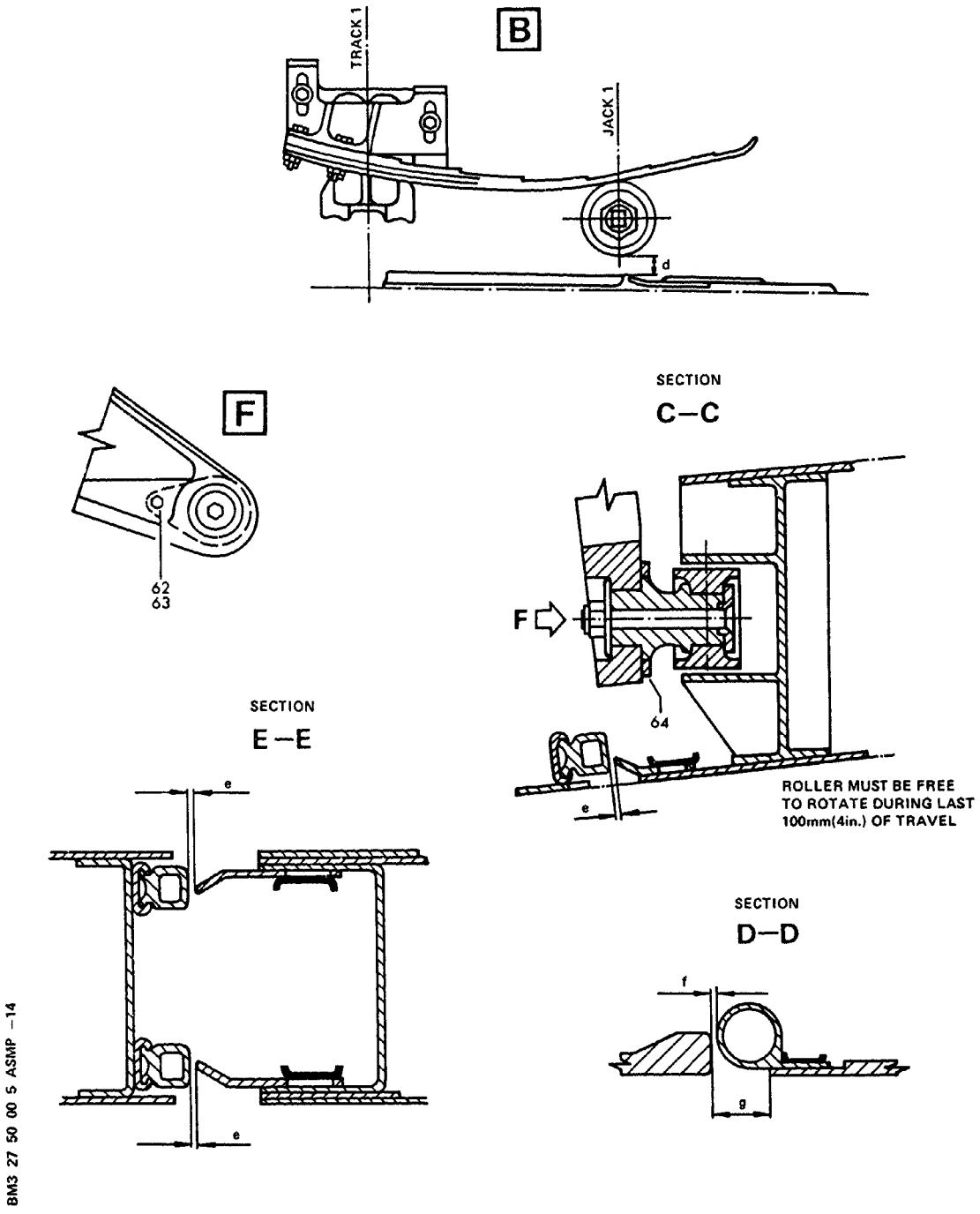
35 If required, adjust outboard flap roller as follows (Ref. Fig. 509) (Sheet 2/2):
   a Remove nut (62), bolt (63) and toothplate (64).
   b Adjust position of eccentric to correctly locate roller in track.
   c Install toothplate (64) and secure with bolt (63) and nut (62).
   d Tighten nut (62).

36 Check setting of flap screwjack 1 support spring and adjust as required (Ref. 27-54-36, P. Block 401).

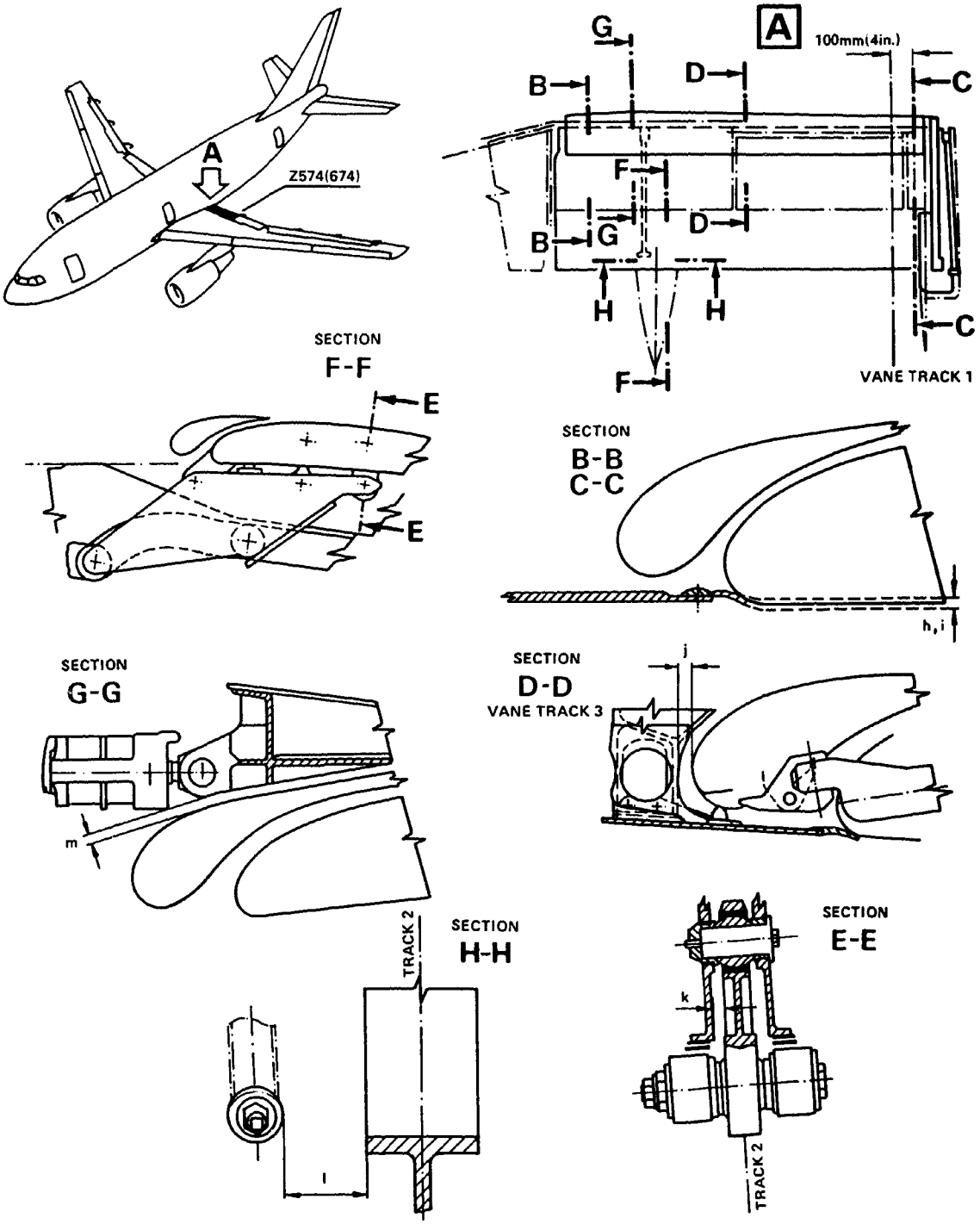
37 Check all other dimensions listed in table below are within specified limits.
   (Ref. Fig. 509) (Sheet 1/2)
   (Ref. Fig. 509) (Sheet 2/2)
   (Ref. Fig. 510) (Sheet 1/3)
   (Ref. Fig. 510) (Sheet 2/3)
   (Ref. Fig. 510) (Sheet 3/3)



Inboard Flap Clearances - 1 (Sheet 1/2)
Figure 509



Inboard Flap Clearances - 1 (Sheet 2/2)
Figure 509



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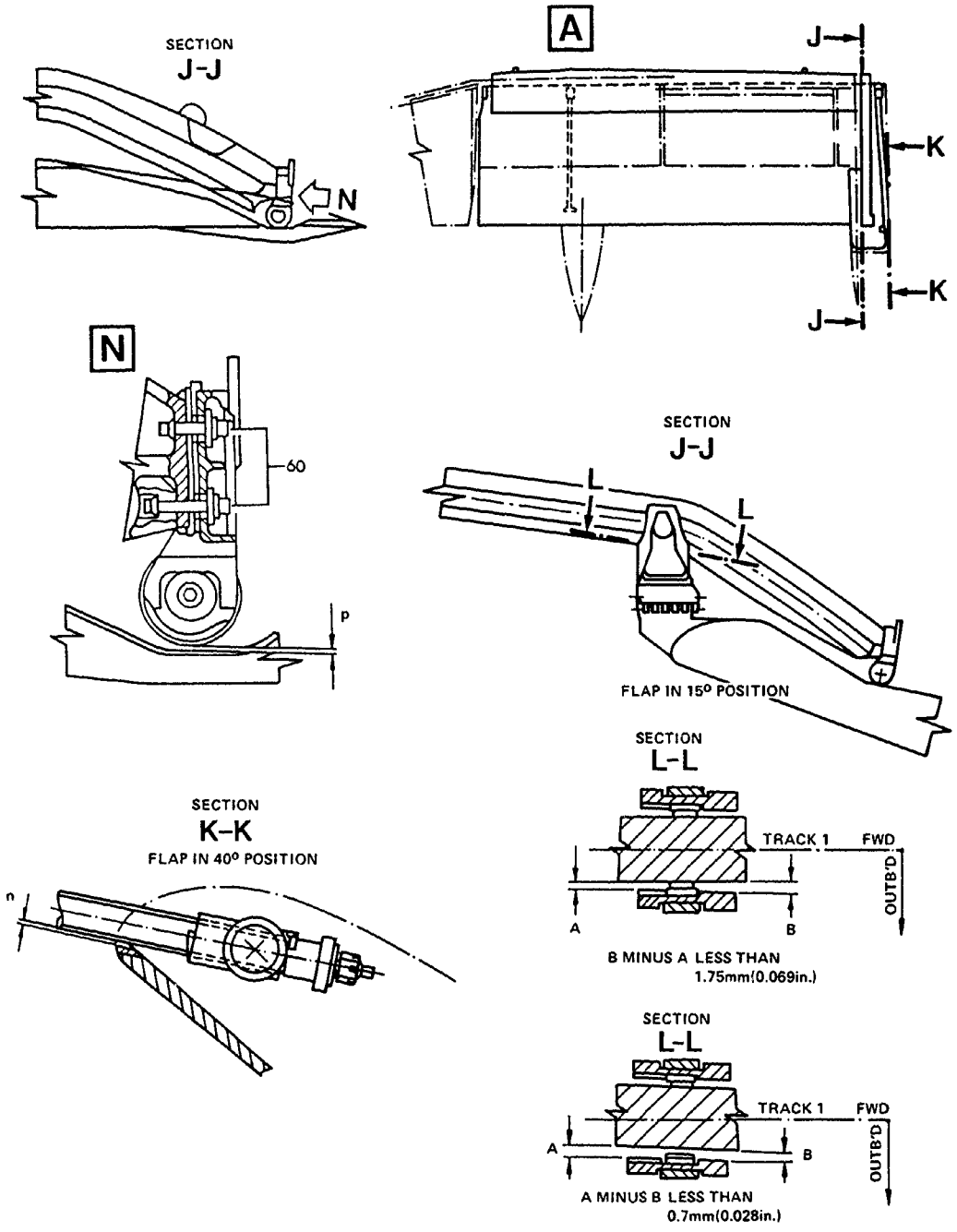
Inboard Flap Clearances - 2 (Sheet 1/3)
Figure 510



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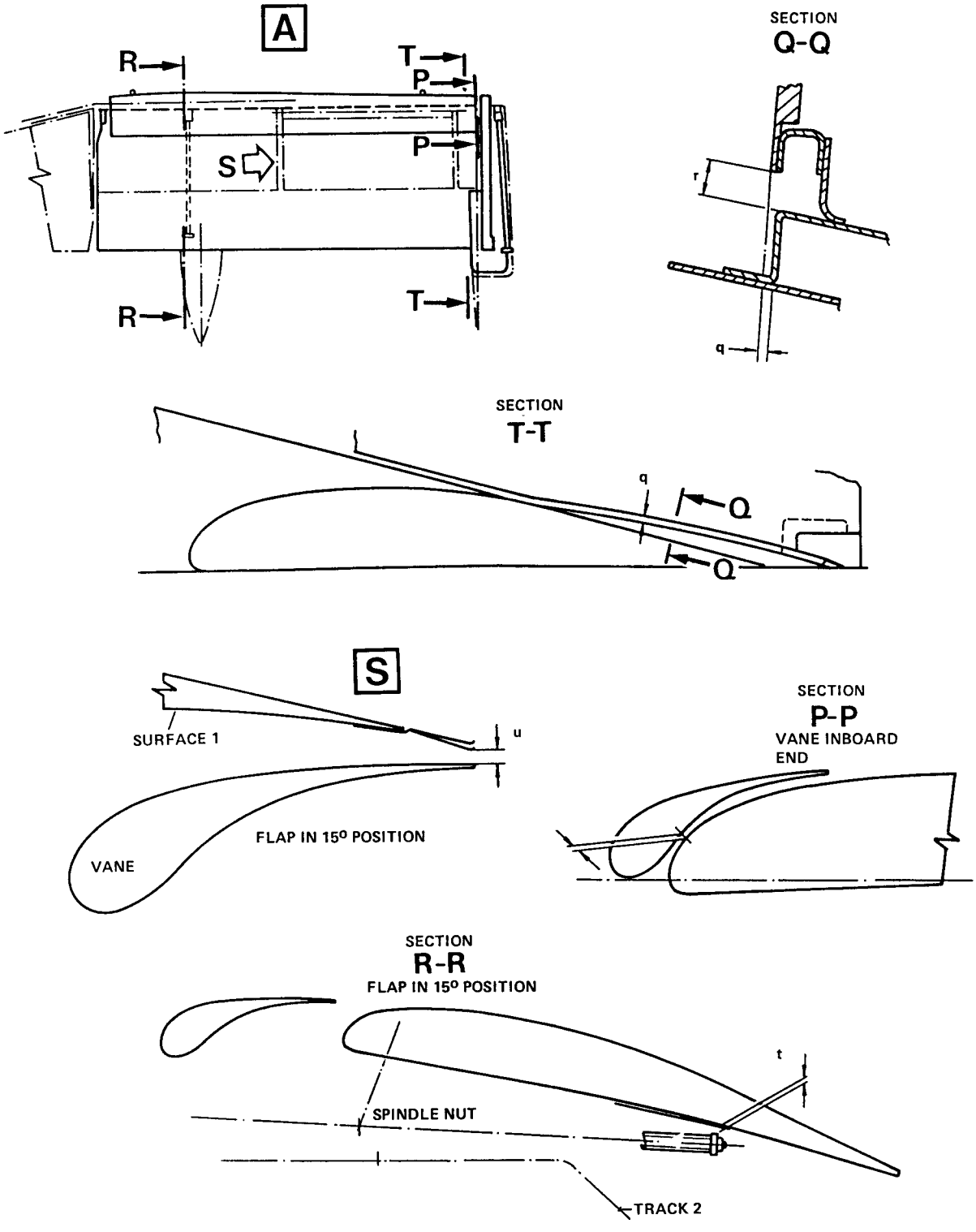
Inboard Flap Clearances - 2 (Sheet 2/3)
Figure 510



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Inboard Flap Clearances - 2 (Sheet 3/3)
Figure 510

R

INBOARD FLAP CLEARANCES (flap retracted)

Index	Description	Dimension
a	Between flap lower surface and closest part of fail-safe spigot housing nut on carriage	0.7 ±0.2 mm (0.027 ±0.0079 in.) *
b	Between flap trailing edge and aileron trailing edge	35.5 ±7.0 mm (1.4 ±0.28 in.) **
bb	Trailing edges of all speed aileron and inboard flap	23 ±5.5 mm (0.91 ±0.22 in.) **
c	Between flap lower skin and aileron lower skin	25.4 ±7.0 mm (1.00 ±0.28 in.) **
d	Between screwjack 1 roller and flap lower skin	≥ 12 mm (≥ 0.47 in.)
e	Between seals on flap and aileron	0.5 ±0.5 mm (0.02 ±0.02 in.) **
f	Between structure seals and flap	0 +2.0 mm (0 +0.079 in.)
g	Between fixed structure and flap	28.0 ±5.0 mm (1.1 ±0.2 in.)
h	Flap lower surface "into" or "out of" wind (inboard end of flap)	3.0 mm (0.12 in.) into or out of wind
i	Flap lower surface "out of" wind (outboard end of flap)	0.0 to 3.0 mm (0.0 to 0.12 in.) out of wind
j	Between vane leading edge and wing structure	≥ 10.0 mm (≥ 0.4 in.)
k	Between aft flap attachment and flap structure	≥ 9.6 mm (≥ 0.38 in.)

INBOARD FLAP CLEARANCES (flap retracted) (cont.)

Index	Description	Dimension
l	Between flap screwjack 2 and track 2	60.0 to 115.0 mm (2.36 to 4.52 in.)
m	Between surface 2 actuator (surface retracted) and vane	≥ 11.0 mm (≥ 0.43 in.)
p	Between inboard guide roller and flap	2.0 ±0.2 mm (0.079 ±0.008 in.)
q	Between inboard end of flap and wing to fuselage fairing	2.5 ±5 mm (0.1 ±0.2 in.)
r	Between fence and wing to fuselage fairing	18.0 ±4.0 mm (0.7 ±0.16 in.)
s	Between vane skin and flap leading edge skin	see below

NOTE : The minimum value for dimension "s" is calculated using the following formula:

$$s = \left(\frac{\theta^{\circ} \times 7.25}{720}\right) + 1$$ where θ is the available clawstop overtravel

measured at screwjack 1 with the carriage at 0° position and the rigging pin installed.

example: if available overtravel is 300° then $s = \left(\frac{300^{\circ} \times 7.25}{720}\right) + 1$

s = 4.02 mm (0.158 in.) minimum

* This dimension checked using tool PN 98A27508052000
** Aileron must be correctly positioned at 0°.

38 Install toothplates (43) at all positions where eccentric bolts/ bushes have been adjusted, secure with washers (42) and nuts (41).
39 TORQUE nuts (45), nuts (41) and bolts (48) at all positions where eccentrics have been adjusted in accordance with the following table:

ECCENTRIC ADJUSTER TORQUE VALUES (Carriage 2)

LOCATION	ITEM	FIG. IDENT.	REQUIRED TORQUE
Carriage 2 forward	nut	45	8.5 +1.0 m.daN (62.6 +7.4 lbf.ft.)
	nut	41	0.6 +0.1 m.daN (4.4 +0.74 lbf.ft.)
Carriage 2 center (fail-safe)	nut	45	4.5 +1.0 m.daN (33.2 +7.4 lbf.ft.)
	bolt	48	0.6 +0.1 m.daN (4.4 +0.74 lbf.ft.)
Carriage 2 rear	nut	45	8.5 +1.0 m.daN (62.6 +7.4 lbf.ft.)
	nut	41	0.6 +0.1 m.daN (4.4 +0.74 lbf.ft.)

40 Safety nuts (45) with cotter pins (44).
41 Insert drive tool in outboard side of screwjack 2 and connect pneumatic motor.
42 Remove rigging pins from carriages 1 and 2.
43 Extend inboard flap to 15° position (≈ 220 revolutions of shaft) and while flap is extending check freedom of outboard guide roller during initial 100 mm (4 in.) of travel.
44 Check the following clearances are within specified limits with the flap at 15° position (Ref. Fig. 510) (Sheets 1/3 thru 3/3).

INBOARD FLAP CLEARANCES (flap at 15° position)

Index	Description	Dimension
t	Between flap screwjack 2 end roller and flap lower surface	≥ 10.0 mm (≥ 0.4 in.)
u	Between spoiler trailing edge and vane trailing edge - at inboard end of surface 1	≥ 5.0 mm (≥ 0.2 in.)
u	- at center of surface 1	≥ 9.5 mm (≥ 0.37 in.)
u	- at outboard end of surface 1	≥ 12.5 mm (≥ 0.5 in.)
u	- at inboard end of surface 2	≥ 12.5 mm (≥ 0.5 in.)
u	- at center of surface 2	≥ 13.5 mm (≥ 0.53 in.)
u	- at outboard end of surface 2	≥ 14.0 mm (≥ 0.55 in.)
u	Between trailing edge of fixed shroud and vane trailing edge	≥ 5.0 mm (≥ 0.2 in.)

45 If clearance of outboard guide roller was unsatisfactory during initial 100 mm (4 in.) of flap extension, adjust setting of roller as detailed in steps 34 and 35 above.
46 Extend flap fully to 40° position.
47 Check that the following clearance is as specified with the flap at 40° position (Ref. Fig. 510) (Sheet 2/3).

INBOARD FLAP CLEARANCES (flap at 40° position)

Index	Description	Dimension
n	Between flap screwjack 1 spindle and flap structure	≥ 2.0 mm (≥ 0.08 in.)

48 Install movable fairing on track 2 (Ref. 27-50-21, P. Block 401).
49 Fully retract flap, checking outboard guide roller for satisfactory clearance during final 100 mm (4 in.) of travel if it was further adjusted at step 45 above.
50 Install rigging pins in carriages 1 and 2.
51 Remove pneumatic motor and drive tool from outboard side of screwjack 2.
52 Install transmission shaft 5485 (5528) in screwjack 2 connection.
53 Without subjecting crown spline joint at inboard end to undue strain deflect shaft sufficiently to allow universal joint to be inserted in steady bearing.
54 Install universal joint in steady bearing 5486 (5529) positioning it such that splitter flange bolt holes align.
55 Secure splitter flange connection with bolts (6) and nuts (5).
56 Remove access panels 577AB, BB (677AB, BB)
57 Connect transmission at 8/12 hole splitter flange on plunging joint inboard of screwjack 1, secure using bolts (4) and nuts (3).

D. Test
(1)Remove rigging pins from all carriages.
(2)Make certain that all areas worked in are free of tools or equipment and that the travel range of the flaps is free of obstructions.
(3)Remove tags and safety clips and close circuit breakers 10CV, 6CV, 5CV.
(4)Remove safety guard from flap/slat control lever quadrant.
(5)Perform operational test of flap system (Ref. 27-54-00, P. Block 501).
(6)Check that transmission has returned to zero position by inserting rigging pins in all carriages.

R NOTE : This procedure sets the flap carriages at zero as established
R using flap adjustment rigging pin set PN 98A27508003001. This
R position differs slightly from the acceptable in service zero
R position which is checked using flap neutral setting check pin
R set PN 98A27508015001.

NOTE : It may not be possible to insert rigging pins PN 98A27508003001 in which case check pins PN 98A27508015001 may be used.

(7)Remove rigging pins/check pins from all carriages.

E. Close-Up
(1)Extend flap to 15° position (Ref. 27-50-00, P. Block 301).
(2)Open, safety and tag circuit breakers 10CV, 6CV, 5CV.
(3)Apply corrosion preventive (Material No. 05-005) to all transmission system connection bolts and nuts which have been disturbed.
(4)Close access panels 577AB, BB (677AB, BB), 576AB (676AB), 575CB (675CB) and any shroud panels remaining open in zones 572 (672) 581 (681).
(5)Install fairing plugs 535BL (635BL), 534BL (634BL), 533BL (633BL), 532BR (632BR).
(6)Make certain that work area is clean and clear of tools and miscellaneous items equipment.
(7)Remove safety clips and tags and close circuit breakers 10CV, 6CV, 5CV.
(8)Retract flaps (Ref. 27-50-00, P. Block 301).
(9)Remove access platform.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SURFACES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3 m (10 ft.)
	B. 98A27108028000	Safety Collar Set - All Speed Aileron Actuator
	C. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	D. 98A27508003001	Rigging Pin Set - Flap Adjustment
R	E. 98F27508498000	Hoisting Sling - Inboard Flap
	F. 98A27508010000	Oversize Eccentric Pin - Flap Carriage 2
	G. 98A27508013000	Drive Tool - Flap Torque Shaft
	H. 98A27508015001	Check Pin Set - Flap Neutral Setting
	I. 98A27508022000	Measuring Device - Overtravel, Flap Screwjacks 1 thru 4
	J. 98A27508025000	Chock Set - Flap Carriages, Location to Tracks 1 and 2
	K. 98A27508026000	Support Cradle - Flap Spindle
	L. 98A27508030000	Templates - Inboard Flap, Track 2
	M. 98A27508031000	Tie Rods - Flap Carriage 1
	N. 98A27508050000	Turning Jig - Flap Drive Shaft
	O. 98A27508052000	Feeler Gage - Fail Safe Spigot Ring, Carriage 2
	P. 98A27608014000	Safety Collar Set - Airbrake Actuator Piston
	Q.	Torque Wrenches, Range up to 9 m.daN (66.4 lbf.ft.)
	R.	Pneumatic Motor
	S.	Trestles
	T.	Safety Barriers
	U.	Circuit Breaker Safety Clips and Tags
	V.	Warning Notice Prohibiting the Pressurization of Hydraulic Systems
	W.	Cotter Pins
	X.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	Y. Material No. 04-004	Common Greases (Ref. 20-31-00)
	Z. Material No. 05-002	Special Materials (Ref. 20-31-00)
	AA.Material No. 05-005	Special Materials (Ref. 20-31-00)
	AB.Material No. 06-002	Lubricants (Ref. 20-31-00)

ITEM	DESIGNATION
AC.Material No. 09-001	Sealants (Ref. 20-31-00)
AD.Material No. 09-016	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 12-22-27, P. Block 1	Flight Controls Lubrication
- 20-28-11, P. Block 1	Electrical Bonding
- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-50-21, P. Block 401	Flap Track Fairings
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-54-25, P. Block 401	Carriage 1
- 27-54-26, P. Block 401	Carriage 2
- 27-56-15, P. Block 401	Vane Jam Detector Unit
- 29-21-00, P. Block 301	Green Auxiliary Power
- 57-25-17, P. Block 401	Damper Assembly

2. Procedure for Removal/Installation of Inboard Flap without Carriages

NOTE : Removal/installation for the LH inboard flap without carriages is described, variations for the RH inboard flap without carriages are described in brackets.

A. Job Set-Up

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2) Make certain that electronics racks ventilation is correct.
(3) Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(4) Set all speed aileron (ASA) fully down on the wing being worked on.
(5) Fully extend the flaps (Ref. 27-50-00, P. Block 301).
(6) Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(7) Position access platform.
(8) Install safety collars PN 98A27108028000 on all three ASA servocontrols.
(9) Open access doors 572AB (672AB), 572BB (672BB), 572CB (672CB), 572DB (672DB), 575DB (675DB), 577AB (677AB) and 577BB (677BB).
(10) Remove flap track fairing No. 2 (Ref. 27-50-21, P. Block 401).
(11) Turn maintenance device on valve groups applicable to speedbrake surfaces 1 and 2 to position "M".
(12) Manually extend speedbrakes 1 and 2 and install safety collars PN 98A27608014000 on speed brake actuators.
(13) Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(14) Fully retract flaps (Ref. 27-50-00, P. Block 301).
R (15) Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(16) Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(17)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(18)Position warning notice prohibiting pressurization of hydraulic systems.
(19)Remove plugs 533BL (633BR) and 535BL (635BR) from flap track fairings 3 and 5.

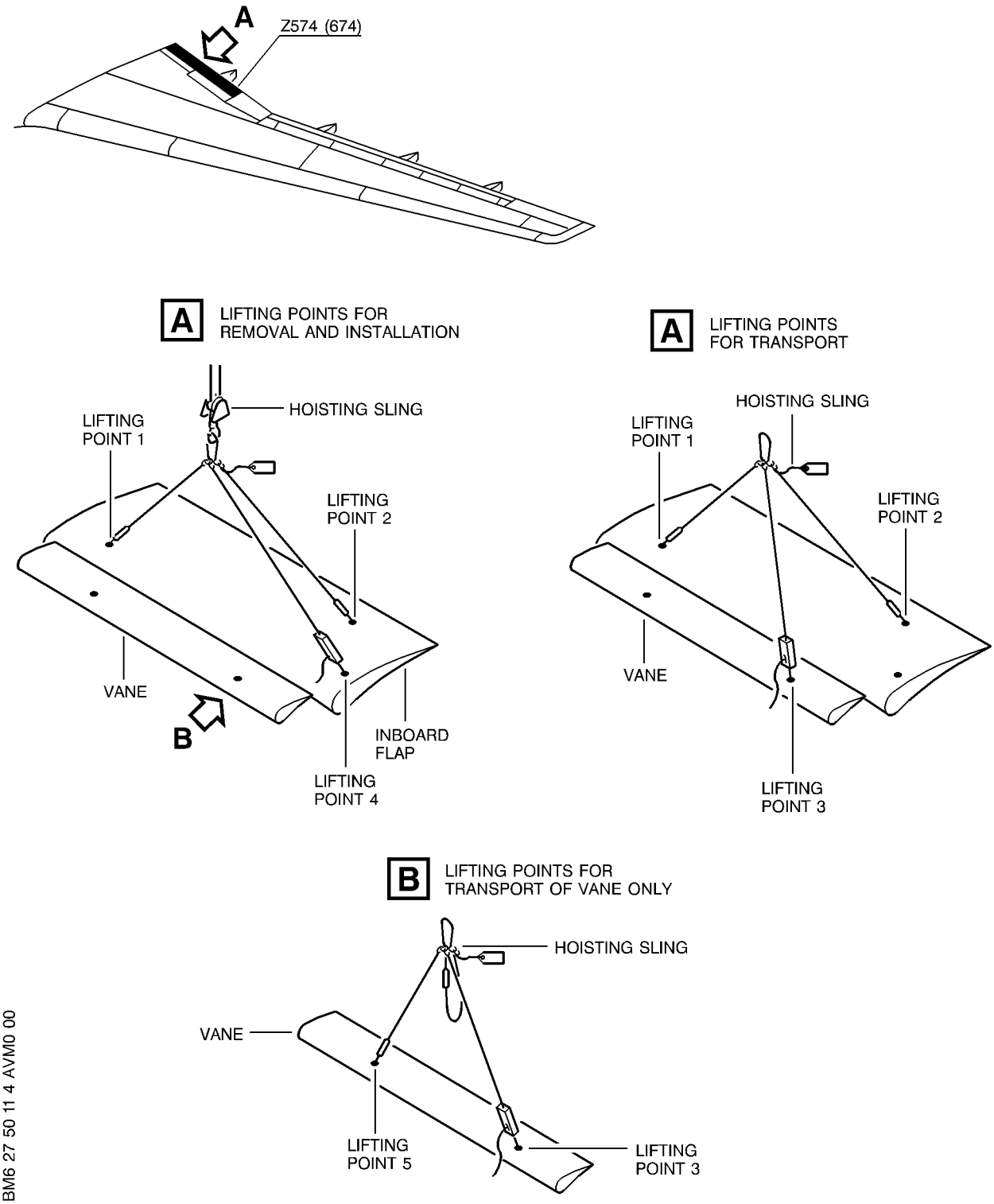
B. Removal

R (Ref. Fig. 401)
(Ref. Fig. 402)
(Ref. Fig. 403)
(Ref. Fig. 404)
(Ref. Fig. 405)
(Ref. Fig. 406)

(1)Install check pins from check pin set PN 98A27508015001 in track carriages 3 and 5.
(2)Remove nuts (107) and bolts (106) securing flange at outboard end of shaft (96) immediately outboard of screwjack 2.
(3)Without subjecting crown spline joint to undue deflection, displace end of shaft until flange halves are clear of each other and withdraw shaft from splined connection of screwjack 2.
(4)Remove check pins from track/carriages 3 and 5 and install rigging pins from rigging pin set PN 98A27508003001 in track/carriages 3 and 5. If required, turn transmission as far as necessary to install rigging pins.
(5)Install chock sets PN 98A27508025000 in tracks 1 and 2.
(6)Connect driving tool PN 98A27508013000 to the splined joint on the outboard side of screwjack 2.
(7)Connect pneumatic motor to the driving tool.
(8)Install turning jig PN 98A27508050000 on transmission system between screwjacks 1 and 2 and hold it in flap retracted direction (against flap vane spring load).
(9)Remove nuts (103) and bolts (104) and torque shaft (98) immediately inboard of screwjack 1.

WARNING : MAKE CERTAIN THAT FLAP SURFACE TRAVEL RANGE IS CLEAR.

(10)Release turning jig PN 98A27508050000 and simultaneously carefully extend flap using pneumatic motor until carriages 1 and 2 rest on their respective chocks.
(11)Disconnect the pneumatic motor and drive tool.
(12)Install screwjack support cradles (13) on tracks 1 and 2.
(13)Cut and discard lockwire and remove four bolts (20) and washers (19) securing trunnion fail safe bearing half housings (16).



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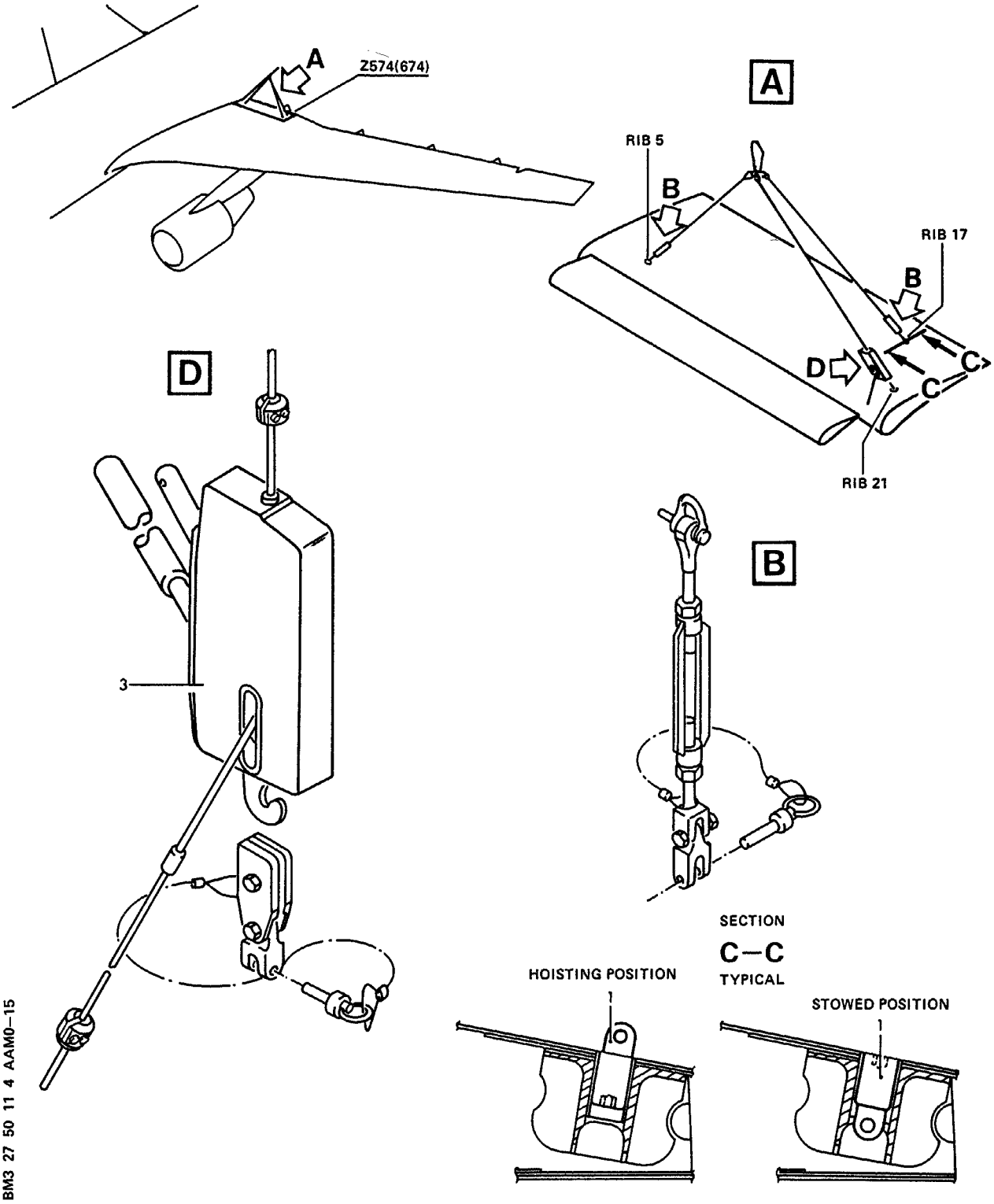
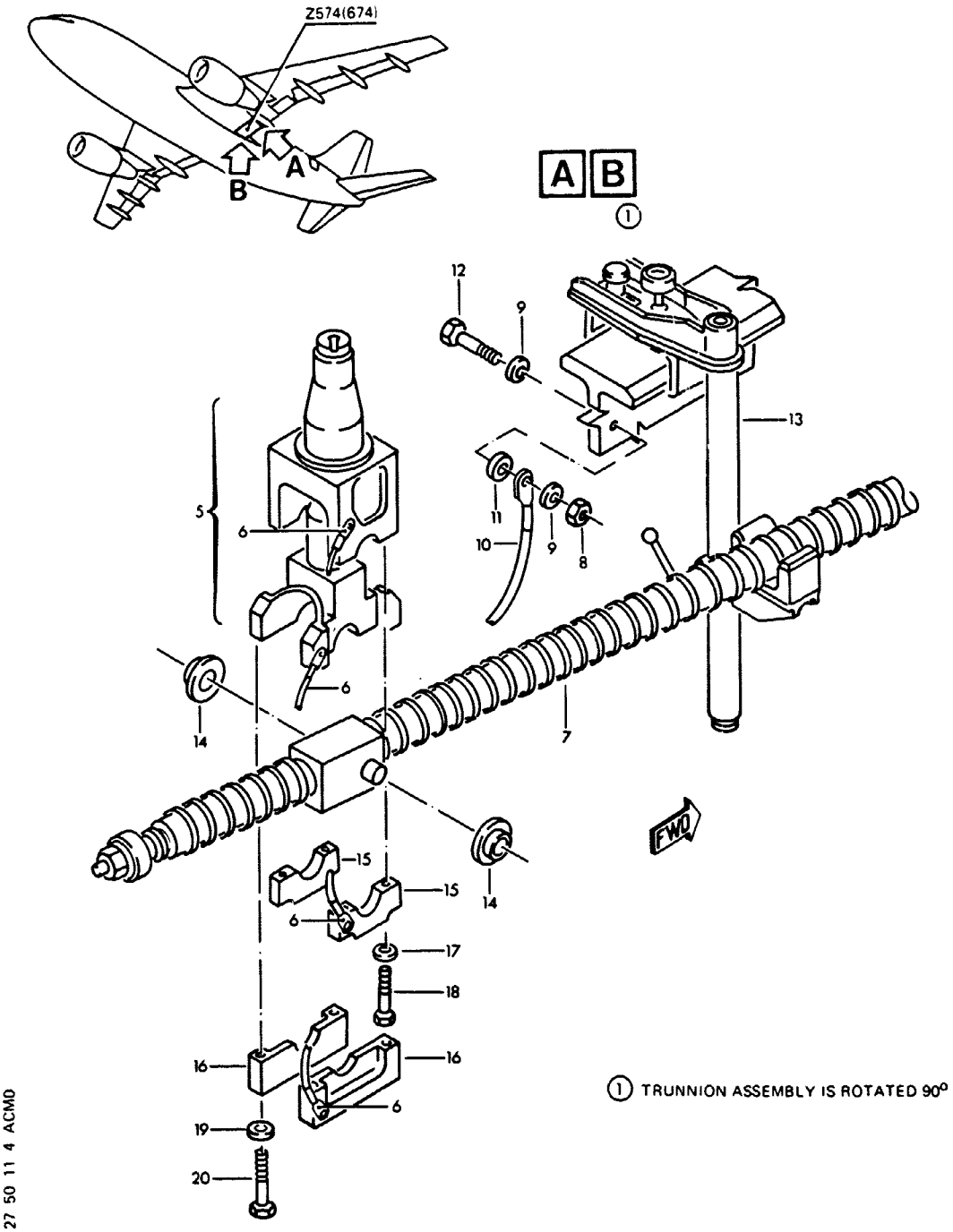
Inboard Flap and Vane - Lifting Points
Figure 401

R

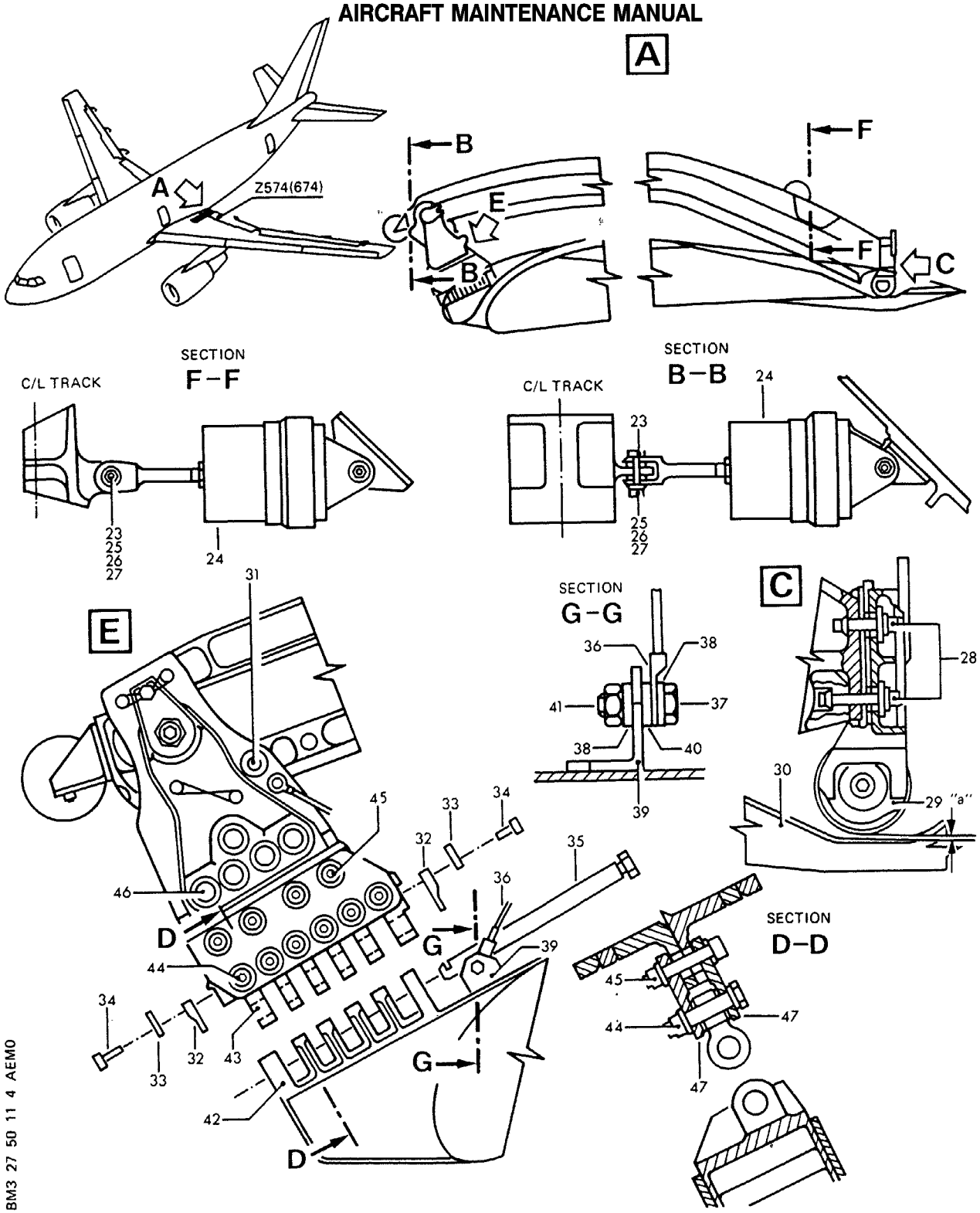


Inboard Flap and Vane Hoisting
Figure 402

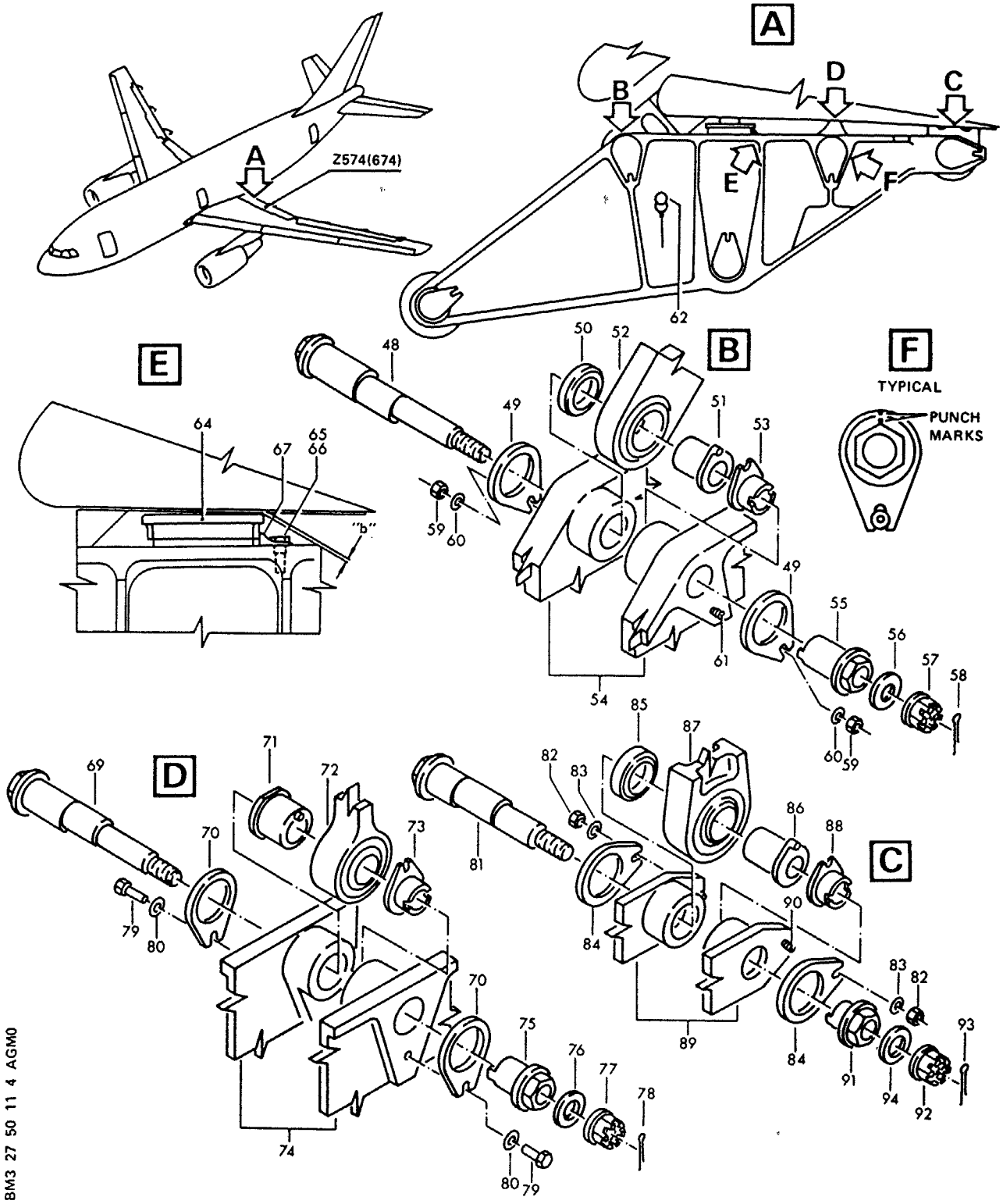


BM3 27 50 11 4 ACM0

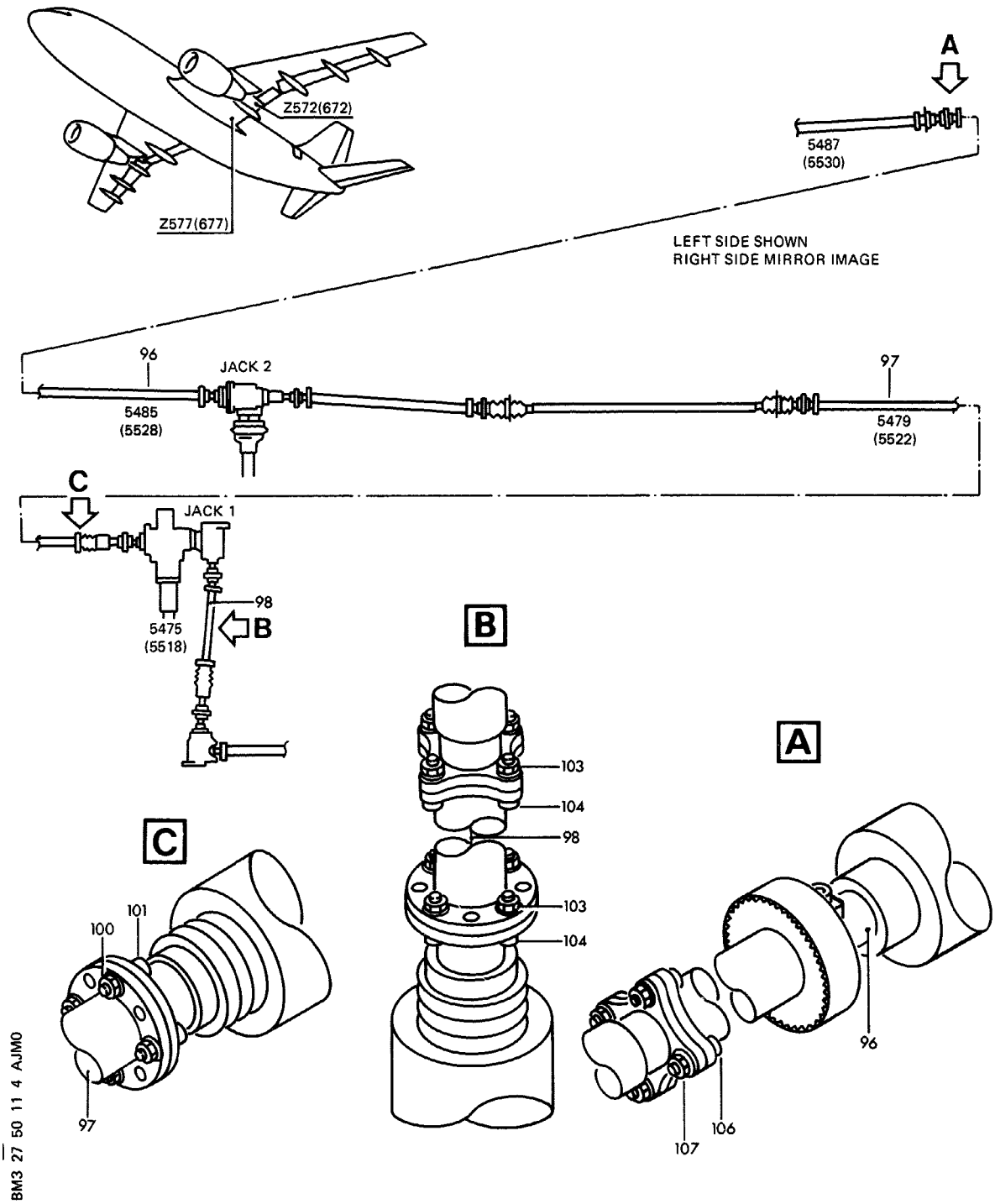
Screwjack 1 and 2 Connections
Figure 403



Carriage 1 Connections
Figure 404



Carriage 2 Connections
Figure 405



Inboard Flap Control System Rigging
Figure 406

(14)Cut and discard lockwire and remove four bolts (18) and washers (17) securing trunnion primary bearing half housings (15).
NOTE : Bearing half housings (15),(16) remain attached to the trunnion blocks (5) by the retaining straps (6).
(15)Lower screwjack spindles clear of trunnions and support in cradles.
(16)Remove and retain bushes (14) from screw nut trunnion attachment.
(17)Remove the hoist fittings (1) from the flap/vane assembly at the lifting points 1, 2 and 4; reverse and install with the hoist eyes uppermost.

NOTE : The lifting points 1, 2 and 4 are used for the removal and installation of the flap/vane assembly. The lifting points 1, 2 and 3 are used for transport of the flap/vane assembly. The lifting points 3 and 5 are used for transport of the vane only.

R (18)Attach hoisting sling PN 98F27508498000 to hoist fittings with the tilting mechanism (3) attached to the forward outboard fitting.
(19)Using a crane, lift the hoisting sling, adjust and take up slack in the cables.
NOTE : The inboard flap weighs approximately 300 kg (661 lb.).
(20)Mark bolt/eccentric relationship at flap/carriage 2 connections if the same flap is being re-installed.
(21)Remove bolts (79), washers (80) and toothplates (70).
(22)Remove nuts (59),(82), washers (60),(83) and toothplates (49),(84).
(23)Remove and discard cotter pins (58),(78),(93). Remove castle nuts (57),(77),(92) and washers (56),(76),(94) from forward, center and aft carriage 2/flap attachment.
(24)Turn hexagonal sleeves (55),(75),(91) until slots in adjusting sleeves (53),(73),(88) and pins in eccentric bushes (51),(71),(86) are uppermost.
(25)Remove eccentric bolt (69) from center connection (74) of carriage 2/flap attachment.
(26)Bend down lugs of tab washers (33), remove bolts (34) and locking plates (32). Discard the tab washers.
(27)Remove bolt (35) from carriage 1/flap attachment.
(28)Remove eccentric bolt (81) from rear connection (89) of carriage 2/flap attachment.
(29)Remove eccentric bolt (48) from forward connection (54) of carriage 2/flap attachment.
(30)Disconnect bonding strap (36) from lug (39) by removing nut (41), bolt (37), washers (38), and washer (40).
(31)Disconnect bonding strap (10) from screwjack 2 track by removing nut (8), bolt (12), washer (11) and washers (9).
(32)Carefully lift the flap with crane to ease flap clear of carriages 1 and 2.
NOTE : Washers (50),(85) may be dislodged at this stage. Retain for flap installation.
(33)Move the flap outboard so that the inboard edge of the flap clears the fixed structure and carriage 1.
(34)Swing the flap clear of the aircraft; then using the sling tilting mechanism, level the flap and lower onto the trestles.

(35)Remove washers (50),(85) and eccentric bushes (51),(71),(86) and retain for flap installation.

C. Preparation of Replacement Component

(1)Depreserve the replacement flap and vane assembly and make certain that it is in good condition.
(2)Thoroughly clean the flap/carriage 1 attachment (42) and flap links (52),(72),(87).
(3)Clean and examine eccentric bushes (51),(71),(86) for corrosion, signs of fretting or other damage.
(4)Wet-assemble eccentric bush (51) into flap link (52) from outboard side with anti-corrosion compound (Material No. 05-002).
(5)Wet-assemble eccentric bush (71) into flap link (72) from inboard side with anti-corrosion compound (Material No. 05-002).
(6)Wet-assemble eccentric bush (86) into flap link (87) from outboard side with anti-corrosion compound (Material No. 05-002).
(7)Assemble washer (50), bevelled face first, onto protruding end of eccentric bush (51) using anti-corrosion compound (Material No. 05-002) to secure in position.
(8)Assemble washer (85), bevelled face first, onto protruding end of eccentric bush (86), using anti-corrosion compound (Material No. 05-002) to secure in position.

D. Preparation for Installation

(1)Clean and inspect component attachment points and surrounding structure for corrosion or other signs of damage.
(2)Remove hexagonal sleeves (55),(75),(91) and adjusting sleeves (53),(73),(88) from carriage 2 positions (54),(74),(89) respectively.
(3)Clean and examine the sleeves for corrosion, signs of fretting or other damage.
(4)Clean and examine eccentric bolts (48),(69),(81) for corrosion, fretting or other signs of damage.
(5)Wet-assemble hexagonal sleeve (55) and adjusting sleeve (53) into carriage 2 forward attachment (54) with anti-corrosion compound (Material No. 05-002).
(6)Wet-assemble hexagonal sleeve (75) and adjusting sleeve (73) into carriage 2 center attachment (74) with anti-corrosion compound (Material No. 05-002).
(7)Wet-assemble hexagonal sleeve (91) and adjusting sleeve (88) into carriage 2 rear attachment (89) with anti-corrosion compound (Material No. 05-002).
(8)Loosen four bolts (28) and adjust rear support roller (29) on track 1 to its fully up position.
(9)Loosen bolt (65), move locking angle (67) and screw carriage 2 fail safe spigot ring (64) fully down. Make certain that spigot ring can be freely rotated by hand.
(10)On flap outboard rib (115), remove nut (117) and bolt (116) to release toothplate (122) and eccentric spigot (119). Remove and discard cotter pin (124), slacken nut (123) and adjust flap uplock roller (120) fully forward.
(11)Remove nuts (100) and bolts (101) at 8/12 holed flanged connection of

torque shaft (97) immediately outboard of screwjack 1. Disconnect torque shaft and suitably support clear of screwjack.

(12)Adjust vane jam detector actuator lever fully forward (Ref. 27-56-15, P. Block 401).

(13)Clean and examine flap/carriage 1 attachment bolt (35) for corrosion, fretting or other signs of damage.

E. Installation (Ref. Fig. 402, 403, 404)
(Ref. Fig. 405, 406)

(1)Remove the hoist fittings (1) from the flap/vane assembly at the lifting points 1, 2 and 4; reverse and install with the hoist eyes uppermost.

NOTE : The lifting points 1, 2 and 4 are used for the removal and installation of the flap/vane assembly. The lifting points 1, 2 and 3 are used for transport of the flap/vane assembly. The lifting points 3 and 5 are used for transport of the vane only.

R (2)Attach hoisting sling PN 98F27508498000 to hoist fittings (1) with tilting mechanism (3) attached to forward outboard fitting.

(3)Using a crane, lift flap/vane assembly clear of the trestles and adjust tilting mechanism (3) to bring the flap to an angle of 20° approximately in the end to end horizontal plane with inboard end down.

(4)Pass inboard end of flap under the fixed structure and carriage 1.

CAUTION : MAKE CERTAIN THAT THE PINS IN THE ECCENTRIC BUSHES ARE CORRECTLY ALIGNED AND ENGAGE IN THE SLOTS OF THE ADJUSTING SLEEVES.

(5)Carefully position the flap to carriages 1 and 2 making certain that the pins of eccentric bushes (51),(71),(86) are correctly engaged in the slots of adjusting sleeves (53),(73),(88) respectively.

CAUTION : MAKE CERTAIN THAT WASHERS (50,85) ARE NOT DISLODGED DURING THIS OPERATION.

(6)Line up flap link (52) to carriage 2 forward attachment (54).

(7)Coat threads of eccentric bolt (48) with lubricant (Material No. 06-002).

(8)Wet-assemble eccentric bolt (48) from inboard side into flap/carriage 2 forward attachment (52),(54) with anti-corrosion compound (Material No. 05-002). Fit washer (56) and castle nut (57) finger tight only.

(9)Line up flap link (87) to carriage 2 rear attachment (89).

(10)Coat threads of eccentric bolt (81) with lubricant (Material No. 06-002).

(11)Wet-assemble eccentric bolt (81) from inboard side into flap/carriage 2 rear attachment (87),(89) with anti-corrosion compound (Material No. 05-002). Fit washer (94) and castle nut (92) finger tight only.

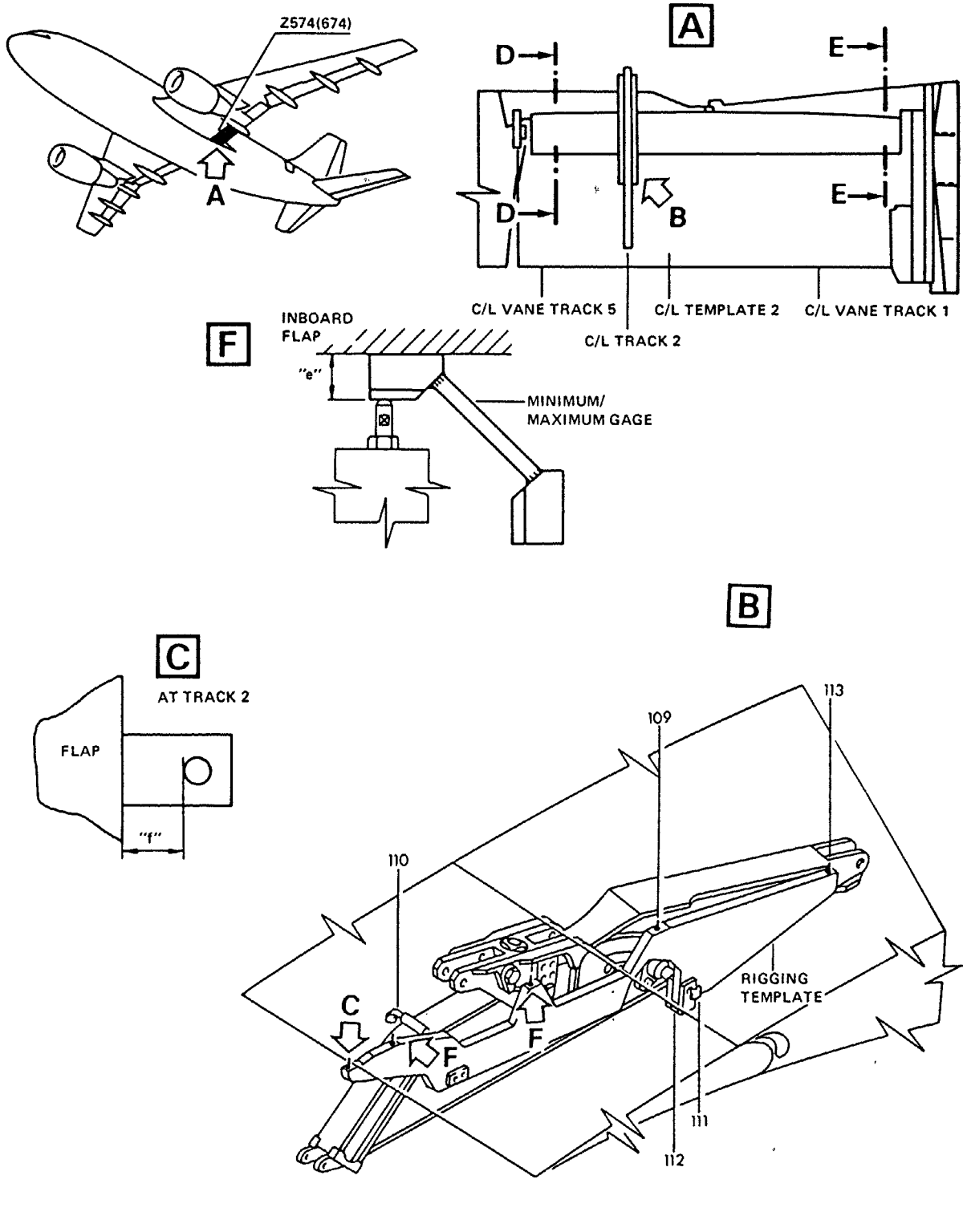
(12)Line up flap attachment (42) to carriage 1 attachment (43) and insert attachment bolt (35) from rear to front.

(13)Install locking plates (32), tab washers (33) and bolts (34) to lock the attachment bolt (35) in position. TORQUE bolts (34) to 0.3 +0.1 m.daN (2.22 +0.74 lbf.ft.) and safety with tab washers (33).

(14)Adjust carriage 2 eccentric bolts (48),(81) and hexagonal sleeves (55),(91) to nominal setting (line up punch marks). Fit toothplates (49),(84), washers (60),(83) and nuts (59),(82). Do not fully tighten at

this stage.
(15)Install bushes (14) on screw nut trunnion attachments (21) and using screwjack support cradles (13) lift until in engagement with the trunnion blocks (5).
(16)Coat threads of bolts (18) with lubricant (Material No. 06-002).
(17)Coat faying surfaces of primary bearing half housings (15) with anti-corrosion compound (Material No. 05-002), fit and secure with washers (17) and bolts (18).
(18)TORQUE bolts (18) to between 3.5 and 3.6 m.daN (25.81 and 26.55 lbf.ft.) lockwire in pairs. Seal bolt heads with corrosion preventive (Material No. 05-005).
(19)Coat threads of bolts (20) with lubricant (Material No. 06-002).
(20)Coat faying surfaces of fail safe bearing half housings (16) with anti-corrosion compound (Material No. 05-002), fit and secure with washers (19) and bolts (20).
(21)TORQUE bolts (20) to between 3.5 and 3.6 m.daN (25.81 and 26.55 lbf.ft.) lockwire in pairs. Seal bolt heads with corrosion preventive (Material No. 05-005).
(22)Lubricate the trunnion blocks with grease (Material No. 04-004) (Ref. 12-22-27, P. Block 1).
(23)Connect torque shaft (97) at 8/12 holed flanged connection with bolts (101) and nuts (100), tighten but do not torque at this stage.
(24)Disconnect the hoisting sling from the flap.
(25)Remove the three hoist fittings (1), reverse and install flush into the flap assembly. Seal with sealant (Material No. 09-016).
(26)Remove support cradles from flap tracks 1 and 2.

F. Adjustment
(1)Connect driving tool PN 98A27508013000 to splined joint on the outboard side of screwjack 2.
CAUTION : MAKE CERTAIN THE FLAP AND VANE DO NOT FOUL THE SURROUNDING STRUCTURE DURING RETRACTION.
(2)Using the pneumatic motor connected to the driving tool PN 98A27508013000, retract the flap until a rigging pin (31) can be inserted through track/carriage 1.
(3)Remove the chock sets PN 98A27508025000 from tracks 1 and 2.
(4)Disconnect torque shaft (97) at 8/12 holed flanged connection and suitably support clear of screwjack 1.
(5)Turn outboard side of screwjack 2 (either backwards or forwards) until a rigging pin (62) can be inserted through track/carriage 2.
(6)Disconnect and remove pneumatic motor and driving tool PN 98A27508013000 from splined joint of screwjack 2.
(7)Install the lower shroud access panel 572BB (672BB) and the lower shroud access panel 572DB (672DB).
(8)Mount the template PN 98A27508030000 next to and inboard of track 2. Secure with bolt (111) and mounting device (110). Turn adjusting device (112) until pins (109),(113) contact skin surface below inner rear spar and false spar respectively.
(9)Carry out following measurements and adjust if necessary - see steps (10) thru (12):
(Ref. Fig. 407) (Sheet 1)



Inboard Flap Rigging
(Sheet 1/2)
Figure 407

(Ref. Fig. 407) (Sheet 2)

(a)Using maximum/minimum gage PN 98A27508030700 (part of templates PN 98A27508030000) and feeler gages, make certain that the dimensions at the positions 'e' and 'f' are correct
'e' = 25 ±0.5 mm (0.984 ±0.020 in.)
'f' = 25 ±2 mm (0.984 ±0.079 in.)

(b)At section D-D make certain that the lower surface of the flap is flush within limits to the wing lower skin. Use a 300 mm (12 in.) straight edge in position 'x' and feeler gages to measure dimension 'g'. Position 'x' = 200 mm (7.87 in.) measured from access panel edge and dimension 'g' = 0 +3 mm (0 +0.12 in.).

(c)At Sections E-E make certain that the lower surface of the flap is flush within limits to the wing lower skin. Use a 300 mm (12 in.) straight edge in position 'y' and feeler gages to measure dimension 'g'. Position 'y' = 200 mm (7.87 in.) measured from access panel edge and dimension 'g' = 0 +3 mm (0 +0.12 in.), or if the flap surface protrudes below the skin line, position the straight edge in position 'z' and measure dimension 'g'.
Position 'z' = 30 mm (1.18 in.) measured from access panel edge and dimension 'g' = 0 +3 mm (0 +0.12 in.).

(d)To check gap between inboard flap and ASA proceed as follows:
1 Remove ASA safety collars PN 98A27108028000 from all three servo controls.
2 Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
3 Set ASA to neutral position.
4 Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).

(e)Make certain that gap dimension "h" at position "i" and gap dimensions "j" and "l" on inboard and outboard sides of flap are correct:
(Ref. Fig. 408)
"h" = 25.4 ±7 mm (1.0 ±0.28 in.)
"i" = 100 ±10 mm (3.9 ±0.39 in.)
"j" = 28 ±5 mm (1.1 ±0.2 in.)
"l" = 35.5 ±7 mm (1.4 ±0.28 in.)

(f)Make certain that misalignment between ASA and inboard flap trailing edge is "ad" = 23 ±5.5 mm (0.91 ±0.22 in.).

NOTE : Steps (10) thru (12) are only applicable if rigging of the flap is necessary.

(10)Adjust on the hexagonal sleeves (55),(91) and the eccentric bolts (48),(81)

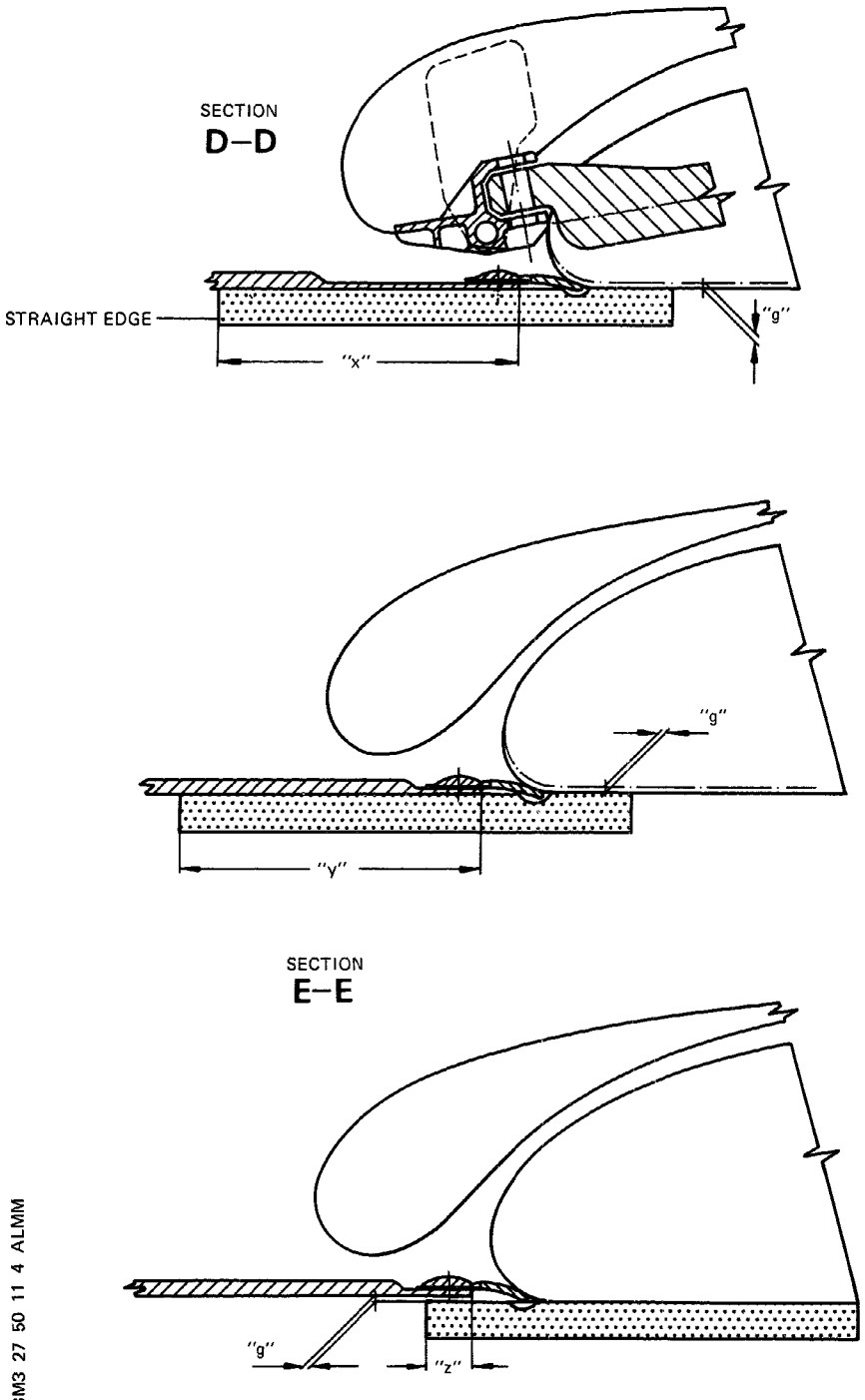
(a)forward connection (controls fore/aft, vertical and angular positioning)

(b)rear connection (controls vertical and angular positioning) until the flap is correctly rigged at the template as detailed in step (9).
NOTE : Manual adjustment of the screwjacks will be necessary when adjusting the flap fore/aft position.

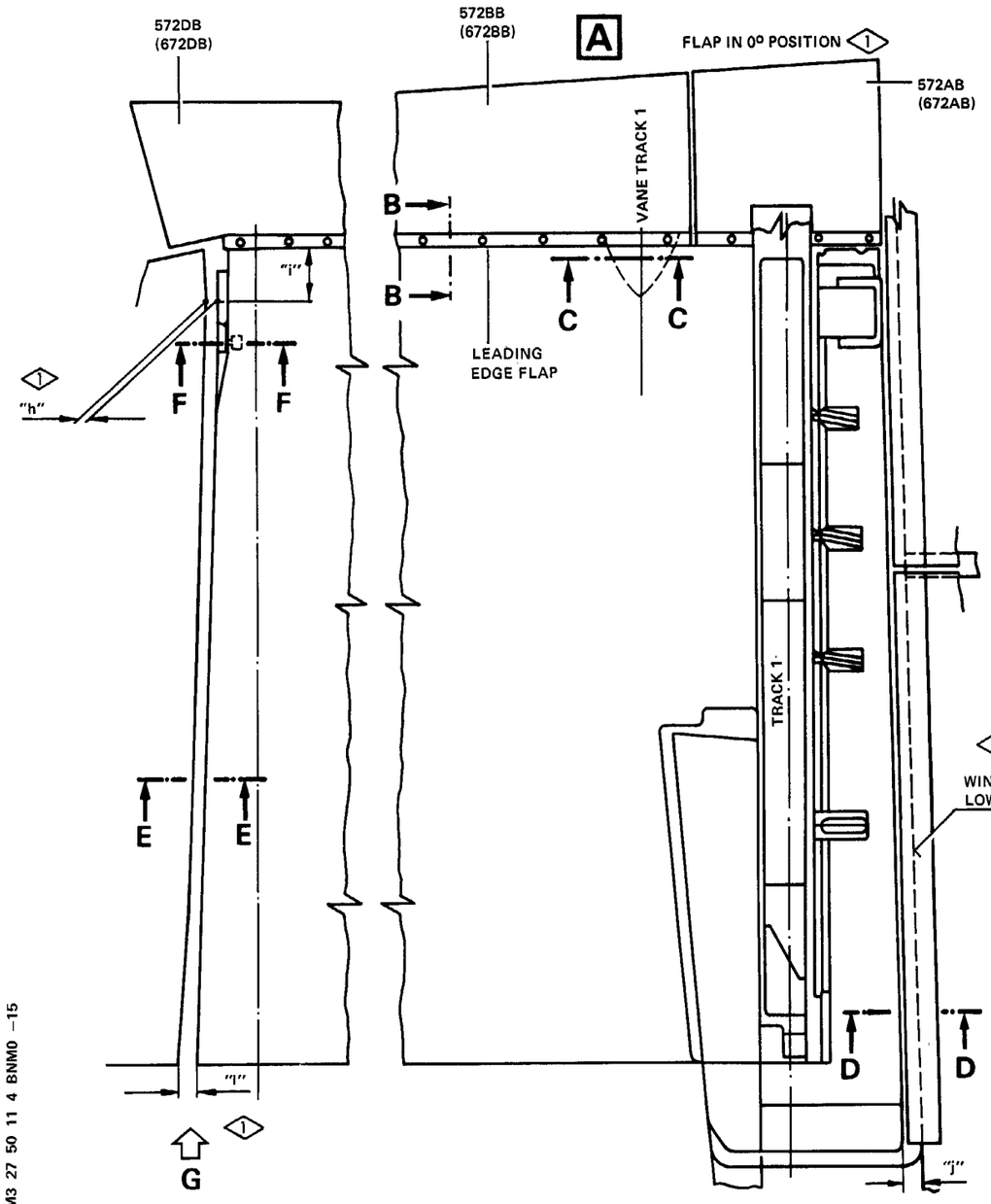
(11)Install the toothplates (49),(84) and secure loosely with washers (60),(83) and nuts (59),(82) respectively.

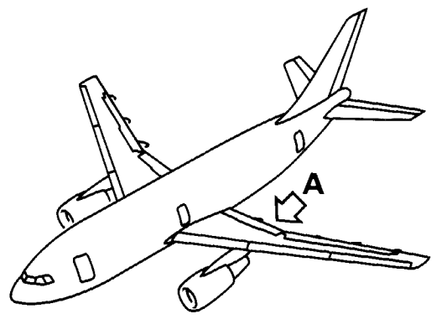
(12)Make certain that the rigging has not been disturbed.

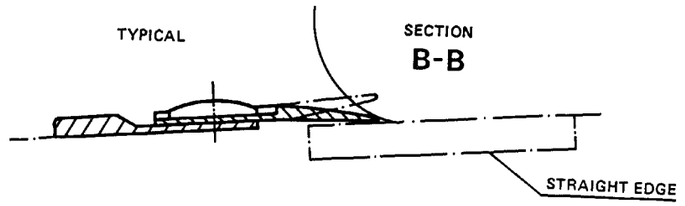
(13)Using measuring device PN 98A27508022000, make certain that the screwjack 1 and 2 overtravel is correct.
(Ref. Fig. 409) (Sheet 1)

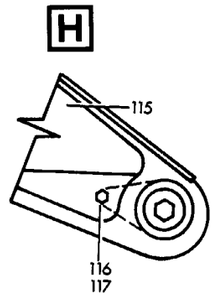


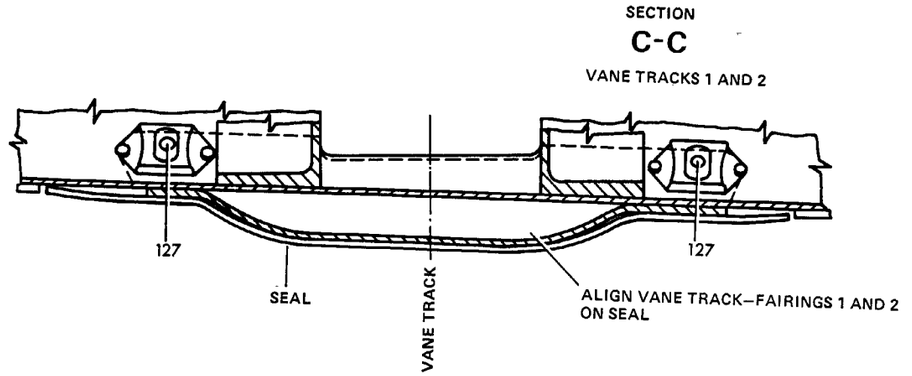
Inboard Flap Rigging
(Sheet 2/2)
Figure 407

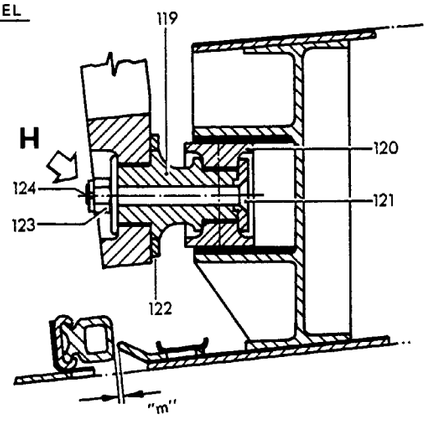


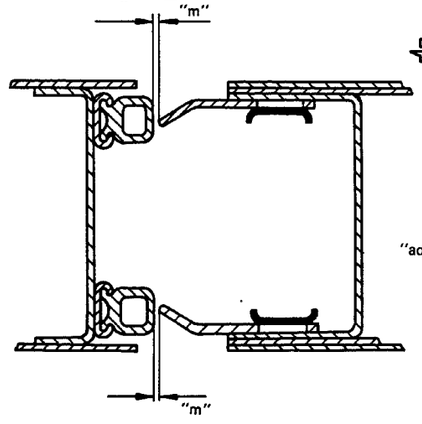


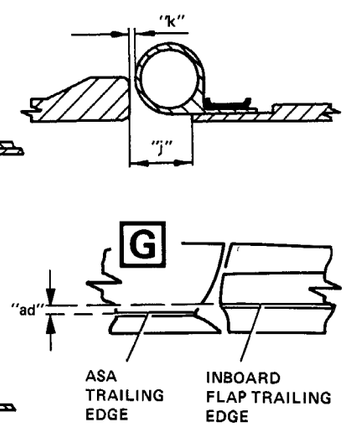












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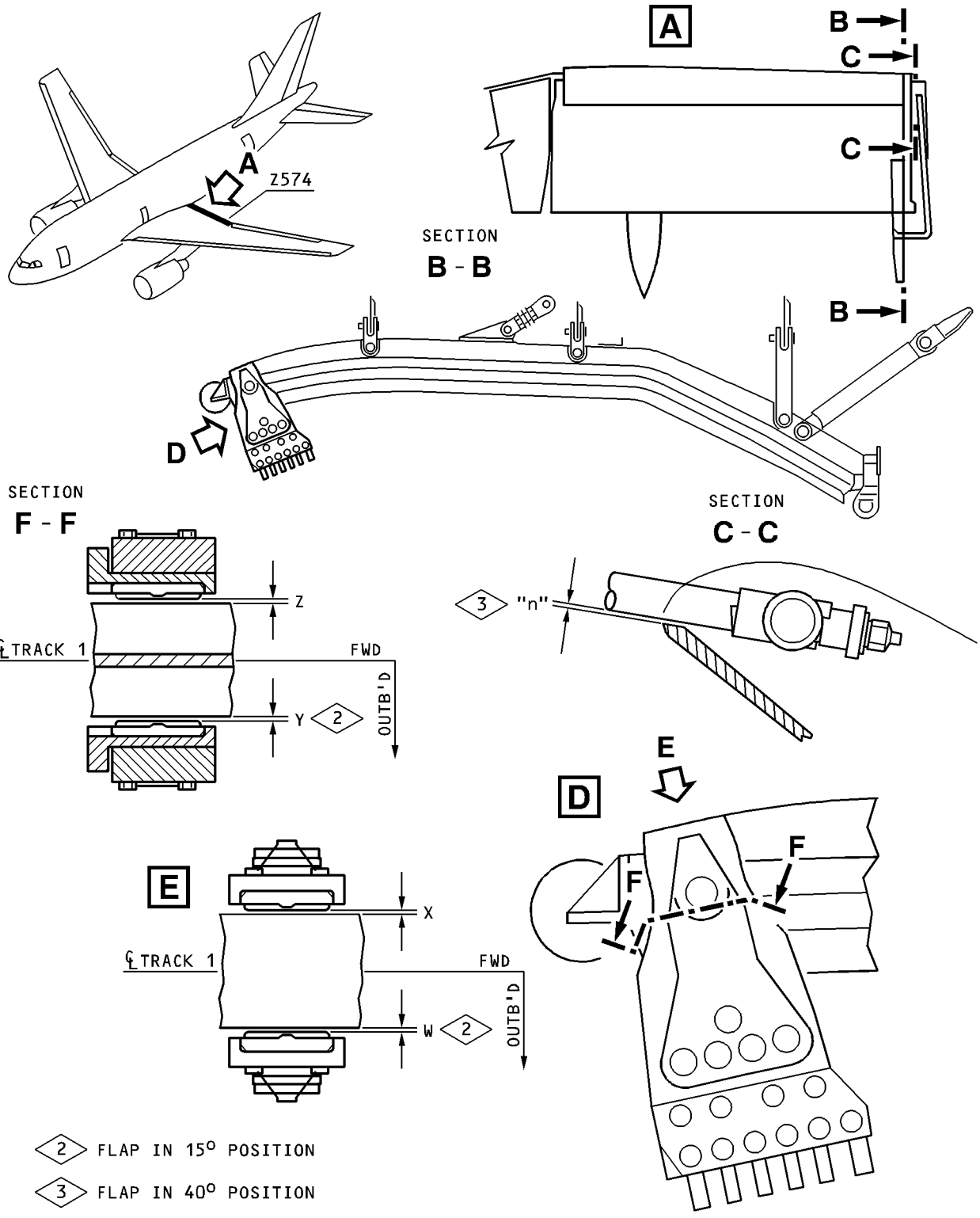
Seal and Roller Adjustment
Figure 408



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Inboard Flap Clearances
(Sheet 1/4)
Figure 409

(Ref. Fig. 409) (Sheet 2)
(Ref. Fig. 409) (Sheet 3)
(Ref. Fig. 409) (Sheet 4)
(a)Screwjack 1 between 270° minimum and 820° maximum
(b)Screwjack 2 between 180° minimum and 650° maximum

NOTE : Steps (14) thru (21) are only applicable in the unlikely event where rigging of the flap cannot be achieved during steps (10) thru (12).

(14)Install the adjustable tie-rods PN 98A27508031000 between track 1 and the flap to support the weight of the inner end of the flap.

CAUTION : UNDER NO CIRCUMSTANCES LOOSEN THE FIVE BRIDGE THROUGH BOLTS (46).

(15)Loosen the ten toothed plate locking bolts (44),(45) on carriage 1.
(16)Adjust the toothed plates (47) on carriage 1 until the flap section next to vane track 1 is rigged and re-check the rigging gaps as detailed in step (9)

NOTE : The adjustable tie-rods may be used to assist in the adjustment of the toothed plates.

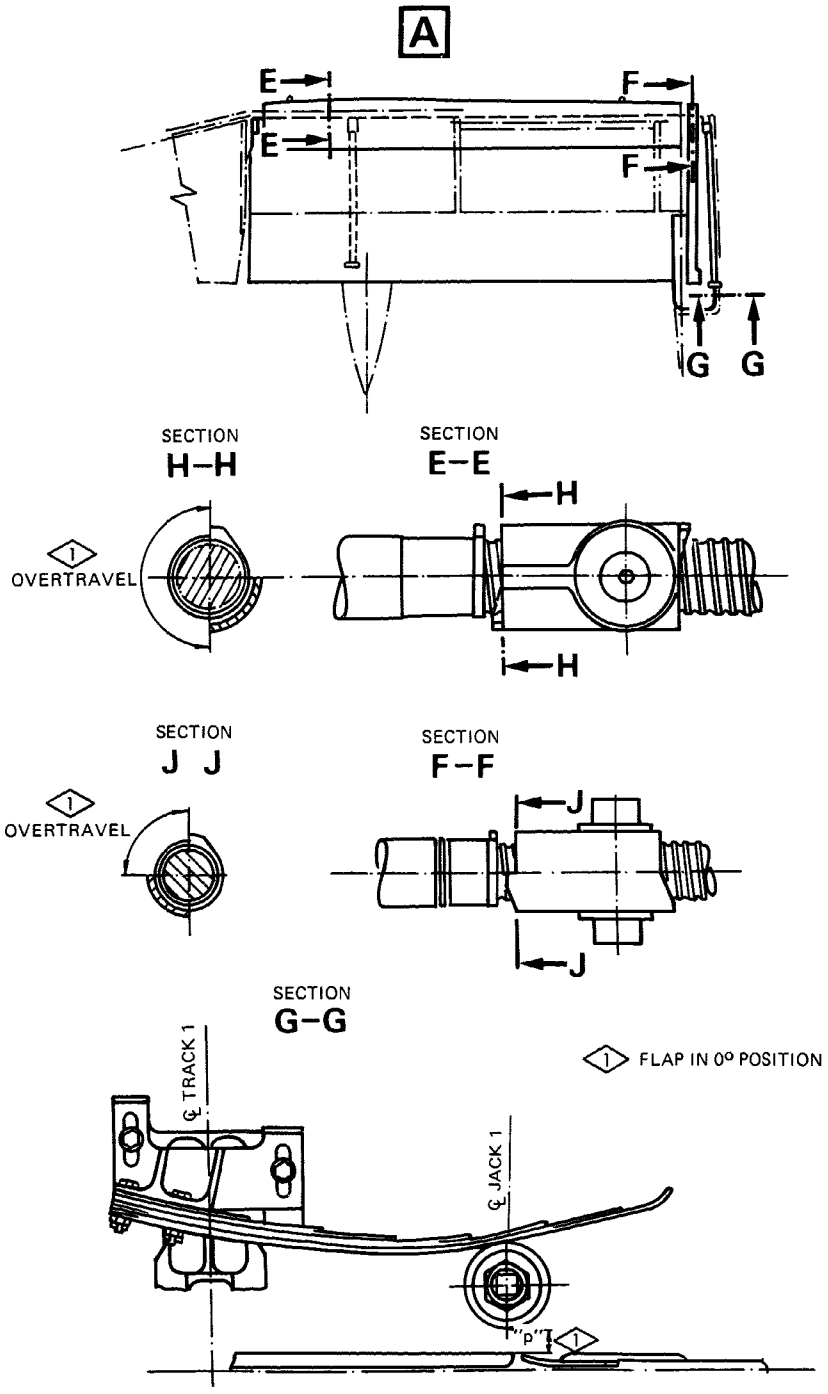
(17)Tighten the four outermost toothed plate locking bolts (44),(45).
(18)Temporarily install access panels 577AB (677AB) and 577BB (677BB).
(19)Bring the rear lower inboard surface of the flap flush with the wing to fuselage fairing.

NOTE : The rear adjustable tie-rod may be used to assist in this operation.

(20)Remove access panels 577AB (677AB) and 577BB (677BB) and the adjustable tie-rods from the flap and track 1.
(21)Check that the rigging of the flap has not been disturbed; if necessary, repeat steps (14) thru (21).
(22)Set the gap 'a' (Ref. Fig. 404) between the support roller (29) at the rear of track 1 and the auxiliary track (30) in the flap to 2 ±0.2 mm (0.0787 ±0.008 in.).
(23)TORQUE the four locking bolts (28) to between 1.8 and 2.0 m.daN (13.276 and 14.75 lbf.ft.).
(24)Remove and discard cotter pins (25). Remove nuts (26) and washers (27) and make certain that bolts (23) are not under load. If necessary, adjust the length of the damper units (24) (Ref. 57-25-17, P. Block 401).
(25)Refit washers (27) and nuts (26). TORQUE bolts (23) to between 0.2 and 0.35 m.daN (1.48 and 2.58 lbf.ft.) and safety with cotter pins (25).
(26)Remove the two lower shroud panels 572BB (672BB) and 572CB (672CB).
(27)Reconnect the torque shaft (97) at the 8/12 holed flanged connection with bolts (101) and nuts (100). TORQUE to between 1.0 and 1.25 m.daN (91 and 110 lbf.in.). Seal the bolt heads and nuts with corrosion preventive (Material No. 05-005).
(28)Remove the rigging template at track 2.
(29)Remove the rigging pins (31, 62) from carriages 1 and 2.
(30)Using the pneumatic motor connected to the splined joint outboard side of the screwjack 2, fully extend the flap until the spindle nut on screwjack 1 contacts the stop on the end of spindle 1.

NOTE : Step (31) is only applicable if rigging of track 1 has taken place.

(31)Tighten the six remaining toothed plate locking bolts (44, 45). TORQUE



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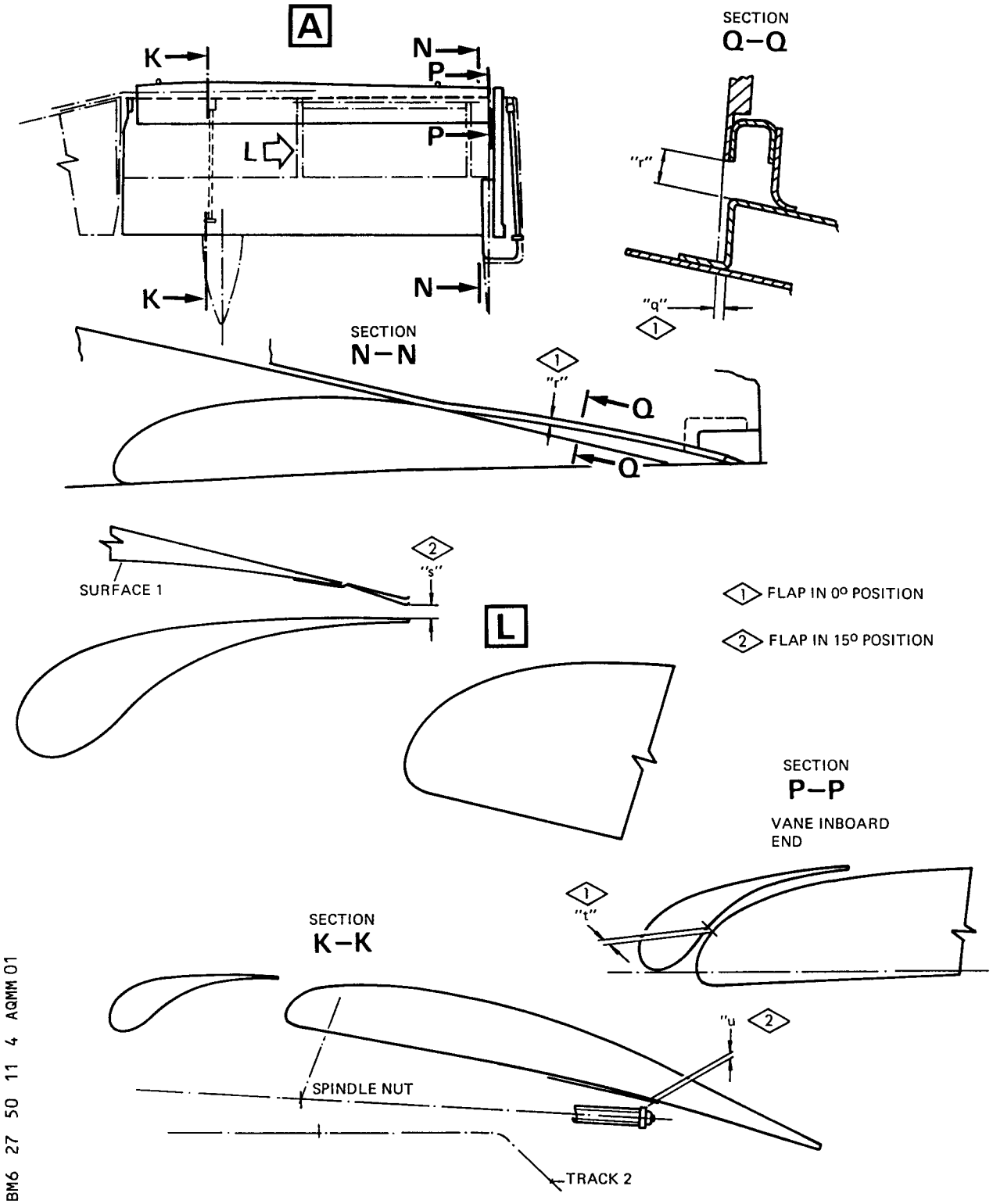
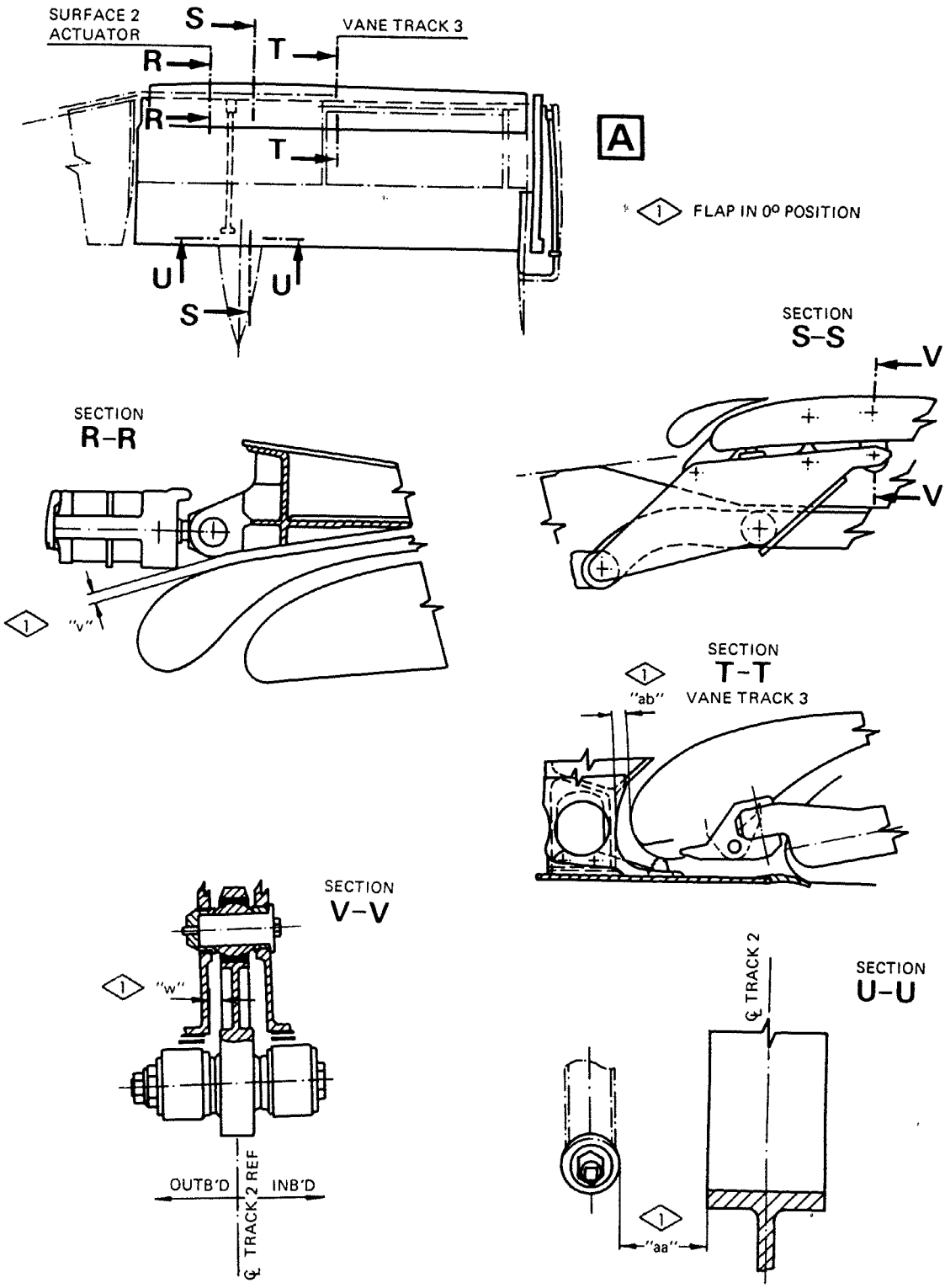
Inboard Flap Clearances
(Sheet 2/4)
Figure 409



Inboard Flap Clearances
(Sheet 3/4)
Figure 409



Inboard Flap Clearances
(Sheet 4/4)
Figure 409

four bolts (45) to 4.8 m.daN (35.55 lbf.ft.) and six bolts (44) to 3.6 m.daN (26.55 lbf.ft.).

NOTE : Make certain that these ten bolts are inserted from the inboard side.

(32)Adjust the hexagonal sleeve (75) at flap center attachment on carriage 2 until it is possible to insert the oversize eccentric pin PN 98A27508010000.

(33)Insert the oversize eccentric pin.

(34)Mark exactly the position of the eccentric marks of the eccentric pin and hexagonal sleeve (75) on the carriage side walls.

(35)Remove the eccentric pin PN 98A27508010000 and install the normal eccentric bolt (69) with all eccentric marks lined up as in step (34).

NOTE : Make certain that hexagonal sleeve (75) is not dislodged.

(36)Install toothplates (70), washers (80) and bolts (79). Tighten bolts (79) but do not torque at this stage.

(37)Install washer (76) and castle nut (77). Tighten castle nut (77) but do not torque at this stage.

(38)Install toothplates (49),(84), washers (60),(83) and nuts (59),(82). Tighten all nuts (59),(82), but do not torque at this stage.

(39)Install washers (56), (94) and castle nuts (57), (92). Tighten castle nuts (57),(92) but do not torque at this stage.

(40)Check clearance "n" (Ref. Fig. 409) (Sheet 1/4) between flap structure and screwjack 1, n = 2.0 mm (0.08 in.) minimum.

(41)Using the feeler gage PN 98A27508052000, adjust the fail safe spigot ring (64) to flap gap "b" = 0.7 ±0.2 mm (0.0276 ±0.0079 in.) (Ref. Fig. 405).

(42)Secure the spigot ring (64) with locking angle (67), washer (66) and bolt (65). TORQUE bolt (65) to 2.35 +0.2 m.daN (17.33 +1.48 lbf.ft.).

(43)Attach bonding strap (36) to lug (39) on flap with bolt (37), washer (40), washers (38) and nut (41) (Ref. 20-28-11, P.Block 1). TORQUE bolt (37) to 0.6 m.daN (4.43 lbf.ft.). Seal connection with sealant (Material No. 09-001).

(44)Attach bonding strap (10) to screwjack 2 track with bolt (12) washer (11), washers (9) and nut (8) (Ref. 20-28-11, P.Block 1). TORQUE bolt (12) to 0.6 m.daN (4.43 lbf.ft.). Seal connection with sealant (Material No. 09-001).

(45)Remove bolt (116) and nut (117) from up-lock roller (120). Withdraw toothplate (122).

(46)Remove cotter pin (124) and slacken nut (123).

NOTE : Step (46) is only necessary if the eccentric spigot (119) cannot be turned.

(47)Fully retract the flap and while doing so, adjust the up-lock roller (120) such that it is free to rotate during the last 100 mm (3.937 in.) of travel.

(48)When flaps are fully retracted, insert rigging pins (30,62) in carriages 1 and 2.

(49)Making certain that position of roller (120) is not disturbed, secure eccentric spigot (119) with toothplate (122), bolt (116) and nut (117).

(50)TORQUE bolt (116) to 0.6 m.daN (4.43 lbf.ft.).

(51)TORQUE nut (123) to 3 m.daN (22.13 lbf.ft.) and safety with cotter pin (124).

(52)Pressurize the GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(53)Set ASA to neutral position.
(54)Depressurize the GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(55)Remove safety collars PN 98A27608014000 from speedbrake actuators 1 and 2.
(56)Make certain that maintenance device on valve groups applicable to speedbrake actuators 1 and 2 is in position "M" and manually move speedbrakes fully down.
(57)Check the following clearances with the flap in 0° position (Ref. Fig. 409) (Sheets 1 thru 4)
(a)"p" = 12 mm (0.47 in.) between support spring and flap structure (Ref. Sheet 2/4)
(b)"t" = The minimum value for dimension "t" is calculated using the following formula:

$$"t" = \frac{\theta^{\circ} \times 7.25}{720} + 1,$$

where θ° is the available claw stop overtravel measured at screwjack 1 with the carriage at 0° position and the rigging pins installed.
θ° must be between 270° and 820°
(c)"ab" = 10 mm (0.39 in.) minimum, at vane track 3 between vane leading edge and wing rear spar bracket (Ref. Sheet 4/4).
(d)"v" = 11 mm (0.43 in.) minimum, between flap vane and surface 2 actuator (Ref. Sheet 4/4).
(e)"aa" = 60 thru 115 mm (2.36 thru 4.53 in.) between flap track 2 and flap screwjack 2 spindle end (Ref. Sheet 4/4).
(f)"w" = 9.6 mm (0.38 in.) minimum, at carriage 2 between aft link and flap structure (Ref. Sheet 4/4).
(58)Adjust the seals on the flap outer edge (Ref. Fig. 408) to dimension 'm', 0.5 ±0.5 mm (0.02 ±0.02 in.) and lower wing to fuselage fairing to dimension 'k', 0 +2 mm (0 +0.08 in.).
(59)Remove rigging pins from carriages 1 and 2 and extend flap to 15° position (15° position correspond to 220 torque shaft revolutions from rigged position).
(60)Check following clearances with flap in 15° position (Ref. Fig. 409)
(a)Make sure that clearances "W", "X", "Y" and "Z" between carriage 1 and track 1 are between 0.1 mm (0.0039 in.) and 0.3 mm (0.0118 in.) (Ref. Sheet 1/4).
(b)Make sure that clearance "s" = 5 mm (0.2 in.) minimum, at inboard end of surface 1,
9.5 mm (0.37 in.) minimum, at center of surface 1 and
12.5 mm (0.5 in.) minimum, at outboard end of surface 1 (Ref. Sheet 3/4).
(c)Make sure that clearance "u" = 10 mm (0.4 in.) minimum, between spindle end of screwjack 2 and flap structure (Ref. Sheet 3/4).
(61)Fully retract flap and insert rigging pins in carriage 1 and 2.
(62)TORQUE bolts (79) at carriage 2 center link attachment to 0.6 +0.1 m.daN (4.43 +0.74 lbf.ft.) and castle nut (77) to 4.5 +1 m.daN

(33.19 +7.4 lbf.ft).
(63)Safety castle nut (77) with cotter pin (78).
(64)TORQUE nuts (59),(82) at carriage 2 aft and forward link attachments to 0.6 +0.1 m.daN (4.43 +0.74 lbf.ft.) and castle nuts (57),(92) to 8.5 +1 m.daN (62.7 +7.4 lbf.ft.).
(65)Safety castle nuts (57),(92) with cotter pins (58),(93).
(66)Disconnect the pneumatic motor and drive tool outboard of screwjack 2.
(67)Close access door 572 (672)-AB, -BB, -CB- -DB for LH (RH) flap.
(68)Adjust the seals at the flap leading edge (Ref. Fig. 408) as per Section B-B.
(69)Slacken screws (127) and align vane track fairings 1 and 2 on seal (Ref. Fig. 408) as per Section C-C. Tighten screws (127).
(70)Check clearances "q" and "r" between wing to fuselage fairing and fence at flap
(Ref. Fig. 409) (Sheet 3/4)
"q" = 2.5 ±5 mm (0.1 ±0.2 in.)
"r" = 14 thru 22 mm (0.55 thru 0.87 in.).
(71)Make certain that rigging pins are fitted at carriages 1,2 3,4 and 5.
(72)Remove access panel 572BB (672BB).
(73)Insert shaft (96) into screwjack 2 making certain that holes in flanges are aligned. If necessary adjust joint on splines to obtain an easy fit of bolts (106). Make certain that indicator groove on make portion of splines connection is not visible, indicating adequate engagement.
(74)Secure flanges with bolts (106) and nuts (107).
(75)TORQUE bolts to between 1.0 and 1.25 m.daN (7.4 and 9.22 lbf.ft.).
(76)Seal bolt heads and nuts with corrosion preventive (Material No. 05-005).
(77)Install torque shaft (98) and secure with bolts (104) and nuts (103).
(78)TORQUE bolts to between 1.0 and 1.25 m.daN (7.4 and 9.22 lbf.ft.).
(79)Seal bolt heads and nuts with corrosion preventive (Material No. 05-005).
(80)Remove rigging pins in sequence from carriages 5, 4, 3, 2 and 1. Make certain that removal/installation of the rigging pins can be freely made.
(81)Adjust the vane jam detector actuator lever (Ref. 27-56-15, P. Block 401).
(82)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(83)Install access panels 572BB (672BB), 577AB (677AB) and 577BB (677BB).
(84)Remove safety clips and tags and close circuit breakers 1CV,2CV,5CV,6CV and 10CV.
(85)Remove safety guard from flap/slat control lever quadrant.
WARNING : MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.
(86)Perform operational test of flap system (Ref. 27-54-00, P. Block 501).
(87)Make certain that rigging pins can be freely inserted in carriages 1, 2, 3, 4 and 5.
NOTE : If it is not possible to rig with rigging pin set PN 98A27508003001, check pin set PN 98A27508015001 may be used.
(88)Install flap track 2 fairing (Ref. 27-50-21, P. Block 401).

G. Close-Up
(1)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(2)Remove warning notice.
(3)Remove access platform.

3. Procedure for Removal/Installation of Inboard Flap with Carriages

NOTE : Removal/installation for the LH inboard flap with carriages is described, variations for the RH inboard flap with carriages are described in brackets.

A. Job Set-Up

(1)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(4)Set all speed aileron (ASA) fully down on the wing being worked on.
(5)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(6)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(7)Position access platform.
(8)Install safety collars PN 98A27108028000 on all three ASA servocontrols.
(9)Open access doors 572AB (672AB), 572BB (672BB), 572CB (672CB), 572DB (672DB), 575DB (675DB), 577AB (677AB) and 577BB (677BB).
(10)Remove flap track fairing No. 2 (Ref. 27-50-21, P. Block 401).
(11)Turn maintenance device on valve groups applicable to speedbrake surfaces 1 and 2 to position "M".
(12)Manually extend speedbrakes 1 and 2 and install safety collars PN 98A27608014000 on speed brake actuators.
(13)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(14)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(15)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(16)Open, safety and tag the following circuit breakers:

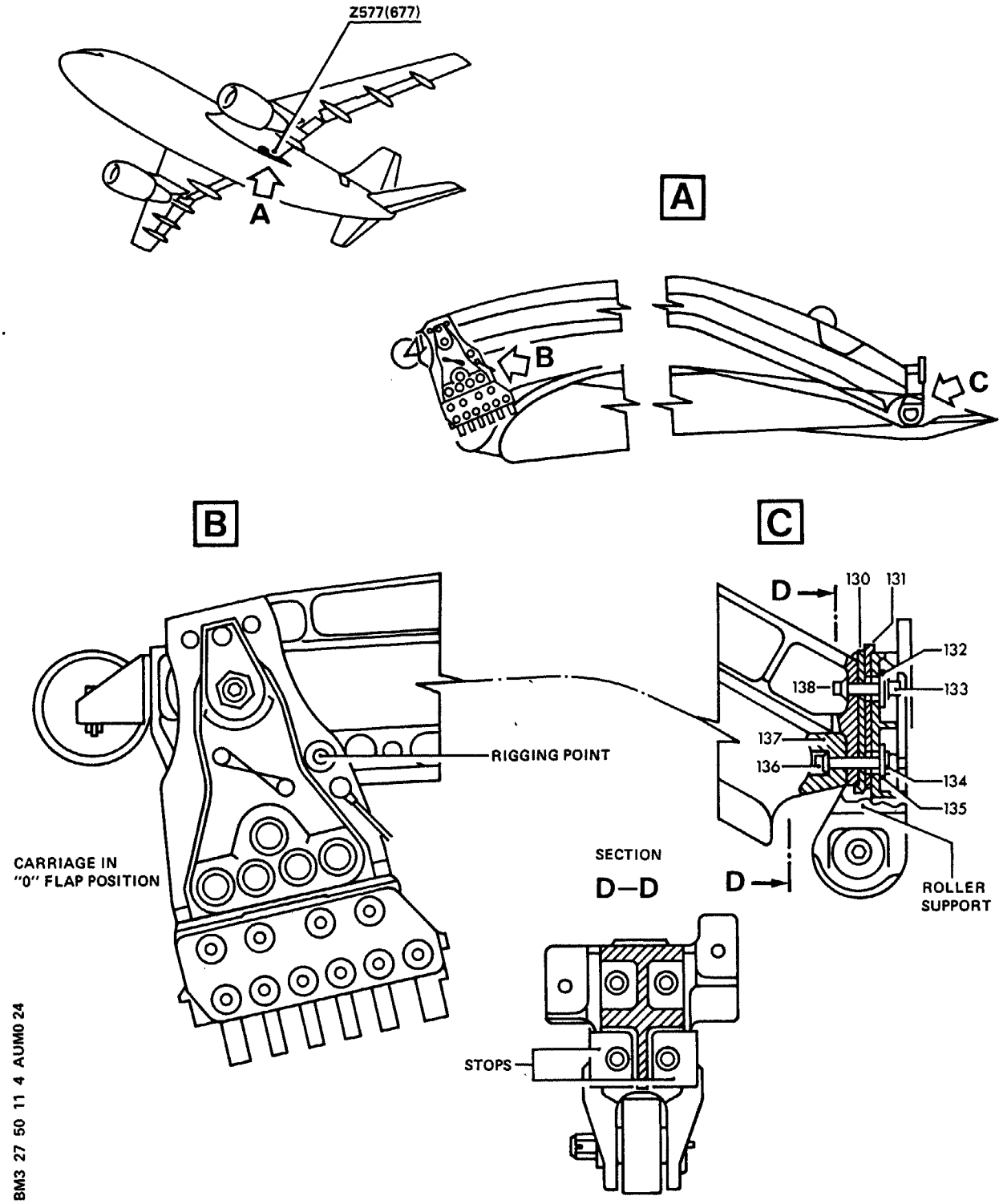
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(17)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(18)Position warning notice in cockpit prohibiting pressurization of hydraulic systems.
(19)Remove plugs 533BL (633BR) and 535BL (635BR) from flap track fairings 3 and 5.

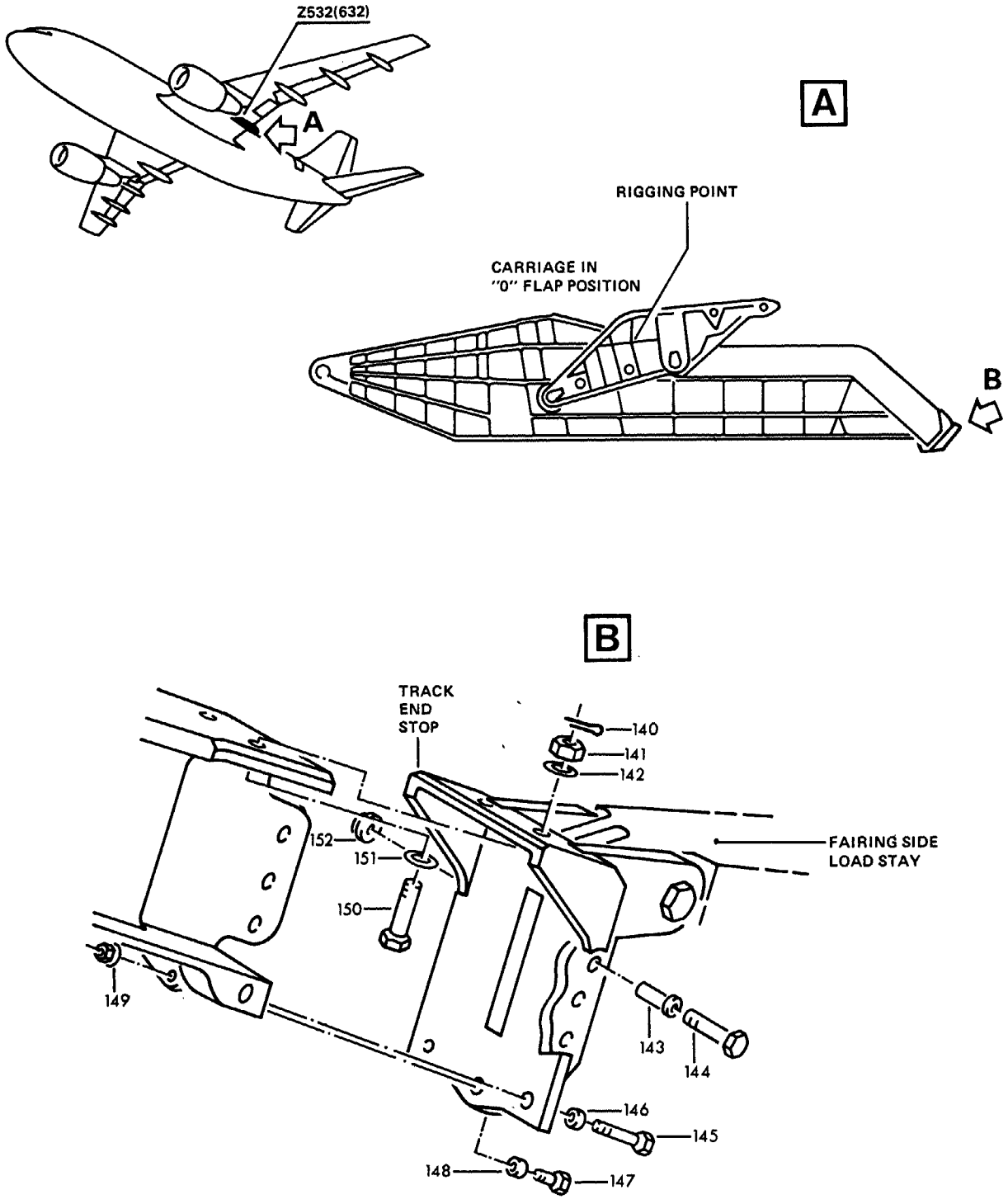
Removal

(Ref. Fig. 410)
(Ref. Fig. 411)

(1)Make certain that flap is at 0° setting.
(2)Install rigging pin PN 98A27508003100 of rigging pin set PN 98A27508003001 in carriage 1, track 1.
(3)Install rigging pin PN 98A27508003200 of rigging pin set



Roller Support of Track 1
Figure 410



End Stop of Track 2
Figure 411

PN 98A27508003001 in carriage 2, track 2.

(4)Install check pins from check pin set PN 98A27508015000 in track carriages 3 and 5.

(5)Remove nuts (107) and bolts (106) securing flange at outboard end of shaft (96) immediately outboard of screwjack 2.

(6)Without subjecting crown spline joint to undue deflection, displace end of shaft until flange halves are clear of each other, and withdraw shaft from splined connection of screwjack 2.

(7)Remove check pins from track/carriages 3 and 5 and install rigging pins from rigging pin set PN 98A27508003001 in track/carriages 3 and 5. If required, turn transmission as far as necessary to install rigging pins.

(8)Remove nuts (103) and bolts (104) and torque shaft (98) immediately inboard of screwjack 1.

(9)At aft end of track 1:

(a)Remove nuts (134), washers (135), bolts (136) and stops (137).

(b)Remove nuts (133), washers (132) and bolts (138).

(c)Remove roller support from track 1, together with serrated plates (130) and (131).

(10)At aft end of track 2:

(a)Remove and discard cotter pins (140).

(b)Remove castle nuts (141), washers (142), bolts (150) and washers (151) from track 2 stop.

(c)Remove nuts (152), bolts (144) and bushes (143).

(d)Remove nut (149), bolt (147) and washer (148).

(e)Remove bolt (145) and washer (146).

(f)Remove track end stop with faring side load stay to clear end of track.

(11)Install screwjack support cradles (13) on tracks 1 and 2.

(12)Cut and discard lockwire and remove four bolts (20) and washers (19) securing trunnion fail safe bearing half housing (16).

(13)Cut and discard lockwire and remove four bolts (18) and washers (17) securing trunnion primary bearing half housings (15).

NOTE : Bearing half housing (15),(16) remain attached to the trunnion blocks (5) by the retaining straps (6).

(14)Disconnect bonding strap (10) from screwjack 2 by remaining nut (8), bolt (12), washer (11) and washers (9).

(15)Lower screwjack spindles clear of trunnions and support in cradles.

(16)Remove and retain bushes (14) from screw nut trunnion attachment.

(17)Remove the hoist fittings (1) from the flap/vane assembly at the lifting points 1, 2 and 4; reverse and install with the hoist eyes uppermost.

NOTE : The lifting points 1, 2 and 4 are used for the removal and installation of the flap/vane assembly. The lifting points 1, 2 and 3 are used for transport of the flap/vane assembly. The lifting points 3 and 5 are used for transport of the vane only.

R (18)Attach hoisting sling PN 98F27508498000 to hoist fittings with the tilting mechanism (3) attached to the forward outboard fitting.

(19)Remove rigging pins PN 98A27508003100 from carriage 1, track 1 and

PN 98A27508003200 from carriage 2, track 2.

(20)Using a crane, lift the hoisting sling, adjust and take up slack in cables.

CAUTION : MAKE CERTAIN THAT AS FLAP ASSEMBLY IS REMOVED FROM TRACKS, EACH CARRIAGE IS WITHDRAWN SIMULTANEOUSLY.

NOTE : The inboard flap plus carriages weighs approximately 389 kg (857 lbs).

(21)Take the weight of the flap assembly with the crane and carefully withdraw the carriages clear of the tracks.

(22)Move the flap assembly outboard so that inboard edge of the flap clears the fixed structure.

(23)Swing the flap clear of the aircraft; then using the sling fitting mechanism (3), level the flap and lower on to trestles.

(24)If no longer required disconnect hoisting sling from flaps.

(25)If no longer required, remove the three hoist fittings (1), reverse and install flush into flap.

C. Preparation of Replacement Component

(1)If a new carriage is to be installed, refer to 27-54-25, P. Block 401 or 27-54-26, P. Block 401.

D. Preparation for Installation

(1)Clean and inspect component attachment paint and surrounding structure for corrosion or other signs of damage.

E. Installation (Ref. Fig. 402, 403, 406)
(Ref. Fig. 410, 411)

NOTE : The inboard flap plus carriages weighs approximately 389 kg (857 lbs).

(1)Remove the hoist fittings (1) from the flap/vane assembly at the lifting points 1, 2 and 4; reverse and install with the hoist eyes uppermost.

NOTE : The lifting points 1, 2 and 4 are used for the removal and installation of the flap/vane assembly. The lifting points 1, 2 and 3 are used for transport of the flap/vane assembly. The lifting points 3 and 5 are used for transport of the vane only.

R (2)Attach the hoisting sling PN 98F27508498000 to hoist fitting (1) with fitting mechanism (3) attached to forward outboard fitting.

(3)Using a crane, lift flap/vane assembly clear of trestles and adjust tilting mechanism (3) to bring the flap to on angle of 20° approximately in the end to end horizontal plane with inboard end down.

(4)Taking care not to get too close, pass flap inboard end under fixed structure and position flap assembly with carriages at the rear of their correct tracks.

(5)Carefully move flap assy forward, engage carriage rollers with correct tracks until flap is at 0° position.

(6)Install rigging pin PN 98A27508003100 in carriage 1, flap track 1.

(7)Install rigging pin PN 98A27508003200 in carriage 2, track 2.
(8)Install bushes (14) on screw nut trunnion attachments and using screwjack support cradles (13) lift until in engagement with trunnion blocks (5).
(9)Coat threads of bolts (18) with lubricant (Material No. 06-002).
(10)Coat faying surfaces of primary bearing half housings (15) with anti-corrosion compound (Material No. 05-002), fit and secure with washers (17) and bolts (18).
(11)TORQUE bolts (18) to between 3.5 and 3.6 m.daN (25.81 and 26.55 lbf.ft) and lockwire in pairs. Seal bolts heads with corrosion preventive (Material No. 05-005).
(12)Coat threads of bolts (20) with lubricant (Material No. 06-002).
(13)Coat faying surfaces of fail safe bearing half housings (16) with anti-corrosion compound (Material No. 05-002), fit and secure with washers (19) and bolts (20).
(14)TORQUE bolts (20) to between 3.5 and 3.6 m.daN (25.81 and 26.55 lbf.ft.) and lockwire in pairs. Seal bolt heads with corrosion preventive (Material No. 05-005).
(15)Lubricate the trunnion blocks with grease (Material No. 04-004) (Ref. 12-22-27, P. Block 1).
(16)Attach bonding strap (10) to screwjack 2 track with bolt (12), washers (11),(9) and nut (8) (Ref. 20-28-11, P. Block 1). TORQUE nut (8) to 0.6 m.daN (4.43 lbf.ft.). Seal connection with sealant (Material No. 09-001).
(17)Insert shaft (96) into screwjack 2 making certain that holes in flanges are aligned. If necessary adjust joint on splines to obtain an easy fit of bolts (106). Make certain that indicator groove on make portion of splines connection is not visible, indicating adequate engagement.
(18)Secure flanges with bolts (106) and nuts (107).
(19)TORQUE bolts to between 1.0 and 1.25 m.daN (7.4 and 9.22 lbf.ft.).
(20)Seal bolt heads and nuts with corrosion preventive (Material No. 05-005).
(21)Install torque shaft (98) and secure with bolts (104) and nuts (103).
(22)TORQUE nuts (103) to between 1.0 and 1.25 m.daN (7.4 and 9.22 lbf.ft.).
(23)Seal bolt heads and nuts with corrosion preventive (Material No. 05-005).
(24)Disconnect the hoisting sling from the flap.
(25)Remove the three hoist fittings (1), reverse and install flush into the flap assembly. Seal with sealant (Material No. 09-016).
(26)Remove support cradles from flap tracks 1 and 2.
(27)Check clearance between upper and lower slide plates on carriage 1 and flap track 1 (Ref. 27-54-25, P. Block 401).
(28)At aft end of flap track 1:
  (a)Apply anti-corrosion compound (Material No. 05-002) over full length of bolts (136),(138).
  (b)Install bolts (138).
  (c)Position stops (137) and install bolts (136).
  (d)Install serrated plate (130) on bolts (138),(136).
  (e)Position serrated plate (131) on bolts (138),(136) in approximately mid position. Make certain that teeth in serrated plate (131) are correctly engaged with teeth in serrated plate (130).
  (f)Install roller support on bolts (138),(136) and slide upwards until shoulder of roller support engages with flange of serrated

plate (131). Make certain that serrated plate (131) does not move from mid position.

(g)Install washers (132) and nuts (133) and hand tighten.

(h)Install washers (135) and nuts (134) and TORQUE to between 3.5 to 6.5 m.daN (25.8 to 47.9 lbf.ft.).

(i)TORQUE nuts (133) to between 3.5 to 6.5 m.daN (25.8 to 47.9 lbf.ft.).

(29)Check clearances between carriage 2 and flap track 2 (Ref. 27-54-26, P. Block 401).

(30)At aft end of flap track 2:

(a)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of track end stop, track and to bolts (150).

(b)Position track end stop with fairing side load stay; install bolts (150), washers (151),(142) and castle nuts (141) and tighten.

(c)Safety castle nuts (141) with cotter pins (140).

(d)Apply anti-corrosion compound (Material No. 05-002) to bolts (145),(147).

(e)Install bolt (147), washer (148) and nut (149) and tighten.

(f)Install bolt (145) and washer (146) and tighten.

(g)Remove rigging pins from carriage 1, flap track 1 and carriage 2, flap track 2.

(31)Remove check pins from carriage 3, flap track 3 and carriage 5, flap track 5.

F. Adjustment

(1)Refer to para. 2.F. where applicable.

G. Close-Up

(1)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(2)Make certain that the safety collars are removed from all three ASA servo controls.

(3)Make certain that all safety collars are removed from the speed brake actuators 1 and 2.

(4)Make certain that access doors 572AB (672AB), 572BB (672BB), 572CB (672CB), 572DB (672DB), 575DB (675DB), 577AB (677AB) and 577BB (677BB) are closed.

(5)Install flap track fairing No. 2 (Ref. 27-50-21, P. Block 401).

(6)Make certain that flaps are in 0° position (Ref. 27-50-00, P. Block 301).

(7)Make certain that circuit breakers 1CV, 2CV, 5CV, 6CV and 10CV are closed.

(8)Make certain that safety guard is removed from flap/slat control lever quadrant.

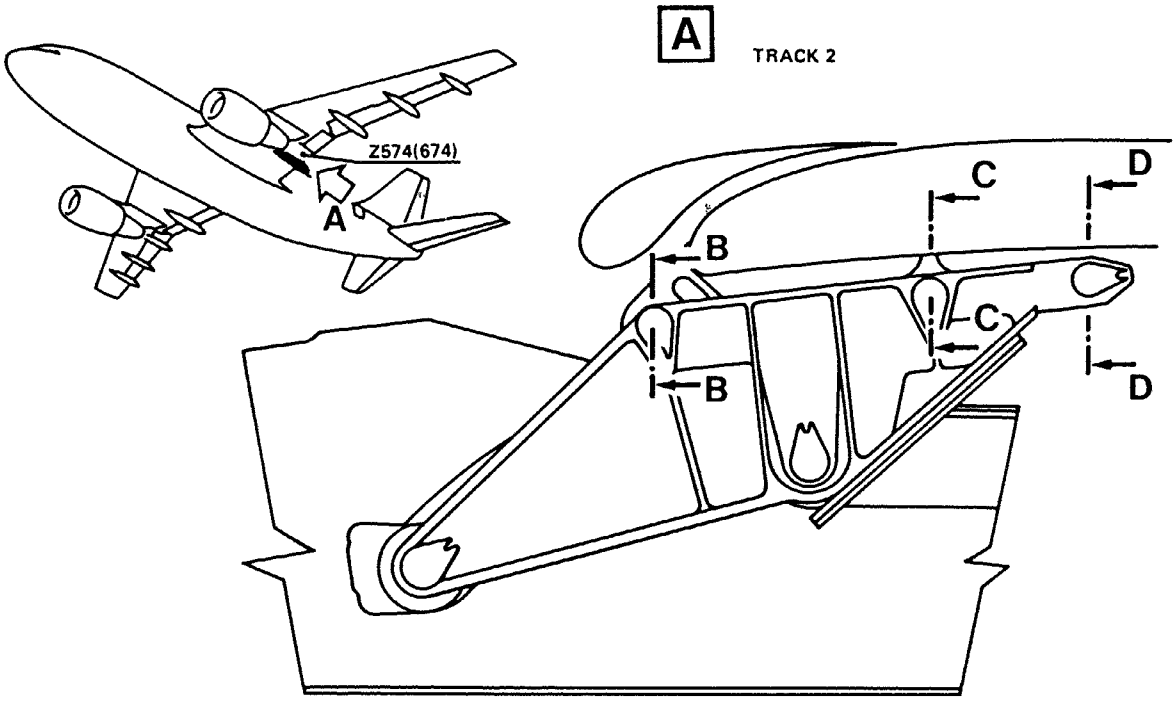
(9)Remove warning notice.

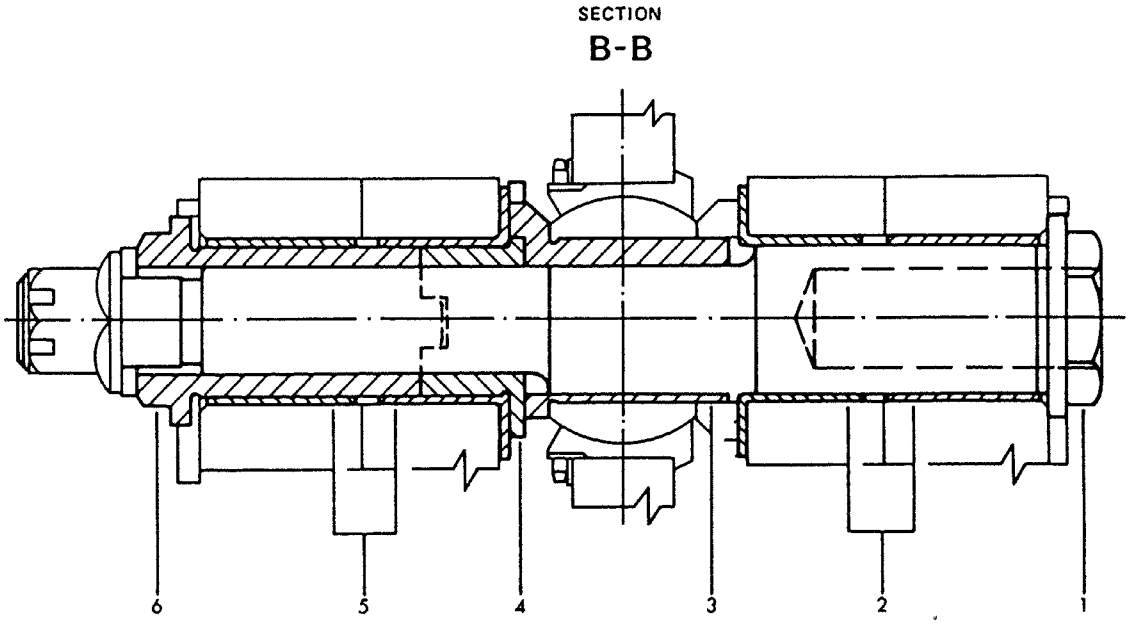
(10)Remove access platform.

1. Reason for the Job

A. Check for Fits and Clearances
With removal - Table of Fits and Clearances
(Ref. Fig. 601) (Sheet 1/3)
(Ref. Fig. 601) (Sheet 2/3)
(Ref. Fig. 601) (Sheet 3/3)

Detail and item No.	Original Mfg Limits				In-Service Wear Limits		
	Dimension mm (in.)		Assy. Clearance mm (in.)		Dimension Limits mm (in.)		Max. Allow. clear mm(in.)
	Min.	Max.	Min.	Max.	Min.	Max.	
B-B							
OD1	35.975 (1.4163)	35.991 (1.4170)			35.955 (1.4155)		
			0.009 (0.0004)	0.050 (0.0020)			0.090 (0.0035)
ID2	36.000 (1.4170)	36.025 (1.4180)				36.045 (1.4190)	
OD1	30.975 (1.2190)	30.991 (1.2200)			30.955 (1.2187)		
			0.009 (0.0004)	0.050 (0.0020)			0.090 (0.0035)
ID3	31.000 (1.2200)	31.025 (1.2210)				31.045 (1.2222)	
OD1	25.980 (1.0228)	25.993 (1.0233)			25.960 (1.0220)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0032)
ID6/ ID4	26.000 (1.0236)	26.021 (1.0244)				26.041 (1.0252)	
OD4	35.950 (1.4150)	35.975 (1.4163)			35.930 (1.4145)		
			0.025 (0.0010)	0.075 (0.0029)			0.115 (0.0045)
ID5	36.000 (1.4170)	36.025 (1.4180)				36.045 (1.4191)	





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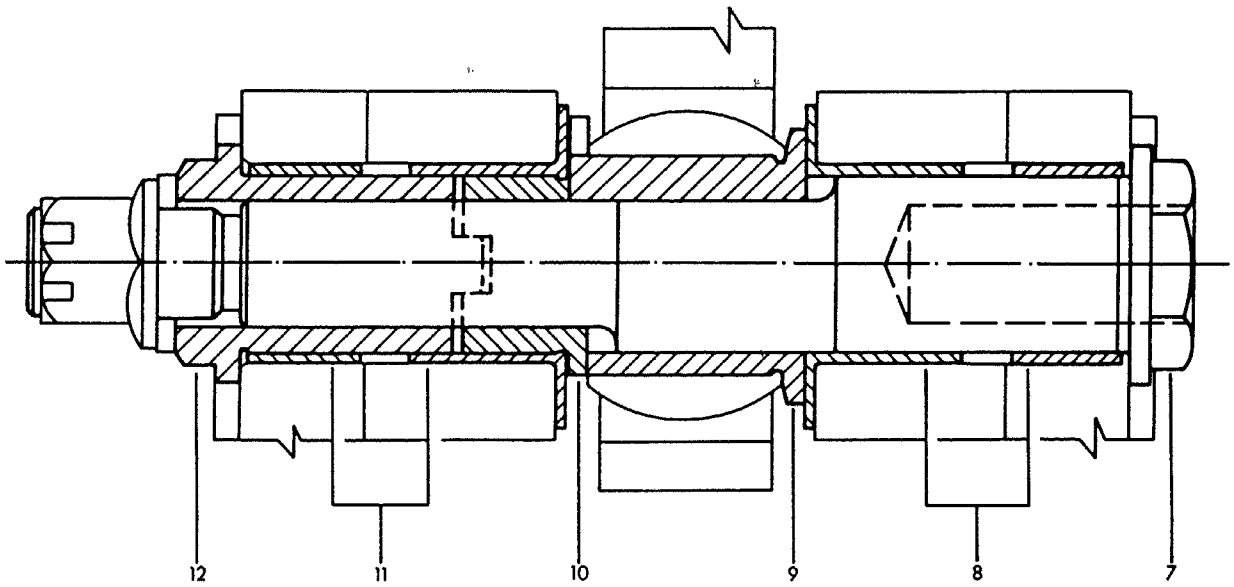
Inboard Flap Connection Parts
Figure 601

SECTION
C-C



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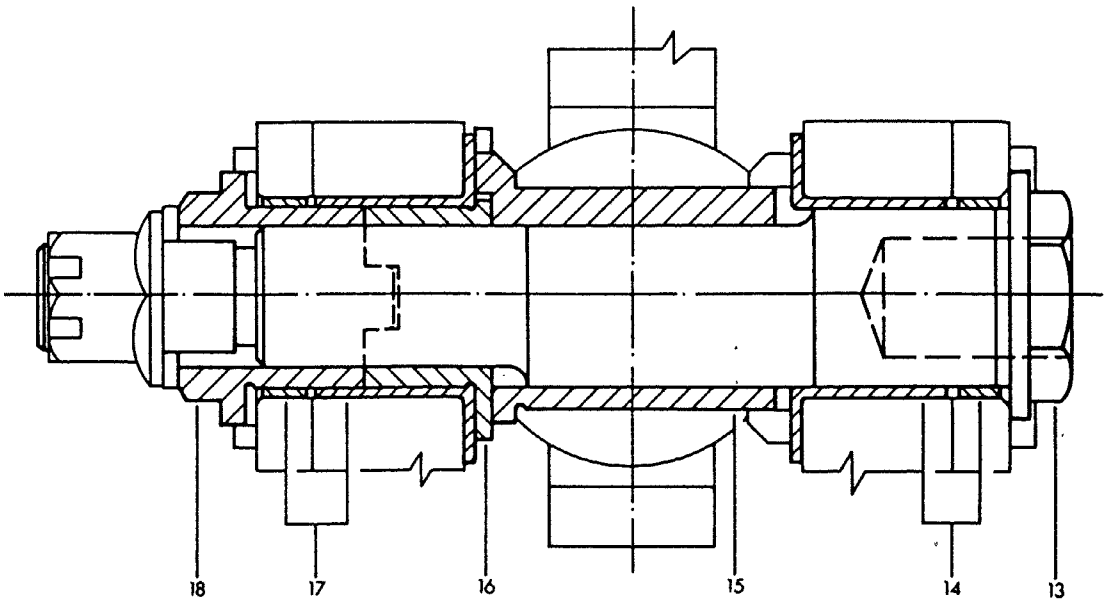
D-D



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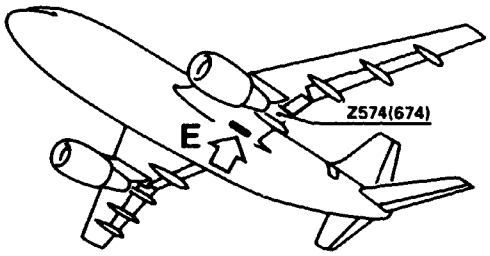
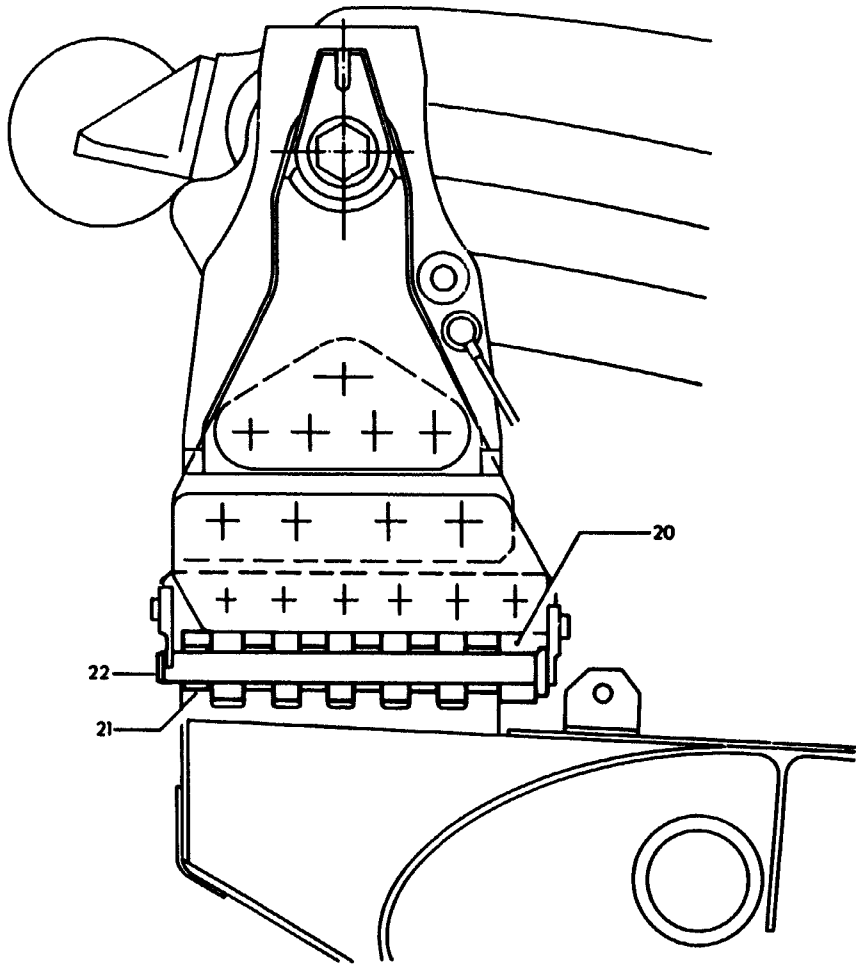
Inboard Flap Connection Parts
Figure 601



E



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Inboard Flap Connection Parts
Figure 601

Detail and item No.	Original Mfg Limits				In-Service Wear Limits		
	Dimension mm (in.)		Assy. Clearance mm (in.)		Dimension Limits mm (in.)		Max. Allow. clear mm(in.)
	Min.	Max.	Min.	Max.	Min.	Max.	
OD6	35.950 (1.4150)	35.975 (1.4163)			35.930 (1.4145)		
			0.025 (0.0010)	0.075 (0.0029)			0.115 (0.0045)
ID5	36.000 (1.4170)	36.025 (1.4180)				36.045 (1.4191)	
C-C							
OD7	35.975 (1.4163)	35.991 (1.4170)			35.955 (1.4155)		
			0.009 (0.0004)	0.050 (0.0020)			0.090 (0.0035)
ID8	36.000 (1.4170)	36.025 (1.4180)				36.045 (1.4190)	
OD7	25.980 (1.0228)	25.993 (1.0233)			25.960 (1.0220)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0032)
ID10	26.000 (1.0236)	26.021 (1.0244)				26.041 (1.0252)	
OD7	25.980 (1.0228)	25.993 (1.0233)			25.960 (1.0220)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0032)
ID12	26.000 (1.0236)	26.021 (1.0244)				26.041 (1.0252)	
OD10	35.950 (1.4150)	35.975 (1.4163)			35.930 (1.4145)		
			0.025 (0.0010)	0.075 (0.0029)			0.115 (0.0045)
ID11	36.000 (1.4170)	36.025 (1.4180)				36.045 (1.4191)	

Detail and item No.	Original Mfg Limits				In-Service Wear Limits		
	Dimension mm (in.)		Assy. Clearance mm (in.)		Dimension Limits mm (in.)		Max. Allow. clear mm(in.)
	Min.	Max.	Min.	Max.	Min.	Max.	
OD12	35.950 (1.4150)	35.975 (1.4163)			35.930 (1.4145)		
			0.025 (0.0010)	0.075 (0.0029)			0.115 (0.0045)
ID11	36.000 (1.4170)	36.025 (1.4180)				36.045 (1.4191)	
D-D							
OD13	35.975 (1.4163)	35.991 (1.4170)			35.955 (1.4155)		
			0.009 (0.0004)	0.050 (0.0020)			0.090 (0.0035)
ID14	36.000 (1.4170)	36.025 (1.4180)				36.045 (1.4191)	
OD13	31.975 (1.2588)	31.991 (1.2595)			31.955 (1.2581)		
			0.009 (0.0004)	0.050 (0.0020)			0.090 (0.0035)
ID15	32.000 (1.2598)	32.025 (1.2608)				32.045 (1.2616)	
OD13	27.980 (1.1016)	27.993 (1.1021)			27.960 (1.1008)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0032)
ID16/ ID18	28.000 (1.1024)	28.021 (1.1032)				28.041 (1.1040)	
OD16	35.950 (1.4150)	35.975 (1.4163)			35.930 (1.4145)		
			0.025 (0.0010)	0.075 (0.0029)			0.115 (0.0045)
ID17	36.000 (1.4170)	36.025 (1.4180)				36.045 (1.4191)	

Detail and item No.	Original Mfg Limits				In-Service Wear Limits		
	Dimension mm (in.)		Assy. Clearance mm (in.)		Dimension Limits mm (in.)		Max. Allow. clear mm(in.)
	Min.	Max.	Min.	Max.	Min.	Max.	
OD18	35.950 (1.4150)	35.975 (1.4163)			35.930 (1.4145)		
			0.025 (0.0010)	0.075 (0.0029)			0.115 (0.0045)
ID17	36.000 (1.4170)	36.025 (1.4180)				36.045 (1.4191)	
E-E							
OD22	13.966 (0.5498)	13.984 (0.5506)			13.946 (0.5491)		
			0.016 (0.0006)	0.052 (0.0020)			0.092 (0.0036)
ID20	14.000 (0.5512)	14.018 (0.5519)				14.038 (0.5527)	
OD22	13.966 (0.5498)	13.984 (0.5506)			13.946 (0.5491)		
			0.016 (0.0006)	0.052 (0.0020)			0.092 (0.0036)
ID21	14.000 (0.5512)	14.018 (0.5519)				14.038 (0.5527)	

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE SURE THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE SURE THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platforms, 4 to 4.6 m (13 to 15 ft.)
	B.	Trestles
	C.	Crane
	D. 98A27108028000	Safety Collar Set - All Speed Aileron Actuator
	E. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	F. 98A27508003001	Rigging Pin Set - Flap Adjustment
	G. 98A27508013000	Drive - Flap Torque Shaft
	H. 98A27508015001	Check Pin Set - Flap Neutral Setting
	J. 98A27508018000	Chock Set, Flap Carriages to Tracks 3 thru 5
	K. 98F27508498000	Hoisting Sling - Outboard Flap
	L. 98A27508022000	Measuring Device - Overtravel, Flap Screwjacks 1 thru 4
	M. 98A27508026000	Support Cradle - Flap Spindle
R	N. 98A27508027000	Templates - Outboard Flap, Tracks 3 thru 5
R	or	
R	98A27508688000	
	P. 98A27608013000	Safety Collar Set - Spoiler Actuator Piston
	Q. 98A27608014000	Safety Collar Set - Airbrake Actuator Piston
	R.	Torque Wrenches, Range up to: 6 m.daN (44.25 lbf.ft.)
	S.	Pneumatic Motor
	T.	Safety Barriers
	U.	Warning Notice Prohibiting the Pressurization of Hydraulic Systems
	V.	Circuit Breaker Safety Clips and Tags
	W.	Cotter Pins
	X.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	Y.	Shims, Fail Safe Cage
	Z.	Lock Washers
	AA.Material No. 04-004	Common Greases (Ref. 20-31-00)
	AB.Material No. 05-002	Special Materials (Ref. 20-31-00)
	AC.Material No. 05-005	Special Materials (Ref. 20-31-00)

ITEM	DESIGNATION
AD.Material No. 06-002	Lubricants (Ref. 20-31-00)
AE.Material No. 08-007	Bonding and Adhesive Compounds (Ref. 20-31-00)
AF.Material No. 09-001	Sealants (Ref. 20-31-00)
AG.Material No. 09-013	Sealants (Ref. 20-31-00)
AH.Material No. 09-016	Sealants (Ref. 20-31-00)

Referenced Procedures

- 20-28-11, P. Block 1	Electrical Bonding
- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-50-21, P. Block 401	Flap Track Fairings
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-54-27, P. Block 401	Carriage 3
- 27-54-28, P. Block 401	Carriage 4
- 27-54-29, P. Block 401	Carriage 5
- 27-56-11, P. Block 401	Asymmetry Position Pick-Off Unit
- 27-60-00, P. Block 301	Spoilers and Speedbrakes
- 29-21-00, P. Block 301	Green Auxiliary Power

2. Procedure for Removal/Installation of Outboard Flap without Carriages

NOTE : Removal/Installation for the LH outboard flap without carriages is described, variations for the RH outboard flap without carriages are described in brackets.

A. Job Set-Up

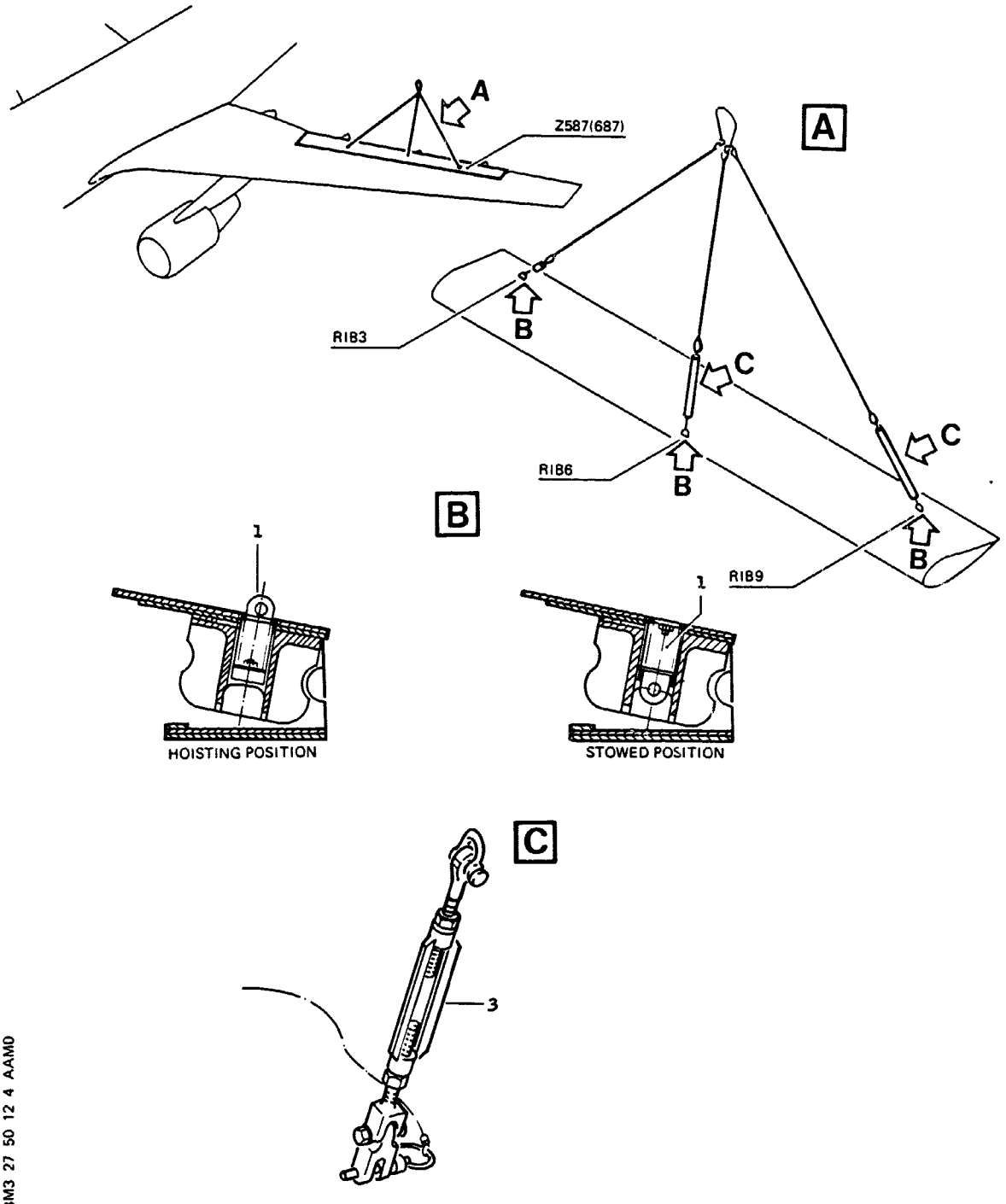
(1)Position safety barriers.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make sure that electronics racks ventilation is correct.
(4)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(5)Set all speed aileron (ASA) fully down on the wing being worked on.
(6)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(7)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(8)Position access platforms.
(9)Install safety collars PN 98A27108028000 on all three ASA servocontrols.
(10)Open access doors 575DB (675DB), 581AB (681AB), 581BB (681BB), 581CB (681CB), 581DB (681DB), 581EB (681EB), 581FB (681FB), 581GB (681GB), 581HB (681HB), 581JB (681JB).
(11)Remove flap track fairings 3,4 and 5 (Ref. 27-50-21, P. Block 401).
(12)Turn maintenance device on valve groups applicable to spoiler surfaces 3 thru 7 to position "M" (Ref. 27-60-00, P. Block 301).
(13)Manually extend surfaces 3 thru 7 and install safety collars PN 98A27608014000 on spoiler/speedbrake actuators 3 and 4 and safety collars PN 98A27608013000 on spoiler actuators 5 thru 7.
(14)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
CAUTION : MAKE SURE THAT ACCESS PLATFORM IS CLEAR OF FLAPS DURING RETRACTION.

(15)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(16)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(17)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(18)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(19)Remove asymmetry position pick-off unit (Ref. 27-56-11, P. Block 401).
(20)Position warning notice prohibiting pressurization of hydraulic systems.

B. Removal
(Ref. Fig. 401)
(Ref. Fig. 402)
(Ref. Fig. 403)
(Ref. Fig. 404)
(Ref. Fig. 405)
(Ref. Fig. 406)
(Ref. Fig. 407)
(1)Remove nuts (125) and bolts (126) at flanged joints of torsion damper (119) immediately inboard of kink steady bearing (120). Remove torsion damper (119) and universal joint.
(2)Install chock sets PN 98A27508018000 on tracks 3,4 and 5.
NOTE : Adjustable chock at track 5 must be installed in the most aft position.
(3)Connect driving tool PN 98A27508013000 to splined joint on the inboard side of kink steady bearing (120).
WARNING : MAKE CERTAIN THAT THE TRAVEL RANGE OF THE CONTROL SURFACE IS CLEAR.
(4)Using pneumatic motor connected to the driving tool, extend the flap.
(5)Remove the three hoist fittings (1) from the flap; reverse and install with the hoist eyes uppermost.
(6)Attach the hoisting sling PN 98F27508498000 to the hoist fittings (1) with the turnbuckle connections (3) attached to the center and outboard fittings.
WARNING : LIFTING DEVICE MUST BE CORRECTLY POSITIONED RELATIVE TO THE CENTER OF GRAVITY AND ATTITUDE OF THE FLAP TO PREVENT UNCONTROLLED MOVEMENT WHEN SCREWJACK AND CARRIAGE ATTACHMENTS ARE RELEASED.
(7)Using a crane, lift the hoisting sling, adjust and take up slack in the cables.
NOTE : The outboard flap weighs approximately 290 kg (639 lbs.).
(8)Disconnect the pneumatic motor and drive tool.
(9)Install screwjack support cradles PN 98A27508026000 (8) on tracks 3



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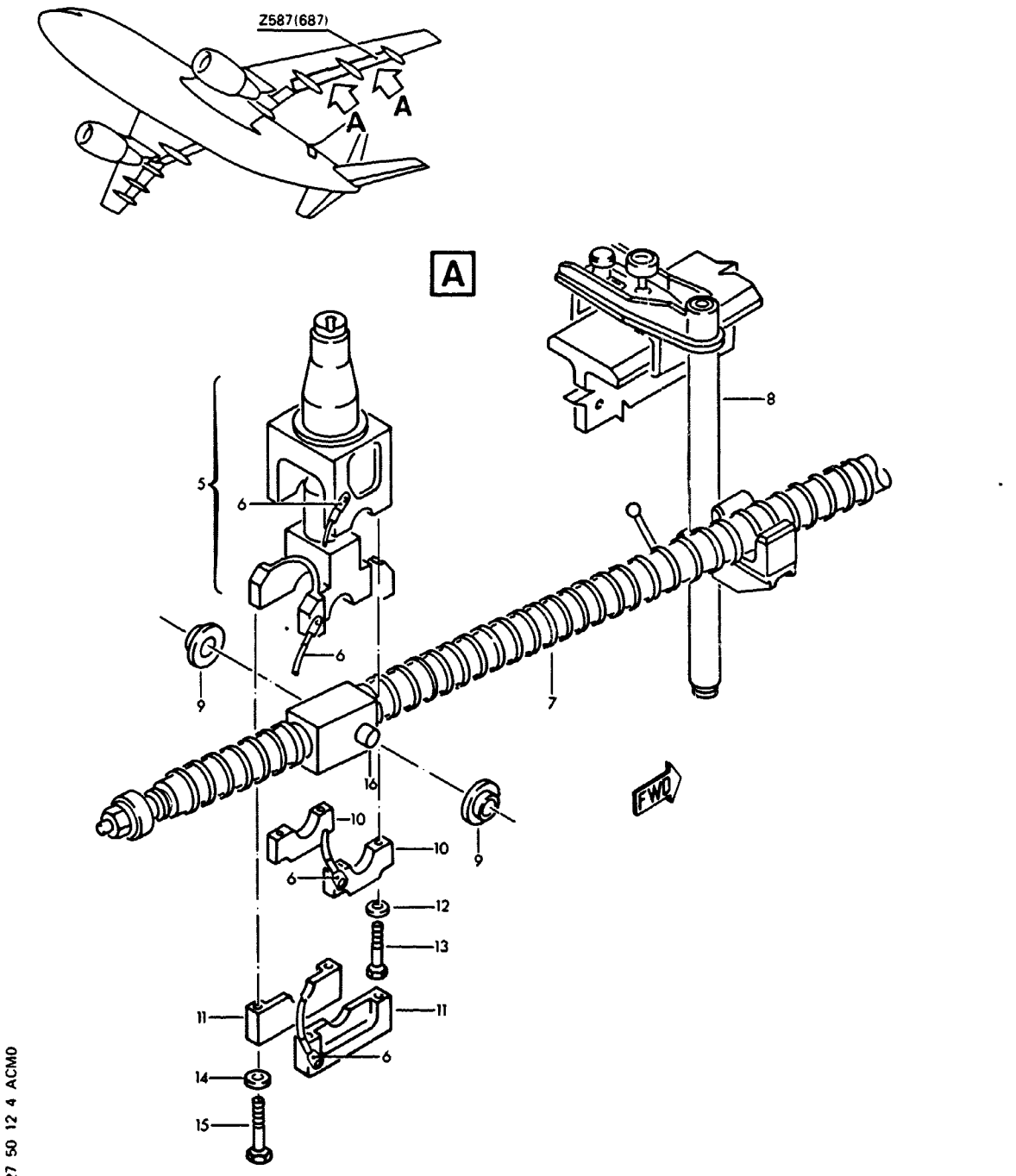
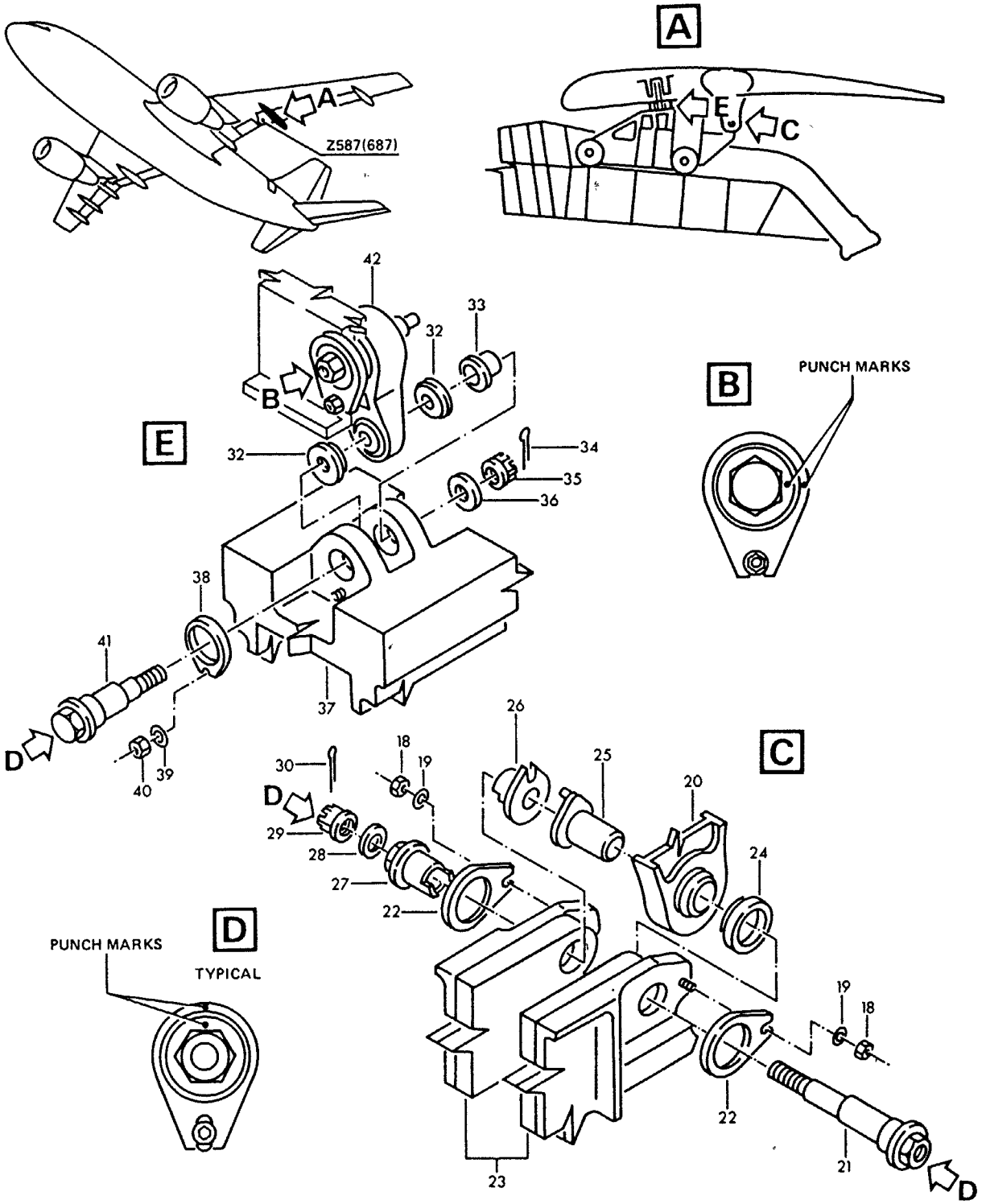
Outboard Flap Hoisting
Figure 401

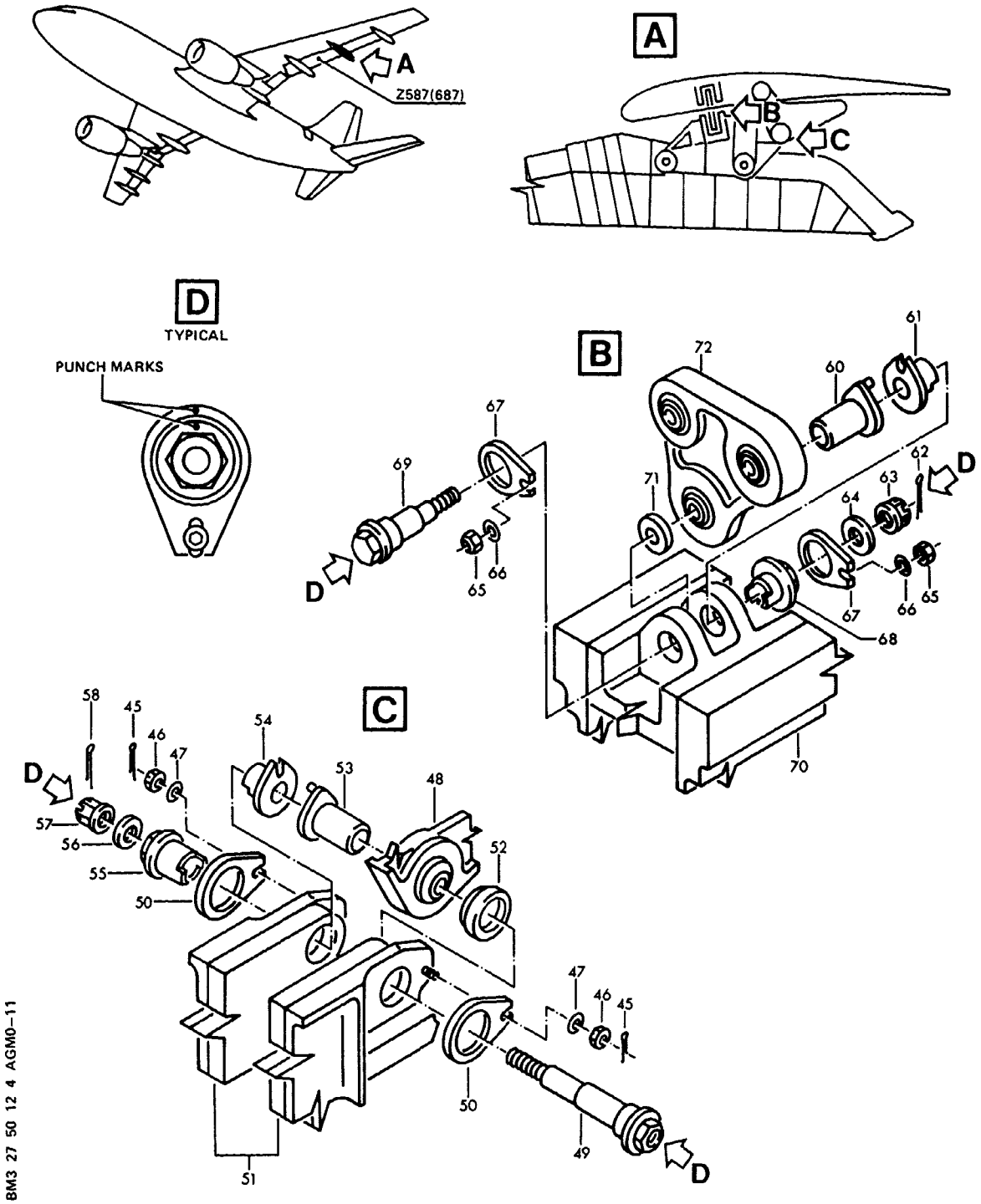


BM3 27 50 12 4 ACM0

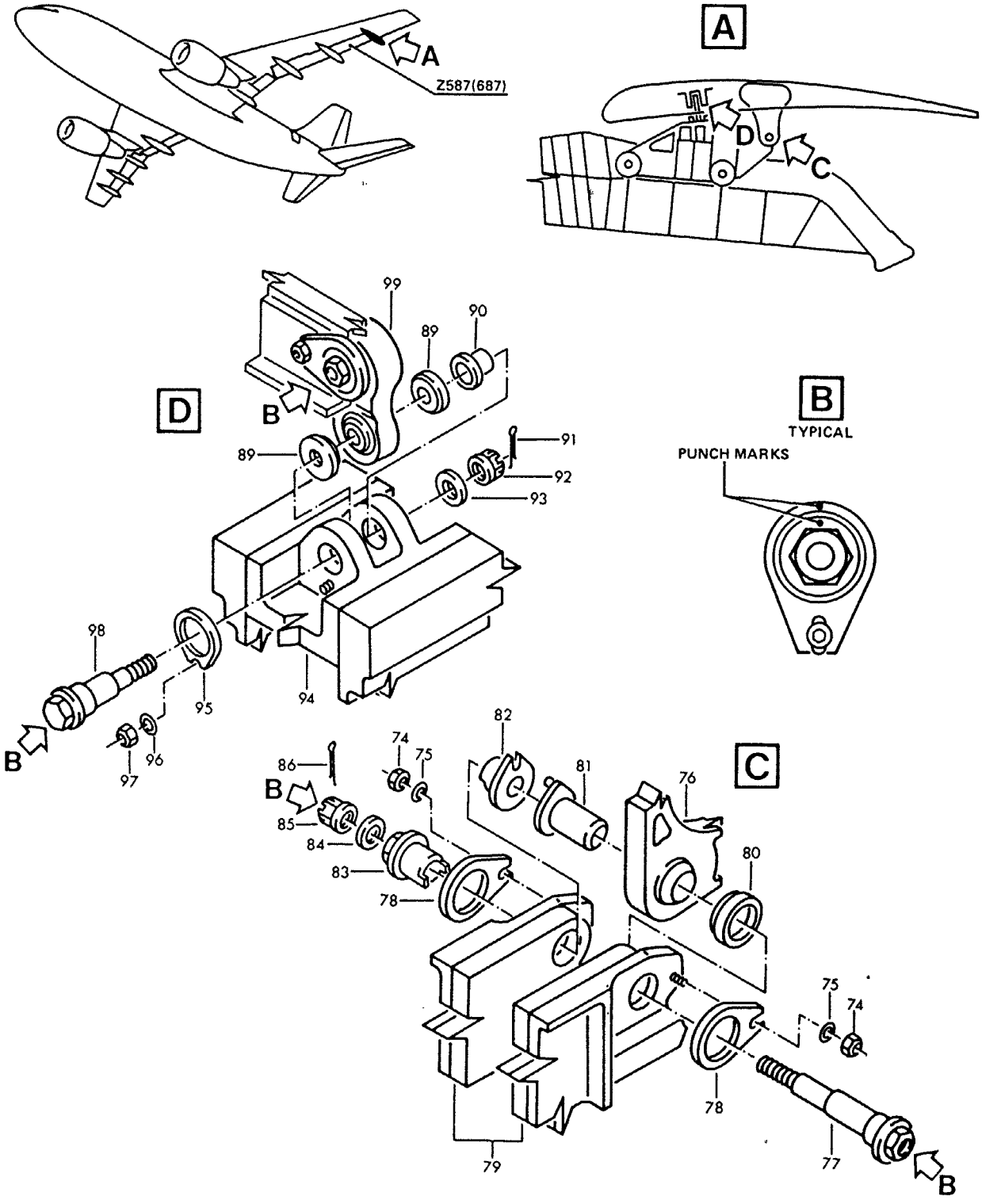
Screwjack 3 and 4 Connections
Figure 402



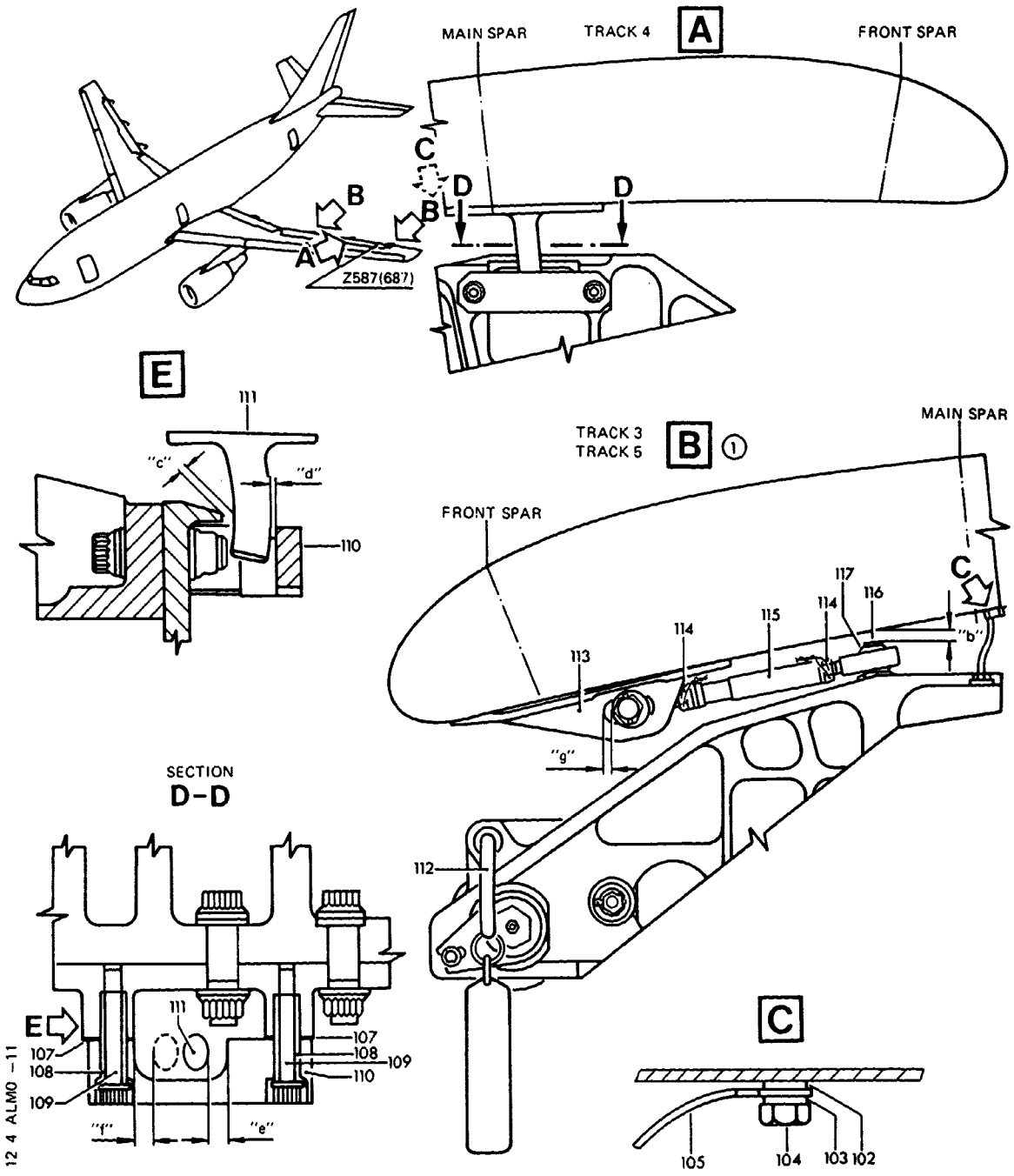
Carriage 3 Connections
Figure 403



Carriage 4 Connections
Figure 404



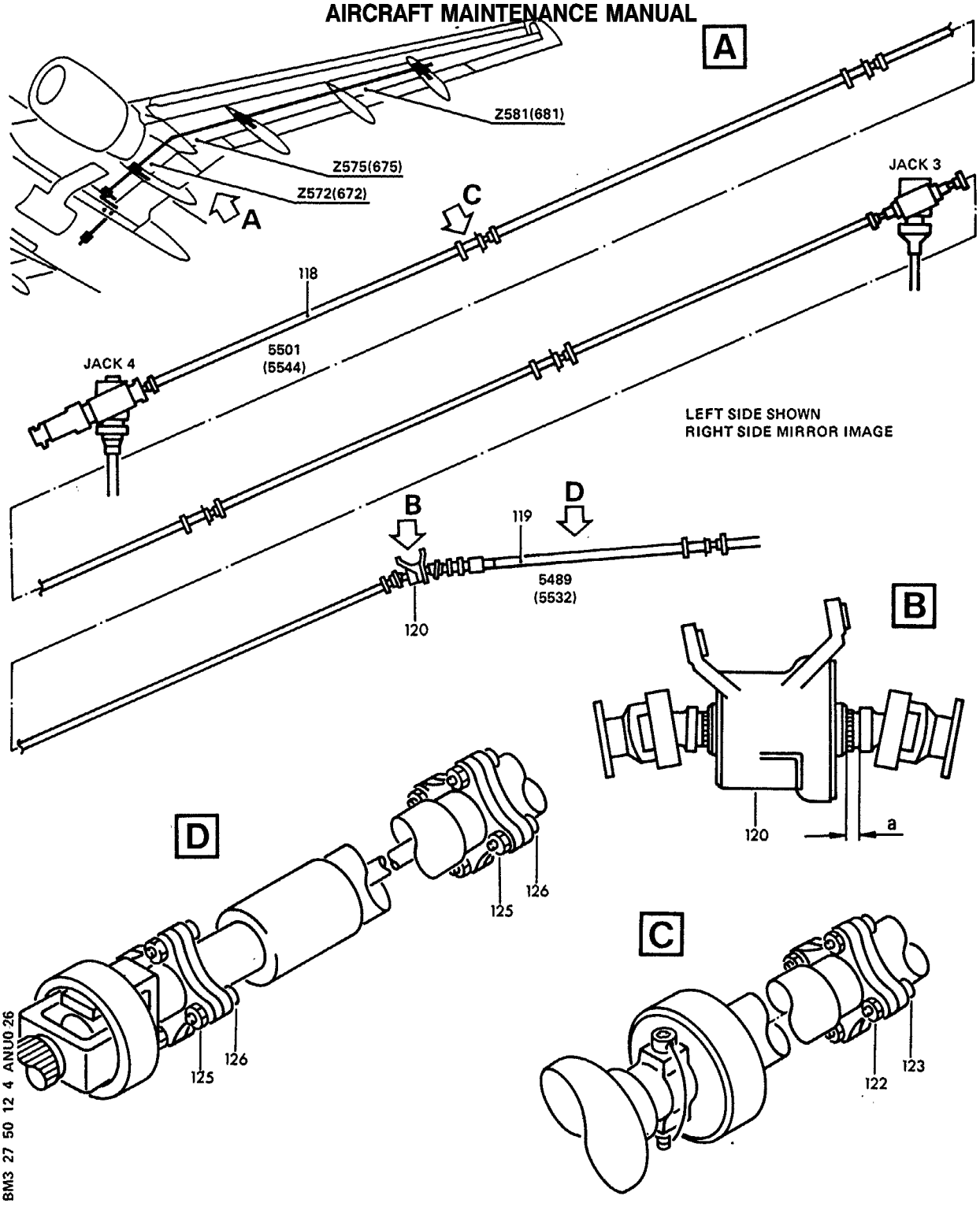
Carriage 5 Connections
Figure 405



①CARRIAGE 3 ILLUSTRATED
CARRIAGE 5 ARRANGEMENT SIMILAR

BM3 27 50 12 4 ALM0 -11

Fail Safe Devices
Figure 406



Outboard Flap Control System Rigging
Figure 407

and 5.
(10)Cut and discard lockwire and remove four bolts (15) and washers (14) securing trunnion fail safe bearing half housings (11).
(11)Cut and discard lockwire and remove four bolts (13) and washers (12) securing trunnion primary bearing half housings (10).
NOTE : Bearing half housings (10),(11) remain attached to the trunnion blocks (5) by the retaining straps (6).
(12)Lower screwjack spindles (7) clear of trunnions and support in cradles.
(13)Remove and retain bushes (9) from screw nut trunnion attachment (16).
(14)Remove bolt (104) and washers (102),(103) and disconnect bonding strap (105) from flap at carriages 3, 4 and 5.
NOTE : Bolts (104) are of differing lengths. Note position for subsequent installation.
(15)At carriage 4, remove bolts (109) and fail safe cage (110) complete with bushes (108) (and shims (107), if installed).
(16)At carriages 3 and 5, remove retaining ring (117) and fail safe cross-brace (115) from pin (116). Secure free end of each cross-brace (115) to the flap with adhesive tape.
(17)Mark bolt/eccentric relationship at each flap/carriage connection if the same flap is being re-installed.
(18)At carriage 4, remove and discard cotter pins (45,58). Remove nuts (46), washers (47), toothplates (50), castle nut (57), washer (56) and eccentric bolt (49) from rear attachment to flap.
(19)At carriage 5, remove and discard cotter pin (86). Remove nuts (74), washers (75), toothplates (78), castle nut (85), washer (84) and eccentric bolt (77) from rear attachment to flap.
(20)At carriage 3, remove and discard cotter pin (30). Remove nuts (18), washers (19), toothplates (22), castle nut (29), washer (28) and eccentric bolt (21) from rear attachment to flap.
(21)At carriage 4, remove and discard cotter pin (62). Remove nuts (65), washers (66), toothplates (67), castle nut (63), washer (64) and eccentric bolt (69) from front attachment to flap.
(22)At carriage 5, remove and discard cotter pin (91). Remove nut (97), washer (96), toothplate (95), castle nut (92), washer (93), eccentric bolt (98) and washers (89) from front attachment to flap.
(23)At carriage 3, remove and discard cotter pin (34). Remove nut (40), washer (39), toothplate (38), castle nut (35), washer (36), eccentric bolt (41) and washers (32) from front attachment to flap.
(24)Carefully lift the flap with crane to ease flap clear of carriages 3, 4 and 5.
NOTE : Washers (24),(52),(80) may be dislodged at this stage. Retain for flap installation.
(25)Swing the flap clear of the aircraft; level the flap and lower onto trestles.
(26)Remove washers (24),(52),(80),(71) and eccentric bushes (25),(53),(81), (60) and retain for flap installation.
(27)Remove bushes (33),(90) and retain for flap installation.

C. Preparation of Replacement Component
(1)Depreserve the replacement flap and make certain that is in good condition.

(2)Thoroughly clean the flap links (20),(42),(48),(72),(76),(99).
(3)Clean and examine the eccentric bushes (25),(53),(60),(81) for corrosion, signs of fretting or other damage.

(4)Using anti-corrosion compound (Material No. 05-002), wet assemble eccentric bush (25) into flap link (20) from inboard side.
(5)Using anti-corrosion compound (Material No. 05-002), wet assemble eccentric bush (53) into flap link (48) from inboard side.
(6)Using anti-corrosion compound (Material No. 05-002), wet assemble eccentric bush (60) into flap link (72) from rear side.
(7)Using anti-corrosion compound (Material No. 05-002), wet assemble eccentric bush (81) into flap link (76) from inboard side.
(8)Using anti-corrosion compound (Material No. 05-002) to secure in position, assemble the washer (24), bevelled face first, onto the protruding end of eccentric bush (25).
(9)Using anti-corrosion compound (Material No. 05-002) to secure in position, assemble the washer (52), bevelled face first, onto the protruding end of eccentric bush (53).
(10)Using anti-corrosion compound (Material No. 05-002) to secure in position, assemble the washer (71) onto the protruding end of eccentric bush (60).
(11)Using anti-corrosion compound (Material No. 05-002) to secure in position, assemble the washer (80), bevelled face first, onto the protruding end of eccentric bush (81).
(12)Remove and retain eye end from free end of cross-braces (115) at track 3 and 5 positions and attach remaining part to flap using adhesive tape.

D. Preparation for Installation
(1)Clean and inspect component attachment points and surrounding structure for corrosion or other signs of damage.
(2)Remove hexagonal sleeves (27),(55),(68),(83) and adjusting sleeves (26),(54),(61),(82) from carriage attachments (23),(51),(70),(79) respectively.
(3)Clean and examine the sleeves for corrosion, signs of fretting or other damage.
(4)Using anti-corrosion compound (Material No. 05-002), wet assemble hexagonal sleeve (27) and adjusting sleeve (26) into carriage 3 rear attachment (23).
(5)Using anti-corrosion compound (Material No. 05-002), wet assemble hexagonal sleeve (68) and adjusting sleeve (61) into carriage 4 forward attachment (70).
(6)Using anti-corrosion compound (Material No. 05-002), wet assemble hexagonal sleeve (55) and adjusting sleeve (54) into carriage 4 rear attachment (51).
(7)Using anti-corrosion compound (Material No. 05-002), wet assemble hexagonal sleeve (83) and adjusting sleeve (82) into carriage 5 rear attachment (79).
(8)Using anti-corrosion compound (Material No. 05-002), wet assemble bushes (33),(90) into carriages 3 and 5 forward attachment.
(9)Clean and examine the eccentric bolts (21),(41),(49),(69),(77),(98) for corrosion, fretting or other signs of damage.

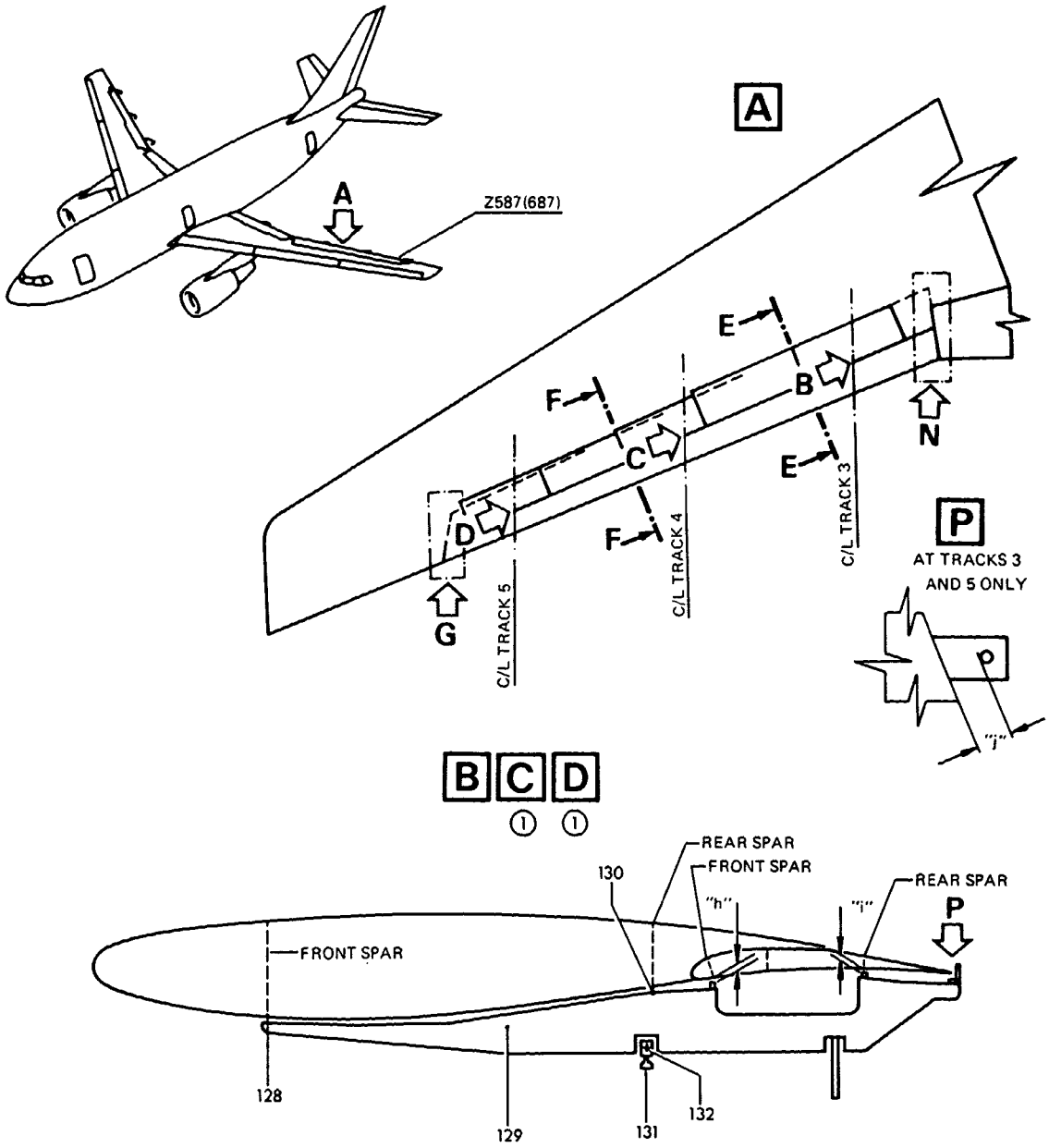
(10)Coat threads of eccentric bolts (21),(41),(49),(69),(77),(98) with lubricant (Material No. 06-002) and shaft with anti-corrosion compound (Material No. 05-002).
(11)Position eccentric bolts on a suitable place in sequence as applicable to each carriage.

E. Installation (Ref. Fig. 401, 402, 403)
(Ref. Fig. 404, 405, 406)
(Ref. Fig. 407)
(1)Remove the three hoist fittings (1) from the flap; reverse and install with the hoist eyes uppermost.
(2)Attach the hoisting sling to the hoist fittings (1) with the turnbuckle connections (3) attached to the center and outboard fittings.
(3)Using a crane, lift the flap clear of the trestles and adjust the turnbuckle connections (3) to bring the flap to an angle of 4 degrees approximately in the end to end horizontal plane with the inboard end down.
(4)Remove chock set at track 4.
(5)Establish forward connections of flap to carriages in sequence, carriage 5,4 and 3 as follows:
NOTE : All bolts at forward connections are to be installed from front to rear.
(a)Carefully position flap to align flap link (99) with carriage 5 forward attachment (94).
(b)Install washers (89) with bevelled faces nearest to link (99) and install eccentric bolt (98).
(c)Install washer (93) and nut (92), do not tighten at this stage.
(d)Lower flap and move carriage 4 upwards to align carriage forward attachment (70) with flap link (72), making certain that pin on eccentric bush (60) is correctly engaged in the slots of adjusting sleeve (61).
(e)Install eccentric bolt (69) into carriage 4 forward attachment.
(f)Install washer (64) and castle nut (63), do not tighten at this stage.
(g)Lower flap and align flap link (42) with carriage 3 forward attachment (37).
(h)Install washers (32) with bevelled faces nearest to link (42) and install eccentric bolt (41).
(i)Install washer (36) and castle nut (35), do not tighten at this stage.
(6)Establish rear connections of flap to carriages in sequence, carriage 5, 4 and 3 as follows:
CAUTION : MAKE CERTAIN THAT PINS IN THE ECCENTRIC BUSHES ARE CORRECTLY ALIGNED AND ENGAGE IN THE SLOTS OF THE ADJUSTING SLEEVES.
(a)Lower trailing edge of flap to align flap links with carriage rear attachments, making certain that pins of eccentric bushes (25),(53), (81) are correctly engaged in the slots of adjusting sleeves (26), (54),(82) respectively.
(b)Align flap link (76) with carriage 5 rear attachment (79).
(c)Install eccentric bolt (77) from outboard side into carriage 5 rear attachment (79).
(d)Install washer (84) and castle nut (85), do not tighten at this stage.
(e)Align flap link (48) with carriage 4 rear attachment (51).

(f)Install eccentric bolt (49) from outboard side into carriage 4 rear attachment (51).
(g)Install washer (56) and castle nut (57), do not tighten at this stage.
(h)Align flap link (20) with carriage 3 rear attachment (23).
(i)Install eccentric bolt (21) from outboard side into carriage 3 rear attachment (23).
(j)Install washer (28) and castle nut (29), do not tighten at this stage.
(7)Disconnect hoisting sling from the flap.
(8)Remove the three hoist fittings (1), reverse and install flush into into the flap. Seal with sealant (Material No. 09-016).
(9)Position toothplates (22),(38),(50),(67),(78),(95), adjust eccentric bolts (21),(41),(49),(69),(77),(98) and hexagonal sleeves (27),(55),(68),(83) nominal setting by aligning punch marks on eccentrics and toothplates.
CAUTION : IN THE ABOVE POSITION, THE SLOT IN THE ECCENTRIC BUSHES IN THE REAR FLAP TO CARRIAGE CONNECTIONS MUST BE VISIBLE FROM THE REAR SIDE. AT TRACK 4 FORWARD CONNECTION THE SLOT IN THE ECCENTRIC BUSH MUST BE VISIBLE FROM OUTBOARD SIDE.
(10)Install washers (19),(39),(47),(66),(75),(96) and nuts (18),(40),(46),(65),(74),(97) on toothplates. Do not fully tighten at this stage.
(11)Install screwjacks 3 and 4 to trunnions as follows:
(a)Apply grease (Material No. 04-004) to bushes (9) and install bushes on screw nut trunnion attachments (16).
(b)Coat threads of trunnion bolts (13),(15) with lubricant (Material No. 06-002).
(c)Coat faying surfaces of secondary half housing (11) and primary half housing (10) with anti-corrosion compound (Material No. 05-002).
(d)Remove support cradles (8) at screwjacks 3 and 4, align screwjack nuts with their respective trunnion blocks and install primary half housing, secure with bolts (13) and washers (12).
(e)TORQUE bolt (13) to between 3.5 and 3.6 m.daN (25.81 and 26.55 lbf.ft.), safety with lockwire.
(f)Install fail safe half housing (11) and secure with bolt (15) and washer (14).
(g)TORQUE bolt (15) to between 3.5 and 3.6 m.daN (25.81 and 26.55 lbf.ft.) and safety with lockwire.
(h)Seal bolt heads (13) (15) with corrosion preventive (Material No. 05-005).

F. Adjustment (Ref. Fig. 403, 404, 405)
(Ref. Fig. 406)
(Ref. Fig. 407)
(Ref. Fig. 408) (Sheets 1 thru 4)
(Ref. Fig. 409, 410)
(1)Connect driving tool to the splined joint on the inboard side of kink steady bearing (120).
WARNING : MAKE SURE THAT THE TRAVEL RANGE OF THE CONTROL SURFACE IS CLEAR.
(2)Using the pneumatic motor connected to the driving tool, retract the flap until a rigging pin (112) from rigging pin set PN 98A27508003001 can be inserted through track/carriage 5.

(3)Remove nuts (122) and bolts (123) from torque shaft (118) immediately inboard of screwjack 4.
(4)Using driving tool connected to the splined joint, retract screwjack 3 until a rigging pin (112) from rigging pin set PN 98A27508003000 can be inserted through track/carriage 3.
(5)Install rigging pin (112) from rigging pin set PN 98A27508003001 through track/carriage 4.
(6)Remove chock sets from tracks 3 and 5.
(7)Coat threads of bolts (109) with lubricant (Material No. 06-002).
(8)Using anti-corrosion compound (Material No. 05-002), wet assemble the fail safe cage (110), bushes (108) and bolts (109) onto carriage 4. TORQUE bolts (109) to 4.6 m.daN (33.9 lbf.ft.).
(9)Make sure that the gap 'd' between the fail safe cage (110) and the fail safe claw (111) is 2 to 4 mm (0.079 to 0.157 in.). Use shims (107) as required to obtain this dimension (Ref. Fig. 406).
(10)Seal heads of bolts (109) with sealant (Material No. 09-013).
R (11)Install the templates PN 98A27508027000 or 98A27508688000 (129) on tracks 3, 4 and 5. Secure with bolts (132) and turn adjusting device (131) until pins (128),(130) contact skin surface below front and rear spars respectively.
(12)Remove safety collars from all three ASA servocontrols.
(13)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301) and set ailerons to neutral.
(14)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(15)Adjust the eccentric bolts (21),(41),(49),(69),(77),(98) and hexagonal sleeves (27),(55),(68),(83) as necessary to obtain the conditions detailed below:
(a)Measure (using minimum/maximum gages supplied with templates where appropriate) distances 'h', 'i' and 'j' between template datum points and flap:
(Ref. Fig. 408) (Sheet 1)
(Ref. Fig. 408) (Sheet 2)
(Ref. Fig. 408) (Sheet 3)
'h' and 'i' = 25 ±0.4 mm (0.9843 ±0.0157 in.)
'j' = 25 +2 -4 mm (0.9843 +0.0787 -0.157 in.)
(b)Using the measuring device PN 98A27508022000, make certain that the screwjack 3 and 4 overtravel is correct.
(Ref. Fig. 409)
1 Screwjack 3 between 135° minimum and 540° maximum
2 Screwjack 4 between 90° minimum and 450° maximum
(c)Make certain that the gap 'e' between the fail safe cage (110) and the fail safe claw (111) is 2 mm (0.0787 in.) minimum (Ref. Fig. 406).
(d)Close access doors 575DB (675DB), 581AB (681AB), 581BB (681BB), 581CB (681CB), 581DB (681DB), 581EB (681EB), 581FB (681FB), 581GB (681GB), 581HB (681HB), 581JB (681JB).
NOTE : The access doors will have to be opened when making rigging adjustments and closed when checking rigging dimensions.
(e)Using a straight edge at positions shown, make certain that the flap lower surface is flush with the wing lower skin or within limits as follows: (Ref. Fig. 408) Sheets 2/3 and 3/3
- dimension 'k' = flush ±2.6 mm (±0.1024 in.)

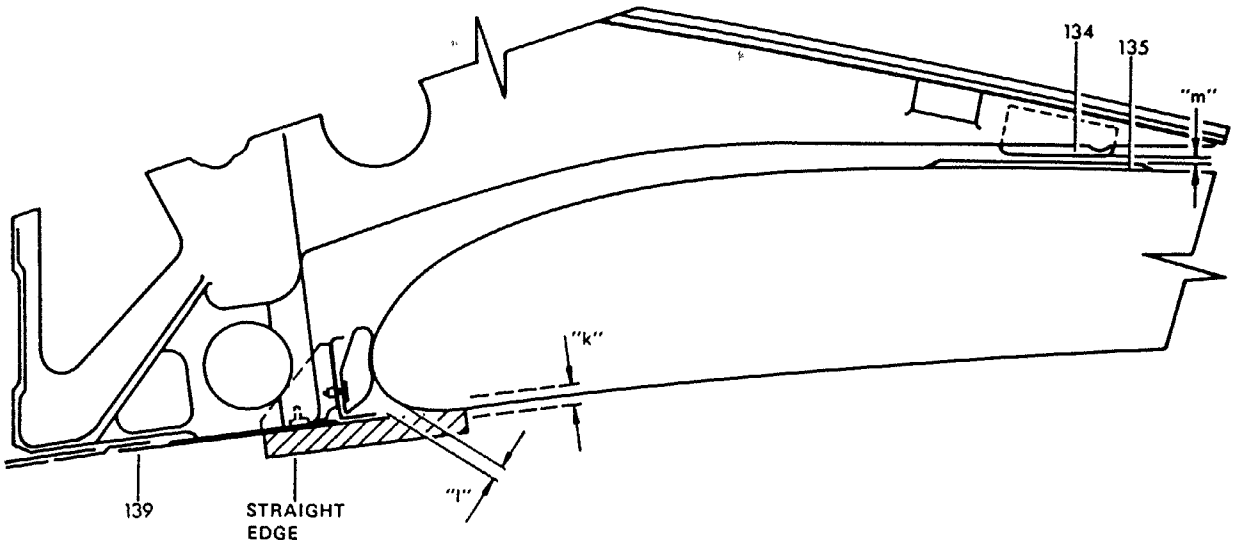


① TRACK 3 ILLUSTRATED, TRACKS 4 AND 5 SIMILAR

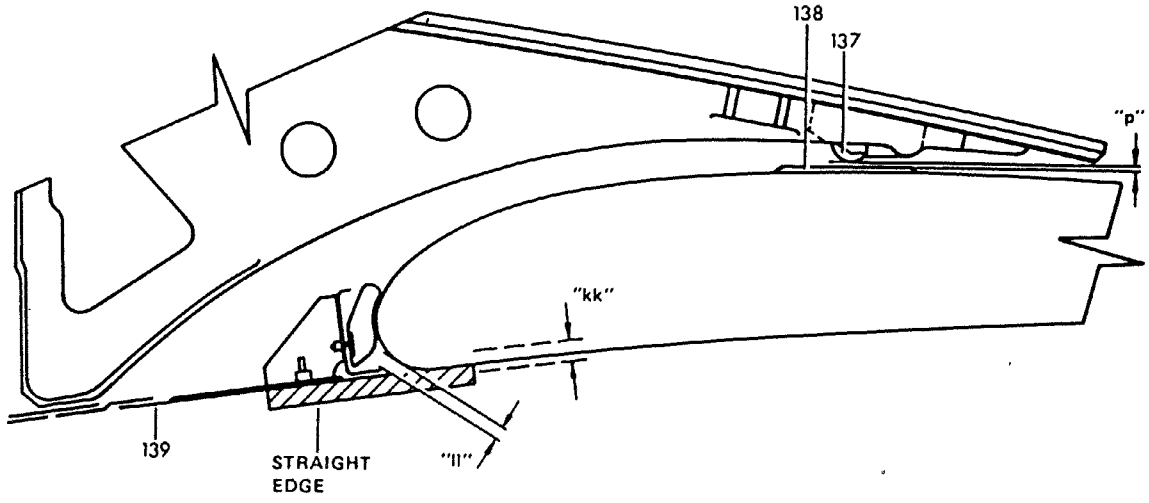
BM3 27 50 12 4 APMA -11

Outboard Flap Rigging (Sheet 1/3)
Figure 408

SECTION
E-E

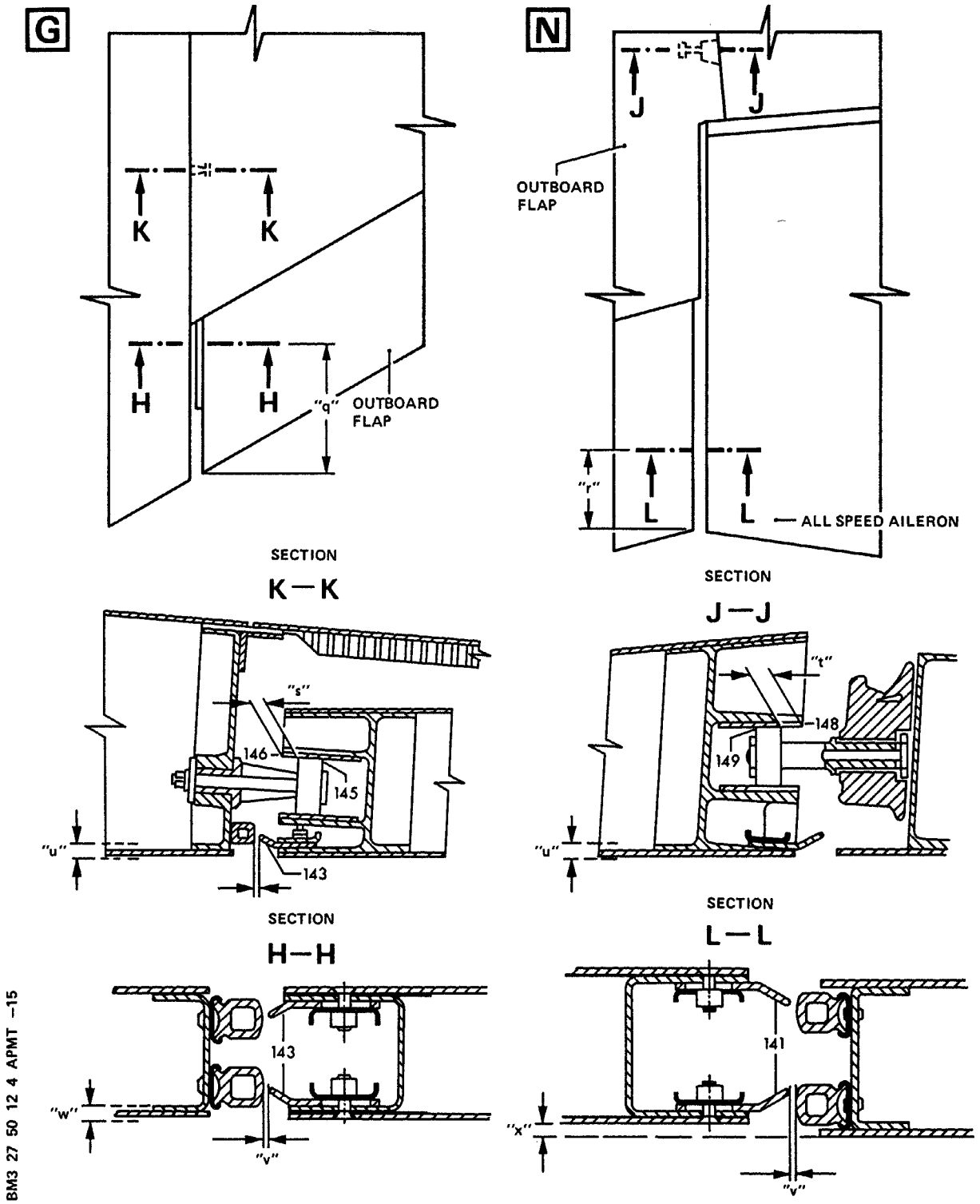


SECTION
F-F

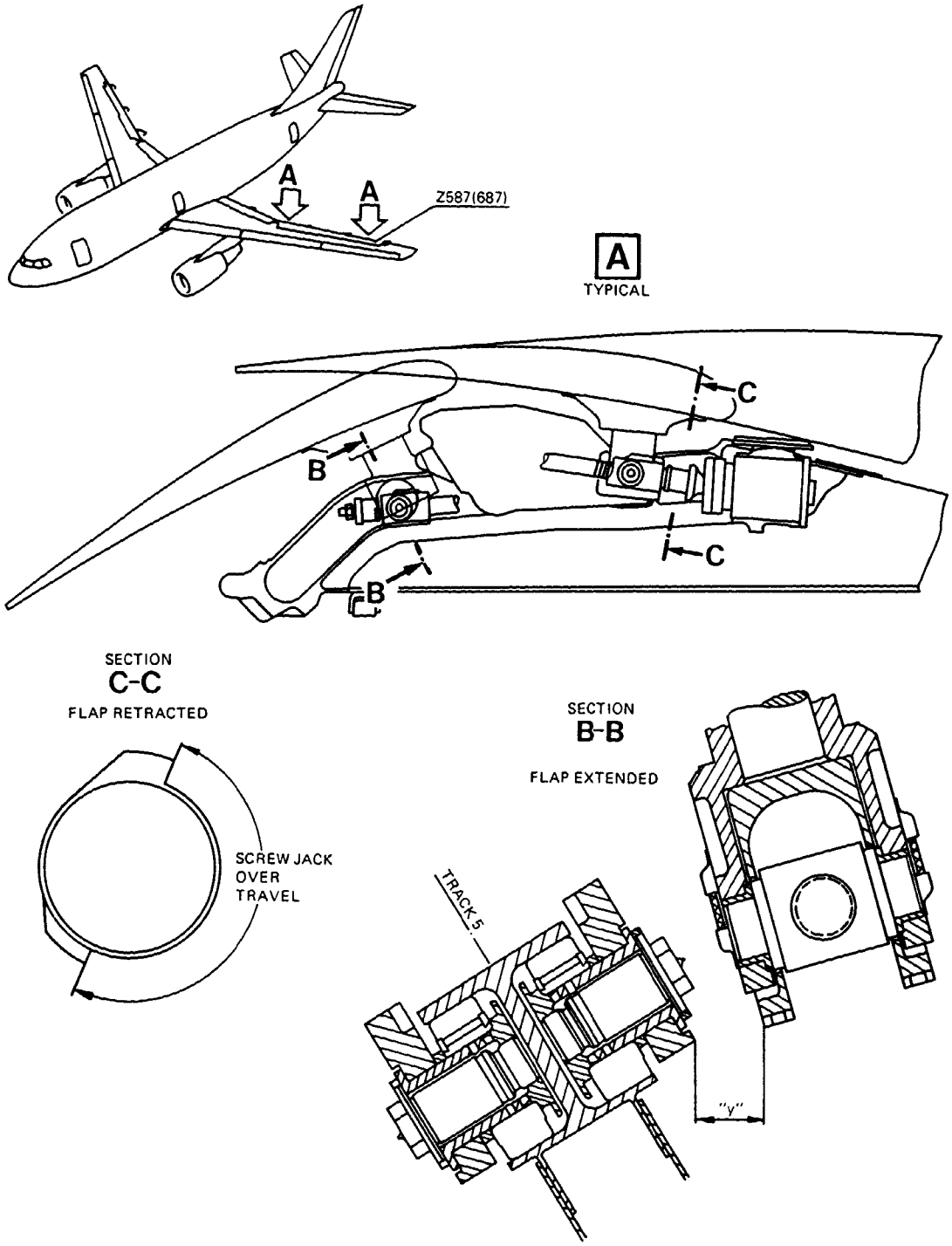


BM3 27 50 12 4 APMJ -12

Outboard Flap Rigging (Sheet 2/3)
Figure 408



Outboard Flap Rigging (Sheet 3/3)
Figure 408



Screwjack Overtravel Measurement
and Carriage/Trunnion Clearance
Figure 409

- dimension 'kk' = flush ±2.6 mm (±0.1024 in.)
  NOTE : A tolerance of +5.1 -2.6 mm (+0.2 -0.1024 in.) is permitted at position 'kk' provided that all of the inboard 50% of the flap is within the tolerance specified for position 'k'.
- dimension 'x' = 13 ±5 mm (0.512 ± 0.197 in.) measured at 'r' = 210 ±15 mm (8.2677 ±0.5906 in.) from trailing edge
- dimension 'w' = flush ±4.0 mm (±0.1575 in.) measured at 'q' = 350 ±15 mm (13.780 ±0.5906 in.) from trailing edge
- dimension 'u' (two positions) = flush ±3.3 mm (±0.1299 in.)

(f)Make certain that outboard up-lock roller (145) engagement into track (146), dimension 's', is 9 ±6 mm (0.3543 ±0.2362 in.).

(g)Make certain that inboard up-lock roller (149) engagement into track (148), dimension 't', is 10.8 ±6 mm (0.4252 ±0.2362 in.).

(h)Make certain that gap 'm' between Teflon block (134) and flap reinforcing plate (135) is 3.7 ±2.6 mm (0.1457 ±0.1024 in.).

(i)Make certain that gap 'p' between roller (137) and flap reinforcing plate (138) is 2.4 +2.6 -2.3 mm (0.095 +0.102 -0.0906 in.).

(j)Make certain that gap 'l' between the flap leading edge and access doors (139) is 7 ±3 mm (0.2756 ±0.1181 in.) and gap "ll" is between 3 and 10 mm (0.118 and 0.394 in.).

NOTE : If the dimensions obtained during steps above are not correct, adjustment shall be made in the sequence, track 3,5 and 4.

NOTE : The rigging pins are to be removed during adjustment.

NOTE : Flap adjustment in the vertical sense is controlled by carriage 3 and 5 forward and carriage 4 rear positions. Carriage 3 and 5 rear and carriage 4 forward positions are used for adjustment in the horizontal and vertical sense.

NOTE : Slight manual adjustment of screwjacks 3 and 4 will be necessary to obtain correct rigging when adjusting the flap in the fore and aft direction.

NOTE : The toothplates are removed and temporarily installed for each adjustment of an eccentric.

(16)Install the toothplates (22),(38),(50),(67),(78),(95) and secure with washers (19),(39),(47),(66),(75),(96) and nuts (18),(40),(46),(65),(74),(97). Do not fully tighten at this stage.

(17)If adjustment in vertical and angular sense cannot be obtained by adjusting the lower eccentrics at tracks 3 and 5, adjust the upper eccentrics inside the flap as follows:
(Ref. Fig. 410)

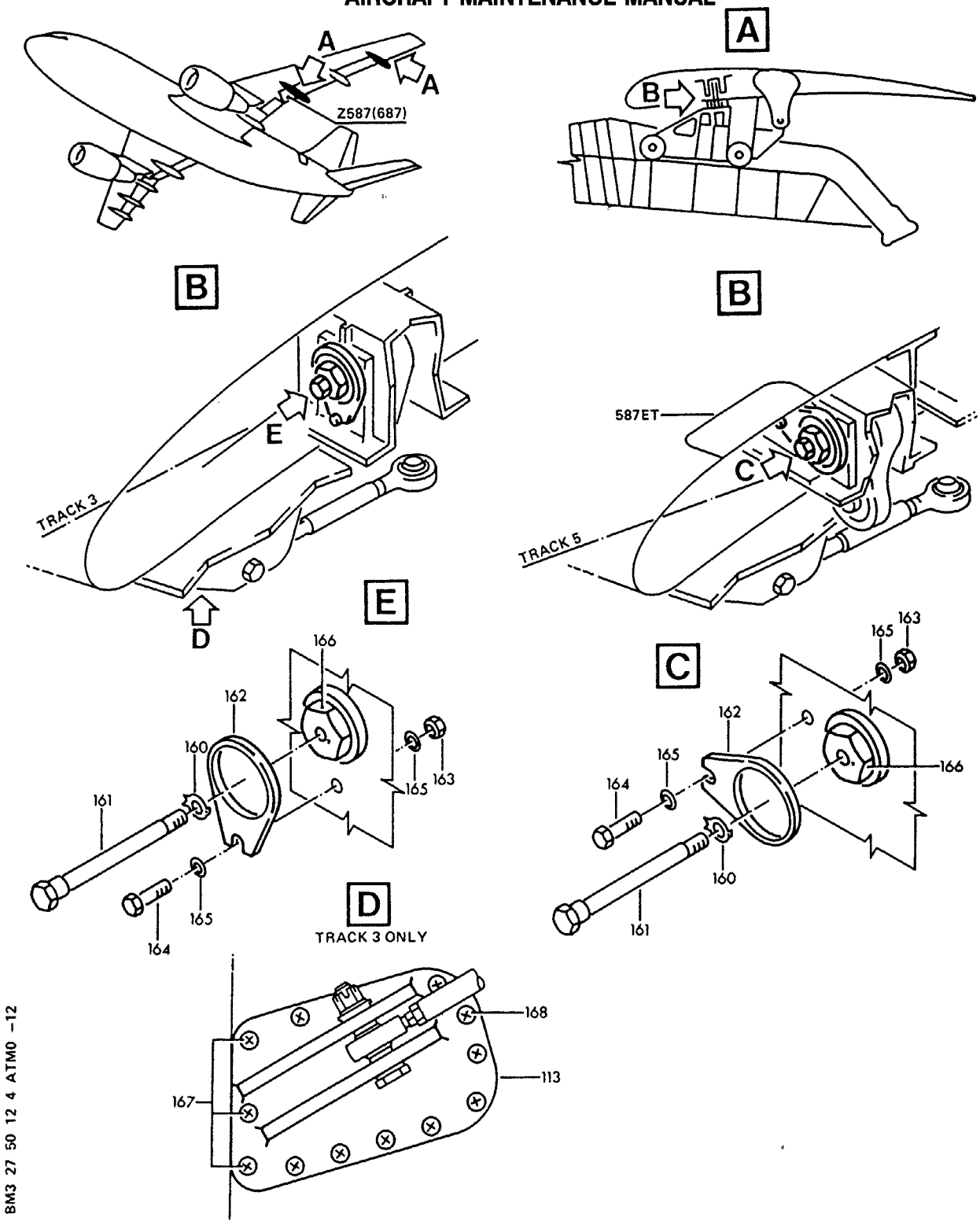
(a)Connect torque shaft (118) using bolts (123) and nuts (122). Tighten nuts but do not torque at this stage.

(b)Remove templates (129) from tracks 3,4, and 5.

(c)Make certain that rigging pins (112) are removed from carriages 3,4 and 5.

WARNING : MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.

(d)Using pneumatic motor, connected to the drive tool inboard of kink



Flap Link Upper Connections at Tracks 3 and 5
Figure 410

steady bearing (120), fully extend the outboard flap.

(e)Remove screws (167),(168) from cross-brace attachment bracket (113) and lower bracket together with cross-brace.

(f)Remove access panel 587ET from the top of flap track 5.

(g)Bend up lock washers (160) and remove bolts (161) at eccentric bolts (166). Discard lock washers (160).

(h)Remove nuts (163), bolts (164), washers (165) and toothplates (162) at tracks 3 and 5.

(i)Turn eccentric bolts (166) by 90° in direction required (vertical or angular).

NOTE : Due to the restricted access the eccentrics inside the flap shall be adjusted by a 90° turn (2 mm (0.0787 in.) from nominal), the fine adjustment shall be made at the lower end of the links.

(j)Install toothplates (162) with bolts (164), washers (165) and nuts (163). TORQUE nuts (163) to between 0.35 and 0.45 m.daN (2.58 and 3.32 lbf.ft.).

(k)Install bolts (161) with new lock washers (160). TORQUE bolts (161) to 5 m.daN (36.9 lbf.ft.) and safety bolts with lock washers (160).

(l)Install access panel 587ET.

(m)Apply anti-corrosion compound (Material No. 05-002) to shanks of screws (167),(168) and thread locking compound (Material No. 08-007) to threads of screws (167).

(n)Install cross-brace attachment bracket (113) with screws (167),(168). TORQUE screws (167),(168) to between 0.8 and 0.9 m.daN (5.9 and 6.6 lbf.ft.).

(o)Seal surrounding of cross-brace attachment bracket with sealant (Material No. 09-016).

(p)Using pneumatic motor, retract flap until rigging pins (112) can be inserted in carriages/tracks 3 and 5.

(r)Re-adjust eccentrics at carriages 3,4 and 5 as described in step (15).

(18)Make certain that the rigging has not been disturbed and that rigging pins (112) can be easily inserted into tracks/carriages 3,4 and 5.

(19)If not performed in step (17) connect torque shaft (118) using bolts (123) and nuts (122). Tighten nuts but do not torque at this stage.

(20)If not performed in step (17) remove the templates (129) from tracks 3, 4 and 5 and rigging pins (112) from carriages 3, 4 and 5.

WARNING : MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.

(21)Using pneumatic motor, connected to the drive tool installed on the splined joint on the inboard side of kink steady bearing (120), fully extend the outboard flap.

(22)Make certain that gaps 'c' and 'f' between the fail safe cage (110) and the fail safe claw (111) are as follows (Ref. Fig. 406):
- gap 'c' = 2 to 5 mm (0.0787 to 0.1969 in.)
- gap 'f' = 2 mm (0.0787 in.) minimum

(23)Make certain screwjack 3 and 4 spindle stop is in contact with nut and that there is a gap 'y' between each screwjack and carriage of 6.5 mm (0.2559 in.) minimum (Ref. Fig. 409):

NOTE : If dimensions are found to be incorrect during steps (22) and (23), retract the flap. Repeat steps (15) and (16) until all rigging requirements detailed in step (15) and steps (22) and

(23) are satisfied.

(24)At carriage 3 forward attachment (37), TORQUE nut (40) to between 0.3 and 0.4 m.daN (2.21 and 2.95 lbf.ft.). TORQUE castle nut (35) to between 5 and 6 m.daN (36.9 and 44.25 lbf.ft.) and safety with cotter pin (34).

(25)At carriage 4 forward attachment (70), TORQUE nuts (65) to between 0.6 and 0.7 m.daN (4.43 and 5.16 lbf.ft.). TORQUE castle nut (63) to between 5 and 6 m.daN (36.9 and 44.25 lbf.ft.) and safety with cotter pin (62).

(26)At carriage 5 forward attachment (94), TORQUE nut (97) to between 0.3 and 0.4 m.daN (2.21 and 2.95 lbf.ft.). TORQUE castle nut (92) to between 5 and 6 m.daN (36.9 and 44.25 lbf.ft.) and safety with cotter pin (91).

(27)At carriage 3 and 5 rear attachments (23),(79), TORQUE nuts (18),(74) to between 0.6 and 0.7 m.daN (4.43 and 5.16 lbf.ft.). TORQUE castle nuts (29),(85) to between 5 and 6 m.daN (36.9 and 44.25 lbf.ft.) and safety with cotter pins (30),(86).

(28)At carriage 4 rear attachment (51), TORQUE nuts (46) to between 0.3 and 0.6 m.daN (2.21 and 4.43 lbf.ft.) and safety with cotter pins (45). TORQUE castle nut (57) to between 5 and 6 m.daN (36.9 and 44.25 lbf.ft.) and safety with cotter pin (58).

(29)At carriage 3, remove adhesive tape securing cross-brace (115) to flap. Install retained eye end to cross-brace (115), position on pin (116) and secure with retaining ring (117).

(30)Slacken locknuts (114) and shorten cross-brace (115) by rotating the barrel until the forward eye-end bottoms out in the rear end of the slot in the flap attachment bracket (113). Extend the cross-brace by one full revolution, tighten the locknuts but do not torque at this stage.

(31)Repeat steps (29) and (30) adjusting the cross-brace at carriage 5.

NOTE : The preliminary adjustment of the cross-brace in steps (29) thru (31) is necessary to make certain that the cross-braces do not bottom out when the flaps are retracted.

WARNING : MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.

(32)Using pneumatic motor, fully retract the flap and install rigging pins (112) at carriages 3 and 5.

(33)Slacken locknuts (114) and adjust the length of each cross-brace (115) by rotating the barrel to achieve dimension 'g' = 2.4 to 3.6 mm (0.0945 to 0.1417 in.) between forward eye-end attachment bolt and forward end of the slot in the flap attachment bracket (113) (Ref. Fig. 406).

NOTE : Dimension 'g' must be checked at both sides of the flap attachment bracket (113) as the spherical joint in end of the cross-brace may be tilted, thus giving a false reading if measurement is only made on one side.

(34)Make certain that the eye-ends of the cross-braces (115) are at 90° to each other and tighten the locknuts (114).

(35)Make certain that it is possible to rotate the cross-braces 6 degrees in each direction about the longitudinal axis.

(36)TORQUE the locknuts (114) to 3 m.daN (22.13 lbf.ft.) and safety with lockwire.

(37)Make certain that the clearance "b" (Ref. Fig. 406) between the top of

each pin (116) at carriages 3 and 5 and the flap lower surface is 2 mm (0.0787 in.) minimum.

WARNING : MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.

(38)Remove rigging pins at carriages 3 and 5. Using the pneumatic motor, fully extend the flap.

(39)Make certain that it is possible to rotate the cross-braces 6 degrees in each direction about the longitudinal axis.

(40)Using pneumatic motor, retract flaps and install rigging pins (112) at carriages 3 and 5.

(41)Make certain that ASA has remained in the neutral position. If not, briefly pressurize and then depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).

(42)Adjust the flap inner and outer edge seals (141),(143) to obtain a gap 'v' of 8 to 10 mm (0.315 to 0.394 in.) between the outer flap and all speed aileron and between the outer flap and the outer wing structure (Ref. Fig. 408) Sheet 3/3.

CAUTION : TORSION DAMPER MUST BE INSTALLED WITH LARGE DIAMETER END OUTBOARD.

(43)Remove pneumatic motor and drive tool and install universal joint and torsion damper (119) at flanged joints with bolts (126) and nuts (125).

(44)Make certain that dimension 'a' at the kink steady bearing (120) is not less than 5 mm (0.1969 in.) (Ref. Fig. 407) and that indicator groove is not visible, indicating adequate engagement.

(45)TORQUE nuts (125) to between 1.0 and 1.25 m.daN (7.376 and 9.22 lbf.ft.) and seal bolt heads and nuts with corrosion preventive (Material No. 05-005).

(46)At torque shaft (118), TORQUE nuts (122) to between 1.0 and 1.25 m.daN (7.376 and 9.22 lbf.ft.) and seal bolt heads and nuts with corrosion preventive (Material No. 05-005).

(47)Connect bonding straps (105) to flap at carriage 3, 4 and 5 with bolt (104) and washers (102,103) (Ref. 20-28-11, P. Block 1).

(48)TORQUE bolts (104) to between 0.6 and 0.7 m.daN (4.43 and 5.16 lbf.ft.) and seal connections with sealant (Material No. 09-001).

(49)Install asymmetry position pick-off unit (Ref. 27-56-11, P. Block 401).

(50)Remove rigging pins from carriages 3 and 5.

(51)Remove the safety collars from the spoiler and speedbrake actuators 3 thru 7.

(52)Make certain that maintenance device on valve groups applicable to surfaces 3 thru 7 is in position "M" and manually move surfaces fully down.

(53)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(54)Make certain that access doors 575DB (675DB), 581AB (681AB), 581BB (681BB), 581CB (581CB), 581DB (681DB), 581EB (681EB), 581FB (681FB), 581GB (681GB), 581HB (681HB), 581JB (681JB) for LH (RH) flap are closed.

(55)Remove safety clips and tags and close circuit breakers 1CV,10CV, 5CV,6CV and 2CV.

(56)Remove safety guard from flap/slat control lever quadrant.

WARNING : MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.

(57)Perform operational test of flap system (Ref. 27-54-00, P. Block 501).

(58)Make certain that the check pins of check pin set PN 98A27508015000 can be freely inserted in tracks/carriages 1,2,3,4 and 5.
(59)Install flap track 3,4 and 5 fairings (Ref. 27-50-21, P. Block 401).

G. Close-Up
(1)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(2)Remove warning notice.
(3)Remove access platform.
(4)Remove safety barriers.

3. Procedure for Removal/Installation of Outboard Flap with Carriages

NOTE : Removal/Installation for the LH outboard flap with carriages is described, variations for the RH outboard flap with carriages are described in brackets.

A. Job Set-Up

(1)Position safety barriers.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(5)Set all speed aileron (ASA) fully down on the wing being worked on.
(6)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(7)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(8)Position access platforms.
(9)Install safety collars PN 98A27108028000 on all three ASA servocontrols.
(10)Open access doors 575DB (675DB), 581AB (681AB), 581BB (681BB), 581CB (681CB), 581DB (681DB), 581EB (681EB), 581FB (681FB), 581GB (681GB), 581HB (681HB), 581JB (681JB).
(11)Remove flap track fairings 3,4 and 5 (Ref. 27-50-21, P. Block 401).
(12)Turn maintenance device on valve groups applicable to spoiler surfaces 3 thru 7 to position "M" (Ref. 27-60-00, P. Block 301).
(13)Manually extend surfaces 3 thru 7 and install safety collars PN 98A27608014000 on spoiler/speedbrake actuators 3 and 4 and safety collars PN 98A27608013000 on spoiler actuators 5 thru 7.
(14)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).

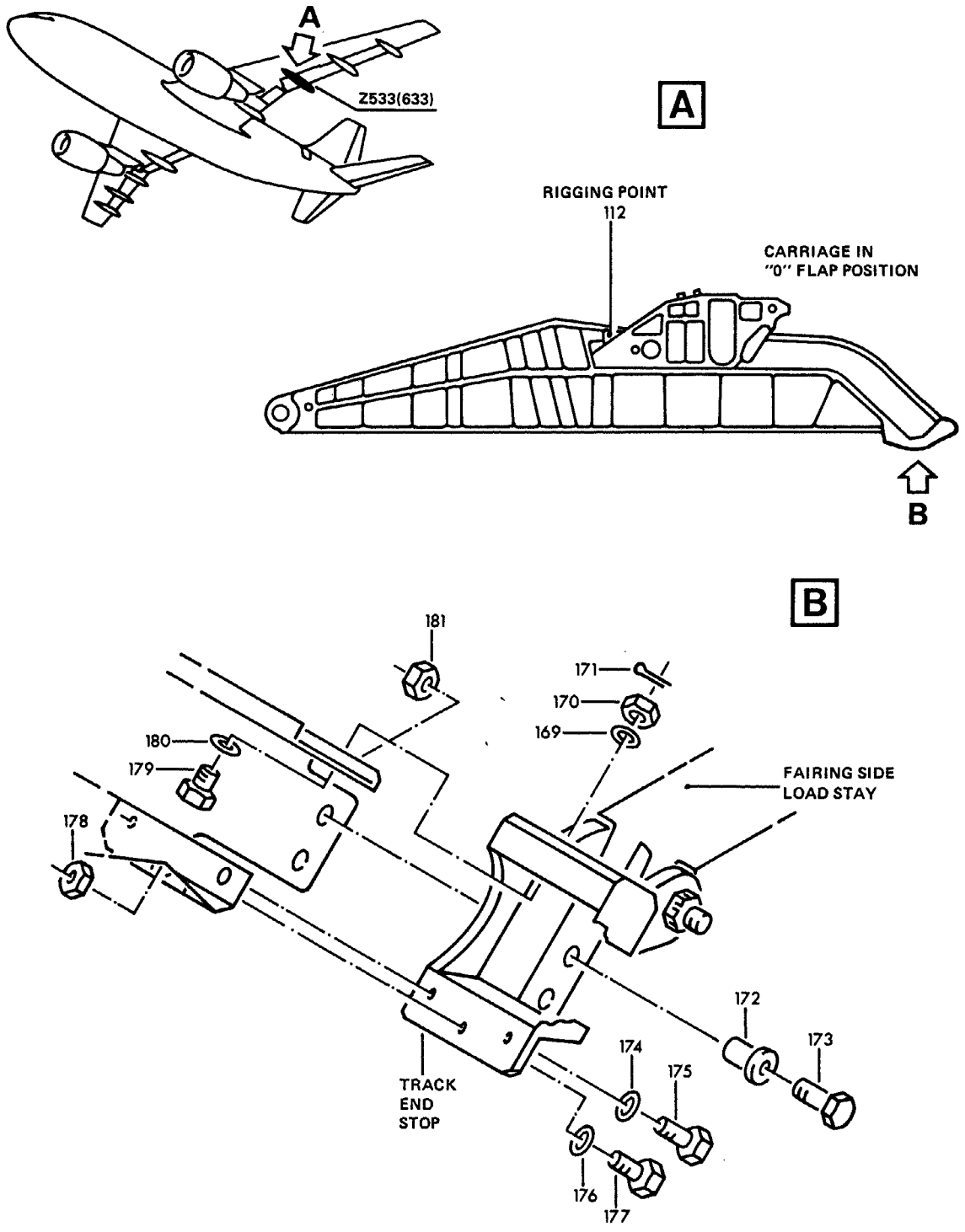
CAUTION : MAKE CERTAIN THAT ACCESS PLATFORM IS CLEAR OF FLAPS DURING RETRACTION.

(15)Fully retract flaps (Ref. 27-50-00, P. Block 301).
R (16)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(17)Open, safety and tag the following circuit breakers:

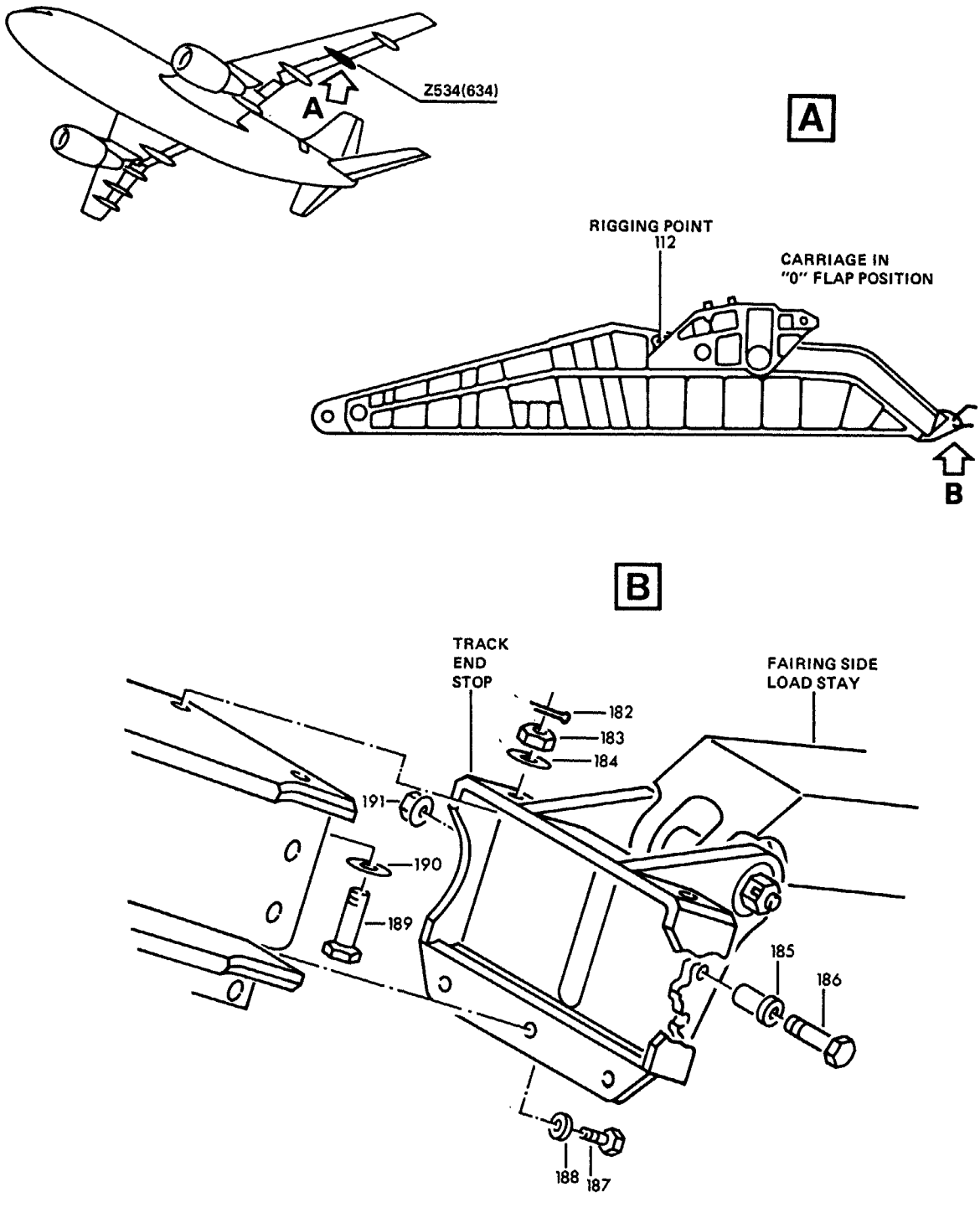
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(18)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(19)Remove asymmetry position pick-off unit (Ref. 27-56-11, P. Block 401).
(20)Position warning notice prohibiting pressurization of hydraulic systems.

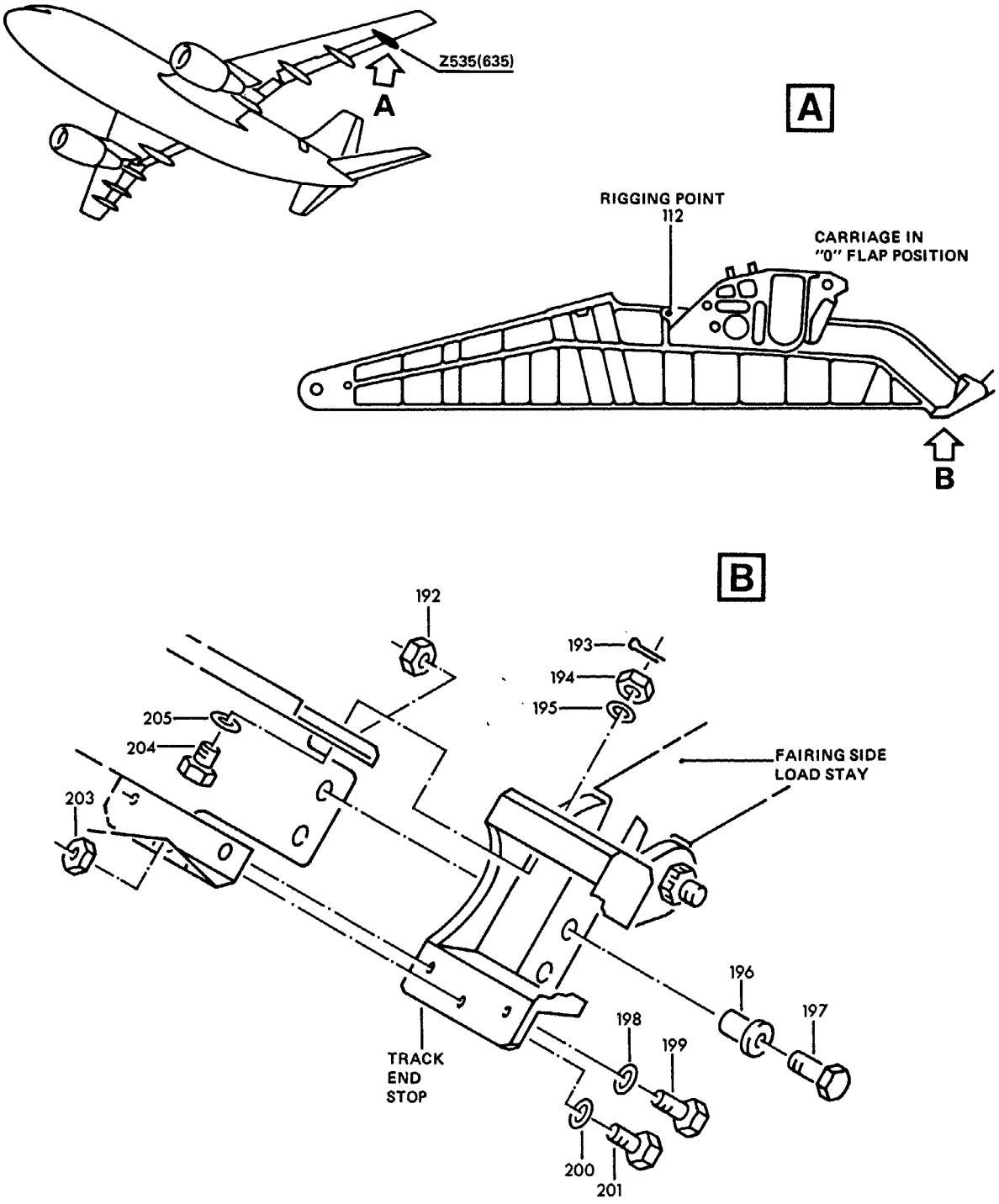
B. Removal (Ref. Fig. 401, 402)
(Ref. Fig. 411)
(Ref. Fig. 412)
(Ref. Fig. 413)
(Ref. Fig. 407)



End Stop of Track 3
Figure 411



End Stop of Track 4
Figure 412



End Stop of Track 5
Figure 413

(1)Remove nuts (125) and bolts (126) at flanged joints of torsion damper (119) immediately inboard of kink steady bearing (120). Remove torsion damper (119) and universal joint.
(2)Install rigging pins (112) PN 98A27508003200 of rigging pin set PN 87A27508003001 in carriages 3, 4 and 5.
(3)Install screwjack support cradles PN 98A27508026000 (8) on tracks 3 and 5.
(4)Cut and discard lockwire and remove four bolts (15) and washers (14) securing trunnion fail safe bearing half housings (11).
(5)Cut and discard lockwire and remove four bolts (13) and washers (12) securing trunnion primary bearing half housings (10).
NOTE : Bearing half housings (10),(11) remain attached to the runnion blocks (5) by the retaining straps (6).
(6)Lower screwjack spindles clear of trunnions and support in cradles.
(7)Remove and retain bushes (9) from screw nut trunnion attachment (16).
(8)At aft end of track 3:
(a)Remove and discard cotter pins (171). Remove castle nuts (170), washers (169), bolts (179) and washers (180) from track 3 stop.
(b)Remove nuts (181), bolts (173) and bushes (172).
(c)Remove nut (178), bolt (177) and washer (176).
(d)Remove bolts (175) and washers (174).
(e)Remove track end stop, with fairing side load stay to clear end of track.
(9)At aft end of track 4:
(a)Remove and discard cotter pins (182). Remove castle nuts (183), washers (184), bolts (189) and washers (190) from track 4 stop.
(b)Remove nuts (191), bolts (186) and bushes (185).
(c)Remove bolts (187), and washers (188).
(d)Remove end stop, with fairing side load stay to clear end of track.
(10)At aft end of track 5:
(a)Remove and discard cotter pins (193). Remove castle nuts (194), washers (195), bolts (204) and washers (205) from track 5 stops.
(b)Remove nuts (192), bolts (197) and bushes (196).
(c)Remove nut (203), bolt (201) and washer (200).
(d)Remove bolt (199) and washer (198).
(e)Remove track end stop, with fairing side load stay to clear end of track.
(11)Remove the three hoist fittings (1) from the flap; reverse and install with the hoist eyes uppermost.
R (12)Attach the hoisting sling PN 98F27508498000 to the hoist fittings (1) with turnbuckle connections (3) attached to the center and outboard fittings.
(13)Using a crane, lift the hoisting sling, adjust and take up slack in the cables.
NOTE : The outboard flap, plus carriages weighs approximately 386 Kg (851 lbs.).
(14)Remove rigging pins (112) PN 98A27508003200 from carriages 3, 4 and 5.
CAUTION : MAKE CERTAIN THAT AS FLAP ASSEMBLY IS REMOVED FROM TRACKS, EACH CARRIAGE IS WITHDRAWN SIMULTANEOUSLY.
(15)Take the weight of the flap assembly with the crane and carefully withdraw the carriages clear of the tracks.

(16)Swing the flap assembly clear of the aircraft; level the flap and lower it onto trestles.
(17)If no longer required, disconnect hoisting sling from flap.
(18)If no longer required, remove the three hoist fittings (1), reverse and install flush into flap.

C. Preparation of Replacement Component
(1)If a new carriage is to be installed, refer to 27-54-27, P. Block 401, 27-54-28, P. Block 401, or 27-54-29, P. Block 401.

D. Preparation for Installation
(1)Clean and inspect component attachment points and surrounding structure for corrosion and other signs of damage.

E. Installation (Ref. Fig. 401, 402, 407)
(Ref. Fig. 411, 413, 412)
NOTE : The outboard flap plus carriages weighs approximately 386 kg (851 lbs.).
(1)If applicable, remove the three hoist fittings (1) from the flap; reverse and install with the hoist eyes uppermost.
(2)Attach the hoisting sling to the hoist fittings (1) with turnbuckle connections (3) attached to the center and outboard fittings.
(3)Using a crane, lift the flap assembly clear of the trestles and adjust the turnbuckle connections (3) to bring the flap to an angle of 4 degrees approximately in the end to end horizontal plane with the inboard end down.
(4)Position flap assembly with carriages at the rear of their respective tracks.
(5)Carefully move flap assembly forward, engage carriage rollers with correct tracks, until flap is at 0° position.
(6)Align rigging pin holes and install rigging pins (112) PN 98A27508003200 in carriages 3, 4 and 5.
(7)Disconnect hoisting sling from flap.
(8)Remove the three hoist fittings (1), reverse and install flush into the flap. Seal with sealant (Material No. 09-016).
(9)Check clearances between carriage 3 and track 3 (Ref. 27-54-27, P. Block 401).
(10)At aft end of track 3:
(a)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of track end stop and track and to bolts (179).
(b)Position track end stop with fairing side load stay; install bolts (179), washers (180),(169) and castle nuts (170) and tighten.
(c)Safety castle nuts (170) with cotter pins (171).
(d)Apply anti-corrosion compound (Material No. 05-002) to bolts (173), (175),(177) and bushes (172).
(e)Install bushes (172) and bolts (173) and nuts (181) and tighten.
(f)Install washers (174) and bolts (175) and tighten.
(g)Install washer (176), bolt (177) and nut (178) and tighten.
(11)Check clearances between carriage 4 and track 4 (Ref. 27-54-28, P. Block 401).
(12)At aft end of track 4:

(a)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of track end stop and track and to bolts (189).
(b)Position track end stop with fairing side load stay; install bolts (189), washers (190),(184) and castle nuts (183) and tighten.
(c)Safety castle nuts (183) with cotter pins (182).
(d)Apply anti-corrosion compound (Material No. 05-002) to bolts (186), (187) and bushes (185).
(e)Install bushes (185), bolts (186) and nuts (191) and tighten.
(f)Install washers (188) and bolts (187) and tighten.

(13)Check clearances between carriage 5 and tracks (Ref. 27-54-29, P. Block 401).

(14)At aft end of track 5:
(a)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of track end stop and track and to bolts (204).
(b)Position track end stop with fairing side load stay; install bolts (204), washers (205),(195) and castle nuts (194) and tighten.
(c)Safety castle nuts (194) with cotter pins (193).
(d)Apply anti-corrosion compound (Material No. 05-002) to bolts (197), (199),(201) and bushes (196).
(e)Install bushes (196), bolts (197) and nuts (192) and tighten.
(f)Install washer (198) and bolt (199) and tighten.
(g)Install washer (200), bolt (201) and nut (203) and tighten.

(15)Install screwjacks 3 and 4 to trunnions as follows:
(a)Apply grease (Material No. 04-004) to bushes (9) and install bushes on screw nut trunnion attachments (16).
(b)Coat threads of trunnion bolts (13),(15) with lubricant (Material No. 06-002).
(c)Coat faying surfaces of secondary half housing (11) and primary half housing (10) with anti-corrosion compound (Material No. 05-002).
(d)Remove support cradles (8) at screwjacks 3 and 5, align screwjack nuts with their respective trunnion blocks and install primary half housing, secure with bolts (13) and washers (12).
(e)TORQUE bolt (13) to between 3.5 and 3.6 m.daN (25.81 and 26.55 lbf.ft.) and safety with lockwire.
(f)Install fail safe half housing (11) and secure with bolt (15) and washer (14).
(g)TORQUE bolt (15) to between 3.5 and 3.6 m.daN (25.81 and 26.55 lbf.ft.) and safety with lockwire.
(h)Seal bolt heads (13),(15) with corrosion preventive (Material No. 05-005).

(16)Remove rigging pins (112) PN 98A27508003200 from carriages 3, 4 and 5.

F. Adjustment
Refer to para. 2.F. where applicable.

G. Close-Up
(1)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(2)Make certain that the safety collars are removed from all three ASA servo controls.
(3)Make certain that all safety collars are removed from the spoiler/

speedbrake actuators 3 thru 7 and all surfaces are in neutral position.

(4) Install asymmetry position pick-off unit (Ref. 27-56-11, P. Block 401).

(5) Make certain that access doors 575DB (675DB), 581AB (681AB), 581BB (681BB), 581CB (681CB), 581DB (681DB), 581EB (681EB), 581FB (681FB), 581GB (681GB), 581HB (681HB) and 581JB (681JB) are closed.

(6) Install flap track fairings 3, 4 and 5 (Ref. 27-50-21, P. Block 401).

(7) Make certain that flaps are in 0° position (Ref. 27-50-00, P. Block 301).

(8) Make certain that circuit breakers 1CV, 2CV, 5CV, 6CV and 10CV are closed.

(9) Make certain that safety guard is removed from flap/slat control lever quadrant.

(10) Remove warning notice.

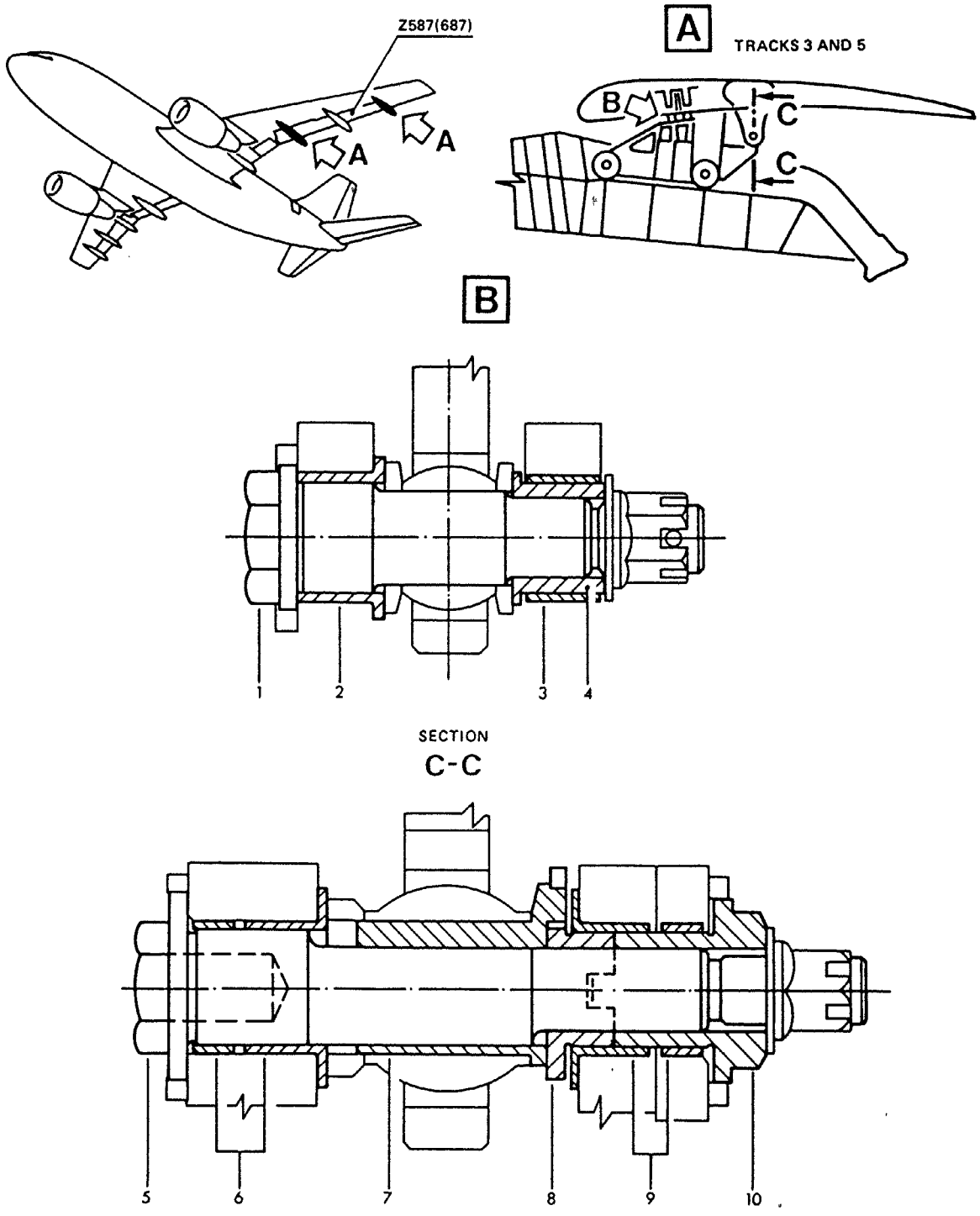
(11) Remove access platform.

(12) Remove safety barriers.

1. Reason for the Job

A. Check for Fits and Clearances
With removal - Table of Fits and Clearances
(Ref. Fig. 601) (Sheets 1/2)
(Ref. Fig. 601) (Sheets 1/2)

Detail and item No.	Original Mfg Limits: Dimension mm (in.) Min.	Original Mfg Limits: Dimension mm (in.) Max.	Original Mfg Limits: Assy. Clearance mm (in.) Min.	Original Mfg Limits: Assy. Clearance mm (in.) Max.	In-Service Wear Limits: Dimension Limits mm (in.) Min.	In-Service Wear Limits: Dimension Limits mm (in.) Max.	In-Service Wear Limits: Max. Allow. clear mm(in.)
B							
OD1	26.200 (1.0315)	26.213 (1.032)			26.180 (1.0307)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0003)
ID2	26.220 (1.0323)	26.241 (1.0331)				26.261 (1.0339)	
OD1	18.200 (0.7165)	18.213 (0.7170)			18.180 (0.7157)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0003)
ID4	18.220 (0.7173)	18.241 (0.7181)				18.261 (0.7189)	
OD4	26.179 (1.0307)	26.200 (1.0315)			26.159 (1.0299)		
			0.020 (0.0008)	0.062 (0.0024)			0.102 (0.0040)
ID3	26.220 (1.0323)	26.241 (1.0331)				26.261 (1.0339)	



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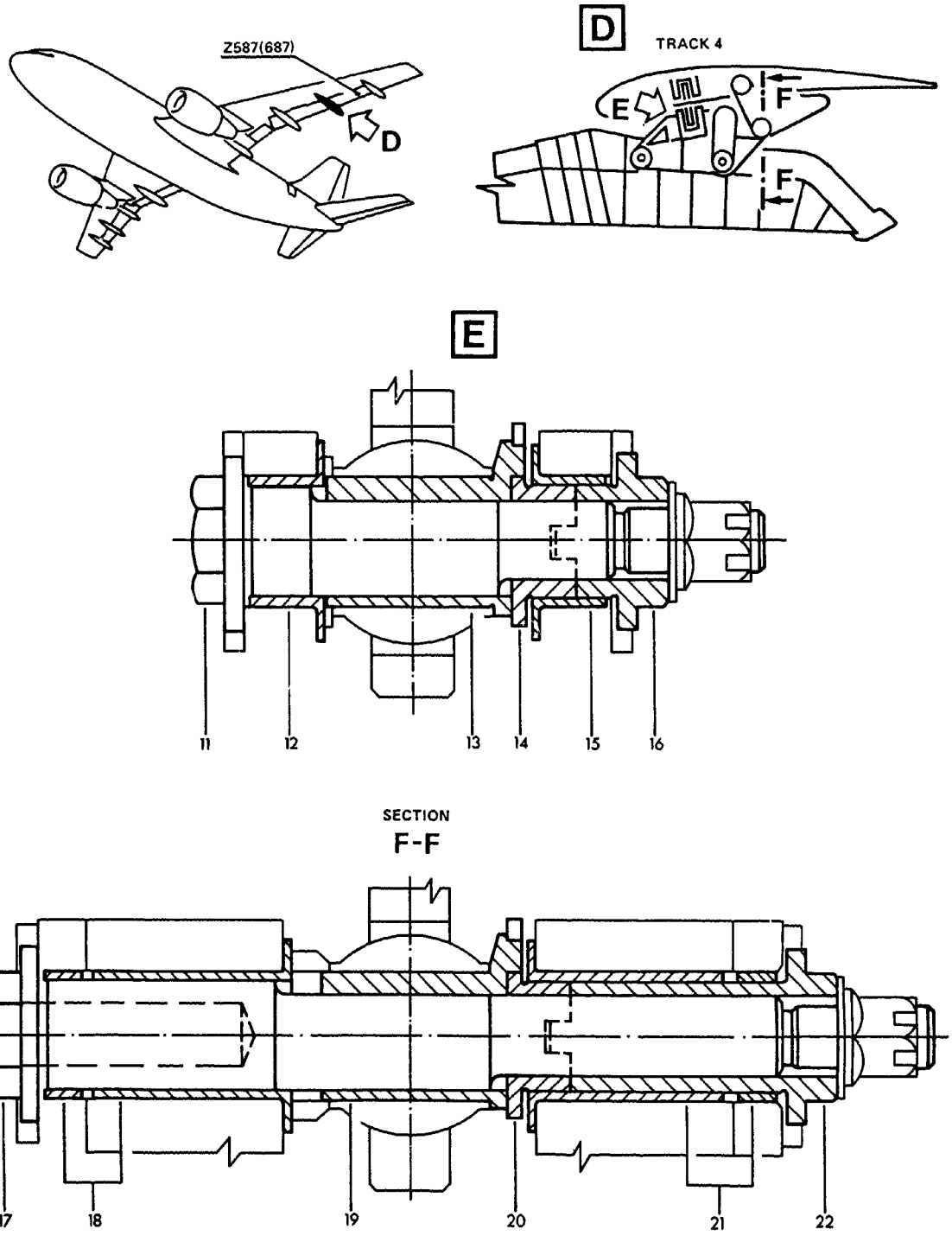
Outboard Flap Connection Parts
Sheet 1
Figure 601



Outboard Flap Connection Parts
Sheet 2
Figure 601

Detail and item No.	Original Mfg Limits				In-Service Wear Limits		
	Dimension mm (in.)		Assy. Clearance mm (in.)		Dimension Limits mm (in.)		Max. Allow. clear mm(in.)
	Min.	Max.	Min.	Max.	Min.	Max.	
C-C							
OD5	27.480 (1.0819)	27.493 (1.0824)			27.460 (1.0811)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0003)
ID6	27.500 (1.0827)	27.521 (1.0835)				27.541 (1.0843)	
OD5	23.480 (0.9244)	23.497 (0.920)			23.460 (0.9236)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0003)
ID7	23.500 (0.9252)	23.521 (0.9260)				23.541 (0.9268)	
OD5	19.480 (0.7669)	19.493 (0.7674)			19.460 (0.7661)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0003)
ID8/ ID10	19.500 (0.7677)	19.521 (0.7685)				19.541 (0.7693)	
OD8	27.459 (1.0810)	27.480 (1.0820)			27.439 (1.0803)		
			0.020 (0.0008)	0.062 (0.0024)			0.102 (0.0040)
ID9	27.500 (1.0827)	27.521 (1.0835)				27.541 (1.0843)	
OD10	27.459 (1.0810)	27.480 (1.0820)			27.439 (1.0803)		
			0.020 (0.0008)	0.062 (0.0024)			0.102 (0.0040)
ID9	27.500 (1.0827)	27.521 (1.0835)				27.541 (1.0843)	

Detail and item No.	Original Mfg Limits				In-Service Wear Limits		
	Dimension mm (in.)		Assy. Clearance mm (in.)		Dimension Limits mm (in.)		Max. Allow. clear mm(in.)
	Min.	Max.	Min.	Max.	Min.	Max.	
E							
OD11	27.480 (1.0819)	27.493 (1.0824)			27.460 (1.0811)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0003)
ID12	27.500 (1.0827)	27.521 (1.0835)				27.541 (1.0843)	
OD11	23.480 (0.9244)	23.497 (0.9250)			23.460 (0.9236)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0003)
ID13	23.500 (0.9252)	23.521 (0.9260)				23.541 (0.9268)	
OD11	19.480 (0.7669)	19.493 (0.7674)			19.460 (0.7661)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0003)
ID14/ ID16	19.500 (0.7677)	19.521 (0.7685)				19.541 (0.7693)	
OD14	27.459 (1.081)	27.480 (1.082)			27.439 (1.0803)		
			0.020 (0.0008)	0.062 (0.0024)			0.102 (0.0040)
ID15	27.500 (1.0827)	27.521 (1.0835)				27.541 (1.0843)	
OD16	27.459 (1.0810)	27.480 (1.0820)			27.439 (1.0803)		
			0.020 (0.0008)	0.062 (0.0024)			0.102 (0.0040)
ID15	27.500 (1.0827)	27.521 (1.0835)				27.541 (1.0843)	

Detail and item No.	Original Mfg Limits				In-Service Wear Limits		
	Dimension mm (in.)		Assy. Clearance mm (in.)		Dimension Limits mm (in.)		Max. Allow. clear mm(in.)
	Min.	Max.	Min.	Max.	Min.	Max.	
F-F							
OD17	27.480 (1.0819)	27.493 (1.0824)			27.460 (1.0811)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0003)
ID18	27.500 (1.0827)	27.521 (1.0835)				27.541 (1.0843)	
OD17	23.480 (0.9244)	23.497 (0.9250)			23.460 (0.9236)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0003)
ID19	23.500 (0.9252)	23.521 (0.9260)				23.541 (0.9268)	
OD17	19.480 (0.7669)	19.493 (0.7674)			19.460 (0.7661)		
			0.007 (0.0003)	0.041 (0.0016)			0.081 (0.0003)
ID20/ ID22	19.500 (0.7677)	19.521 (0.7685)				19.541 (0.7693)	
OD20	27.459 (1.0810)	27.480 (1.0820)			27.439 (1.0803)		
			0.020 (0.0008)	0.062 (0.0024)			0.102 (0.0040)
ID21	27.500 (1.0827)	27.521 (1.0835)				27.541 (1.0843)	
OD22	27.459 (1.0810)	27.480 (1.0820)			27.439 (1.0803)		
			0.020 (0.0008)	0.062 (0.0024)			0.102 (0.0040)
ID21	27.500 (1.0827)	27.521 (1.0835)				27.541 (1.0843)	

FLAP VANE - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE COMMENCING REMOVING FLAP VANE TRACKS, SPRING STRUTS MUST BE LOCKED IN SAFE CONDITION USING LOCK BOLTS.

1. Reason for the Job

A. Removal of vane without tracks.

B. Removal of vane with tracks.

2. Vane without vane tracks

A. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3.5 to 4 m (10 to 16 ft.)
R	B. 98A27503003000	Guard-Safety, Flap/Slat Ctl Lever
	C.	Safety Barriers
	D.	Circuit Breaker Safety Clips and Tags
	E. Material No. 04-004	Common Greases (Ref. 20-31-00)
	F. Material No. 05-002	Special Materials (Ref. 20-31-00)
	G. Material No. 09-013	Sealants (Ref. 20-31-00)
	Referenced Procedures	
	- 20-28-11, P. Block 1	Electrical Bonding
	- 27-50-00, P. Block 301	Flaps
	- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)

B. Procedure (Ref. Fig. 401)

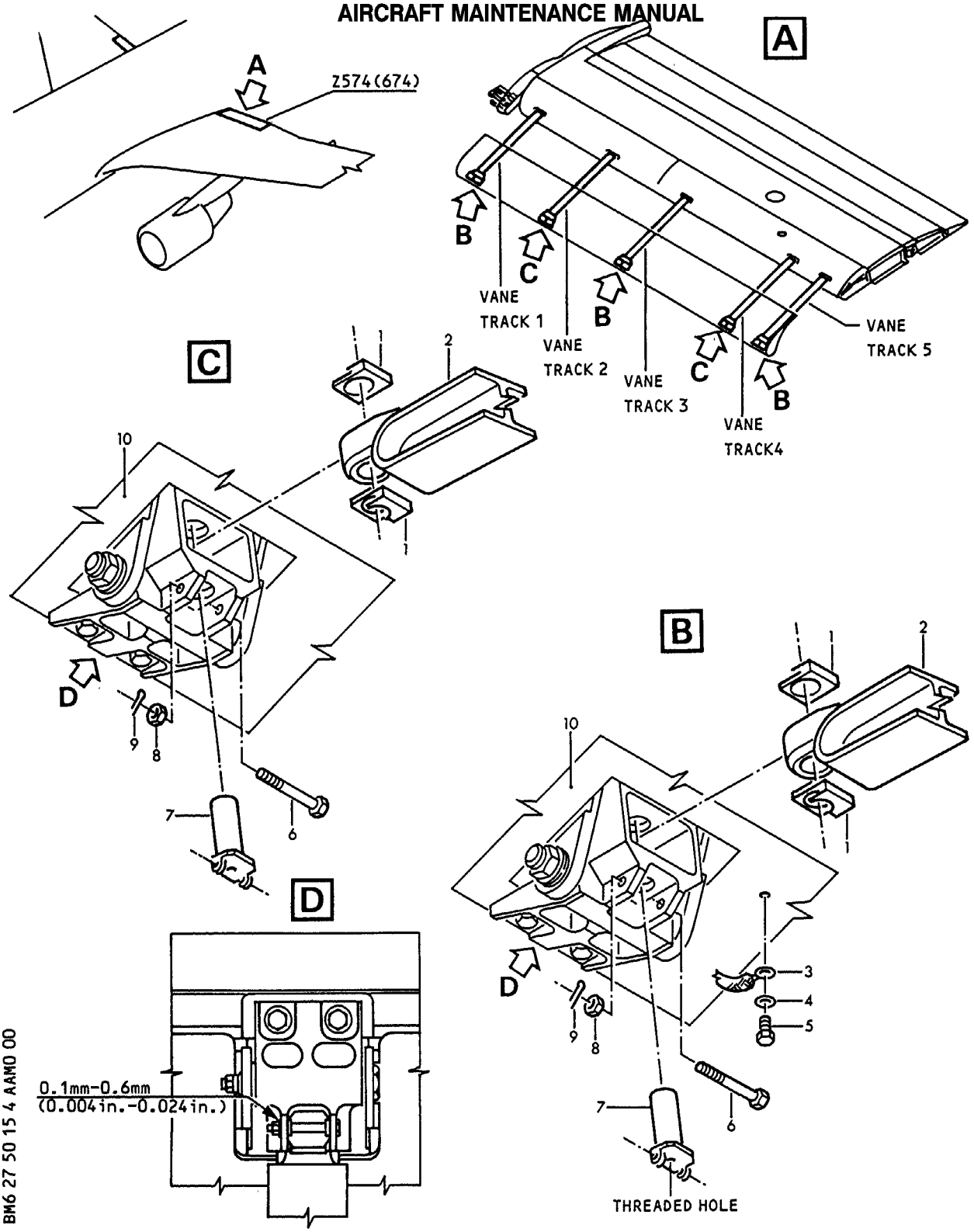
(1)Job Set-Up

(a)Position safety barriers.

(b)Fully extend flaps (Ref. 27-50-00, P. Block 301).

R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(d)Position access platform.



Flap Vane
Figure 401

R

(e)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/FLAPS/SYS 1	10CV	335/R67

(2)Removal
(a)Remove the screws (5), washers (4) and bonding straps (3) from vane (10) at vane tracks 2 and 4.
(b)Remove and discard cotter pins (9).
(c)Remove nuts (8) and bolts (6) from vane tracks (2).
(d)Install bolts (6) into threaded hole of bolts (7) to extract bolts (7) from vane (10).
(e)Support vane (10) and remove bolts (7) with bolts (6).
(f)Remove vane (10) from inboard flap.
(g)Remove bolts (6) from threaded hole of bolts (7).

NOTE : Record quantity and thickness of shims (1) at each vane track position.

(h)Remove shims (1) from vane track (2).

(3)Installation
(a)Apply grease (Material No. 04-004) to shims (1).
(b)Install shims (1) on vane track (2).

NOTE : Make sure that shims (1) are installed correctly as recorded during removal.

(c)Apply anti-corrosion compound (Material No. 05-002) to bolts (6),(7).
(d)Put vane (10) in position at vane tracks (2) and engage both parts.
(e)Align the vane tracks (2) with vane (10) and install bolts (7).
(f)Install bolts (6) and nuts (8).
(g)Make certain that there is a gap of between 0.1 and 0.6 mm (0.004 and 0.0024 in.) between nuts (8) and brackets of vane (10).
(h)Safety nuts (8) with new cotter pins (9).
1 (j)Apply sealant (Material No. 09-013) to head of bolts (6),(7), nuts (9) and cotter pins (5).
(k)Position bonding straps (3) on vane (10) and install screws (5) and washers (4) (Ref. 20-28-11, P. Block 1).

(4)Test
(a)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV and 10CV.
R (b)Remove safety guard PN 98A27503003000 from flap/slat control lever quadrant.

(c)Carry out operational test of flap system (Ref. 27-54-00, P. Block 501) and during test make sure that the vane retracts and extends smoothly.

NOTE : Finish the test with flaps fully retracted.

(5)Close-Up
(a)Remove safety barriers.
(b)Remove access platform.

3. Vane with vane tracks

A. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3.5 m (11 ft.)
	B. 98A27108028000	Safety Collar Set - All Speed Aileron Actuator
	C. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	D. 98A27508043000	Checking Device - Vane Drive Linkage Lever
R	E. 98A27508494000	Checking Jig - Vane Position, Vane Tracks 1 and 5, LH and RH Wing
	F. 98A27508056000	Check Pin Set - Vane Track 3
	G. 98A27508375000	Removal/Installation Tool, Spring Unit, Vane Tracks 2 and 4
	or 98A275086790008	
	H. 98A27508053002	Wing Tip Brake Test Tool
	J. SL90-437-6250	Wrench - Notched, Tightening of Nuts NSA5454
	K. SL90-314-6250	Tool - Extraction, Tab Washers STA-LOK NSA5454
	L. SL90-487-6250	Tool - Installation, Tab Washers STA-LOK NSA5454
	M. SL90-315-3750	Wrench - Notched, Tightening of Nuts NSA5454
	N. SL90-356-3750	Tool - Extraction, Tab Washers STA-LOK NSA5454
	P. SL90-359-3750	Tool - Installation, Tab Washers STA-LOK NSA5454
	Q.	Torque Wrench, 0.4 to 3.2 m.daN (3.0 to 23.6 lbf.ft.)
	R.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	S.	Cotter Pins
	T.	Circuit Breaker Safety Clips and Tags
	U.	Safety Barriers
	V. Material No. 04-004	Common Greases (Ref. 20-31-00)
	W. Material No. 05-002	Special Materials (Ref. 20-31-00)
	X. Material No. 06-002	Lubricants (Ref. 20-31-00)
	Y. Material No. 09-013	Sealants (Ref. 20-31-00)
	Referenced Procedures	
	- 20-28-11, P. Block 1	Electrical Bonding
	- 24-41-00, P. Block 301	AC External Power Control
	- 27-50-00, P. Block 301	Flaps

- 27-54-00, P. Block 501 Hydraulic Actuation and Power Transmission (Flaps)
- 29-21-00, P. Block 301 Green Auxiliary Power

B.Procedure
(Ref. Fig. 402)

(1)Job Set-Up
(a)Position safety barriers.
(b)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Make certain that electronics racks ventilation is correct.
(d)Connect hydraulic ground power supply and pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).

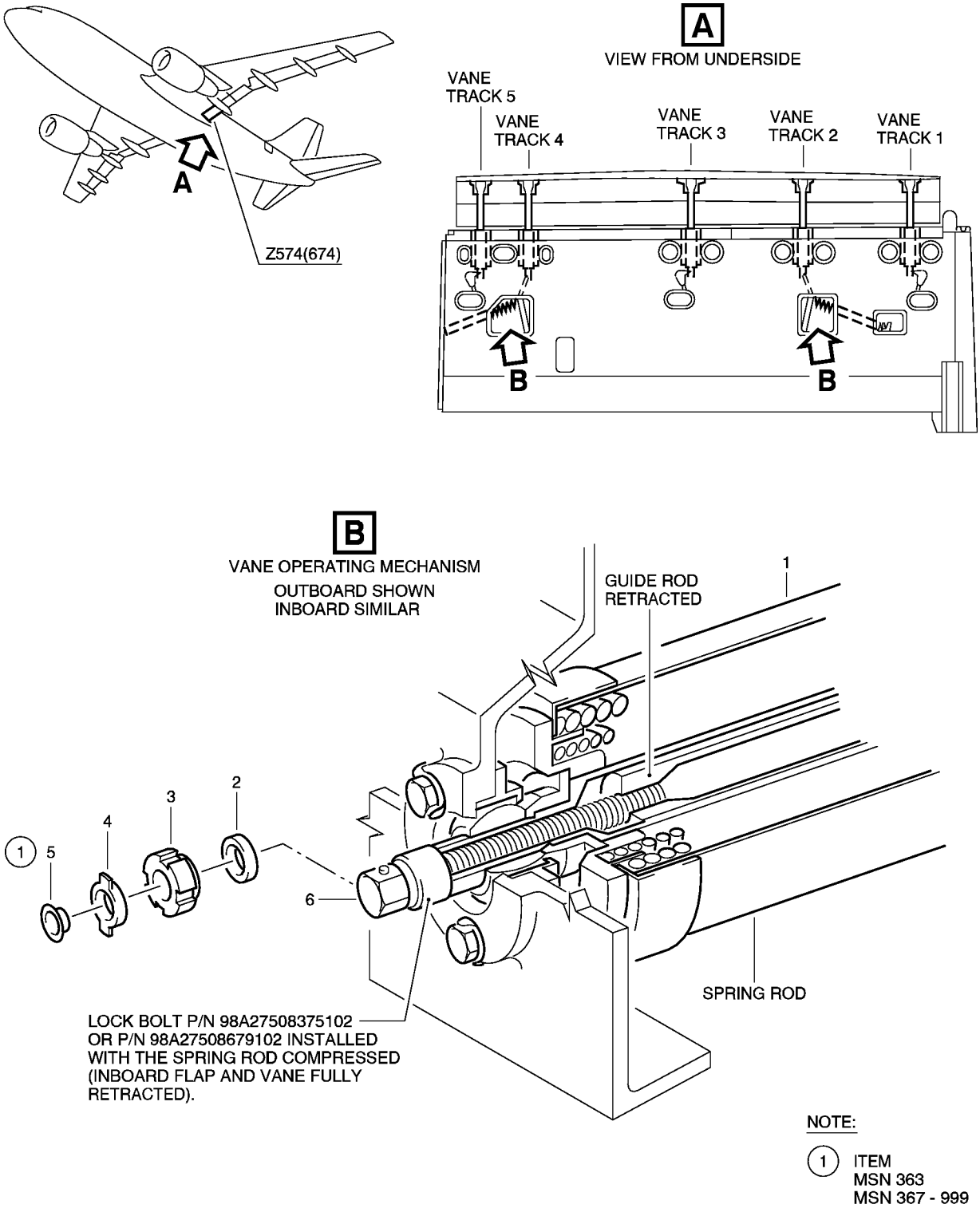
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.

(e)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(f)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(g)Position aileron on side being worked on to full deflection (trailing edge down).
(h)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(j)Install all three safety collars PN98A27108028000 on aileron servo controls.
(k)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/FLAPS/SYS 1	10CV	335/R67

(l)Position access platform.
(m)Open following access panels:
- 574AB (674AB), 574BB (674BB), 574CB (674CB),
- 574DB (674DB), 574EB (674EB), 574FB (674FB),
- 574GB (674GB), 574HB (674HB), 574JB (674JB),
- 574KB (674KB), 574LB (674LB), 574MB (674MB),
- 574NB (674NB), 574PB (674PB), 574QB (674QB)

(2)Removal
(a)If installed remove sealant and extract plug (5) from end of spring rod (1) at outboard vane operating mechanism only.
(b)Using STA-LOK extraction tool PN SL90-314-6250, remove tab washer (4) from end of spring rod at vane tracks 2 and 4.
(c)Using STA-LOK notched wrench PN SL90-437-6250, remove nut (3) and washer (2) from end of spring rod.



Installation of Lock Bolt in Spring Rod
Figure 402

R

(d)Apply lubricant (Material No. 06-002) to threads of lock bolt (6)
R PN 98A27508375106 or PN 98A27508679106, install lock bolt (6) on end of spring rod and tighten sufficiently, to remove spring loading from mechanism.

R NOTE : Lock bolt PN 98A27508375102 or PN 98A27508679102 is necessary
R for flap vane track 2. Lock bolt PN 98A27508375102 or
R PN 98A27508679102 and lock bolt PN 98A27508375106 or
R PN 98A27508679106 are part of Removal/Installation tool set
R PN 98A27508375000 or PN 98A27508679000.

(e)Using STA-LOK extraction tool PN SL90-356-3750, remove tab washer (10).
(Ref. Fig. 403)
(f)Using STA-LOK notched wrench PN SL90-315-3750, remove nut (11).
(g)Remove washer (12), bolt (22), bush (14) and bearing bush (13) attaching sarma rod (29) to vane track (15).
(h)Remove sarma rod (29) from flap vane track (15).
(j)Remove and discard cotter pin (16).
(k)Remove nut (17), washer (18), bolt (27) and serrated plate (19).
(l)Remove and discard cotter pin (23).
(m)Mark position of eccentric bolt (28) on vane track (15).
(n)Remove nut (24), washer (25), bush (26), eccentric bolt (28), bushes (20) and bearing (21).
(p)Removal of sarma rod (29) and bearing assembly at track 2 is the same as described above.
(q)Remove screws (37), vane stop (36) and mounting rail (35) from flap vane track 1,3 and 5.
(r)Remove nuts (39), bolts (38) and slide block (40) from flap vane track 1 and 5.
(s)Remove safety clips and tags and close circuit breakers 10CV, 6CV, 5CV, 2CV, 1CV.

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.

NOTE : Extension of the flaps with the vane locked in its retracted position must be performed using WTB Test Tool PN 98A27508053002 as otherwise the system will shut down automatically on detection of incorrect vane operation.

(t)Remove safety guard from flap/slat control lever quadrant.
(u)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(v)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(w)Install safety guard on flap/slat control lever quadrant.
(x)Open, safety and tag circuit breakers 10CV, 6CV, 5CV, 1CV, 2CV.
(y)Support flap vane and pull it in direction of leading edge of inboard flap.
(z)Remove flap vane with tracks from inboard flap.
(aa)If it is necessary to replace one or more vane track(s) proceed as follows:

(Ref. Fig. 404)

1 Remove the screws (47), washers (48) and bonding straps (49) from vane track 1, 3 and 5.
2 Remove and discard cotter pins (56), remove nuts (55) and bolts (52) from vane tracks (51).
3 Install bolts (52) into threaded hole of bolts (53) to extract bolts (53) from vane (57).
4 Support vane (57) and remove bolts (53).
5 Remove vane tracks (51).
6 Remove bolts (52) from threaded hole of bolts (53).

NOTE : Record quantity and thickness of shims (50) at each vane track position.

7 Remove shims (50) from vane tracks (51).

(3)Installation

(a)If vane tracks have been removed, install the vane track(s) as follows:

1 Apply grease (Material No. 04-004) to shims (50).
2 Install shims (50) on vane tracks (51).

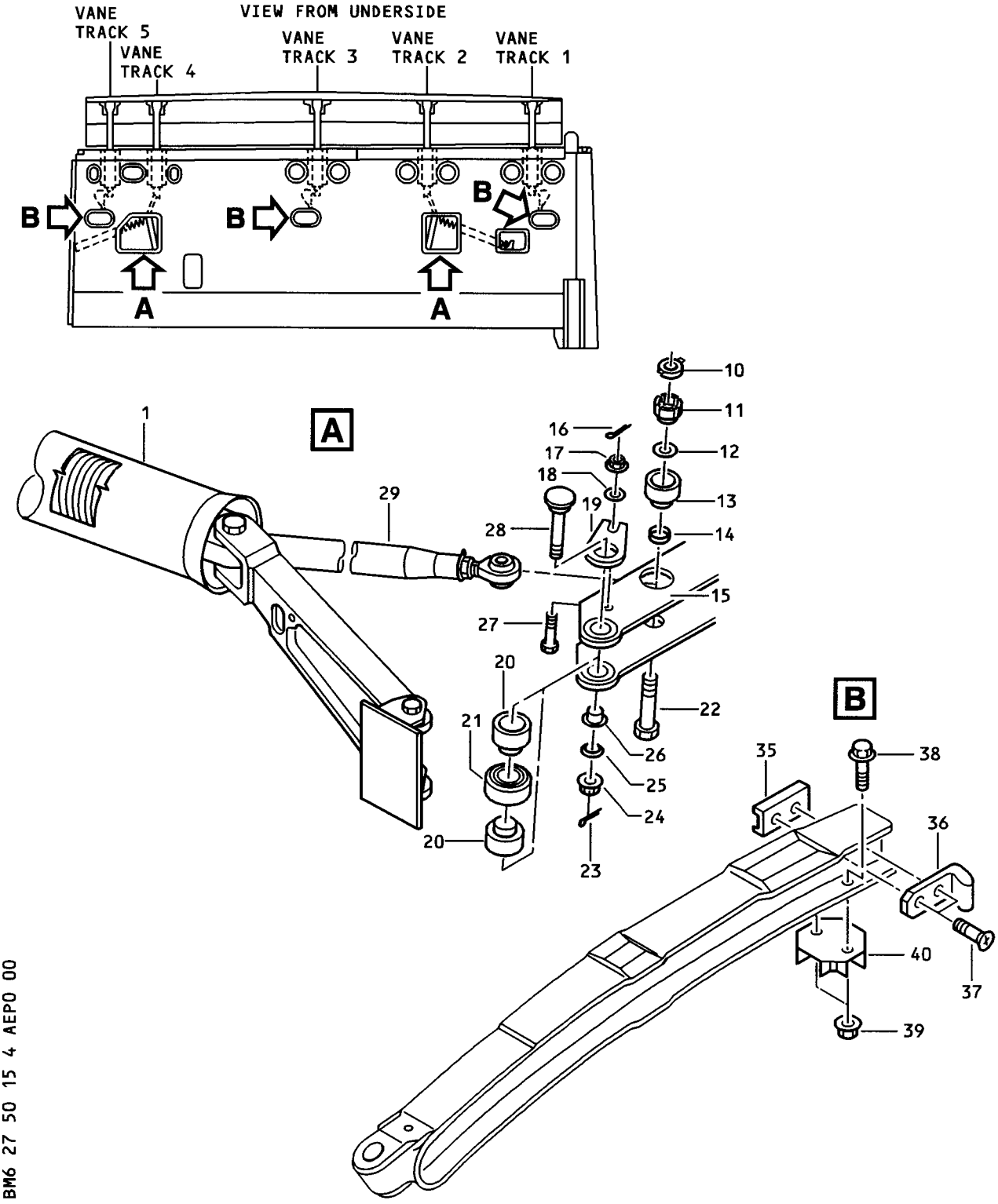
NOTE : Make sure that shims (50) are installed correctly as recorded during removal.

3 Apply anti-corrosion compound (Material No. 05-002) to bolts (52), (53).
4 Put vane track (51) in position at vane (57) and engage both parts.
5 Align the vane tracks (51) with vane (57) and install bolts (53).
6 Install bolts (52) and nuts (55).
7 Make certain that there is a gap of between 0.1 and 0.6 mm (0.004 and 0.024 in.) between nuts (55) and brackets of vane (54).
8 Safety nuts (55) with new cotter pins (56).
9 Apply sealant (Material No. 09-013) to head of bolts (52),(53), nuts (55) and cotter pins (56).
10 Position bonding straps (49) on vane track (51) and install screws (47) and washers (48) (Ref. 20-28-11, P. Block 1).

(b)Put flap vane with vane tracks in position at inboard flap.
(c)Push the flap vane in direction of trailing edge of flap.
(d)Install the slide block as follows:

1 Install slide block (40) with bolts (38) and nuts (39) at flap vane track 1 and 5.
2 TORQUE bolts (38) to 0.3 m.daN (26.55 lbf. in.).

(e)Install vane stops (36) at vane track 1, 3 and 5 with screws (37) and mounting rail (35).
(f)TORQUE screws (37) to 0.3 m.daN (26.55 lbf. in.).
(g)Apply anti-corrosion compound (Material No. 05-002) to mating surface of eccentric bolts (28) and bushes (20).
(h)Install eccentric bolts (28), bushes (20), bearings (21), bushes (26), washers (25) and nuts (24) on vane tracks 2 and 4.
(j)Make sure that the marks on the eccentric bolts (28) align with the mark on the vane tracks (15).
(k)Do not tighten nuts (24) at this step.
(l)Using the appropriate vane position checking jigs of checking jig set



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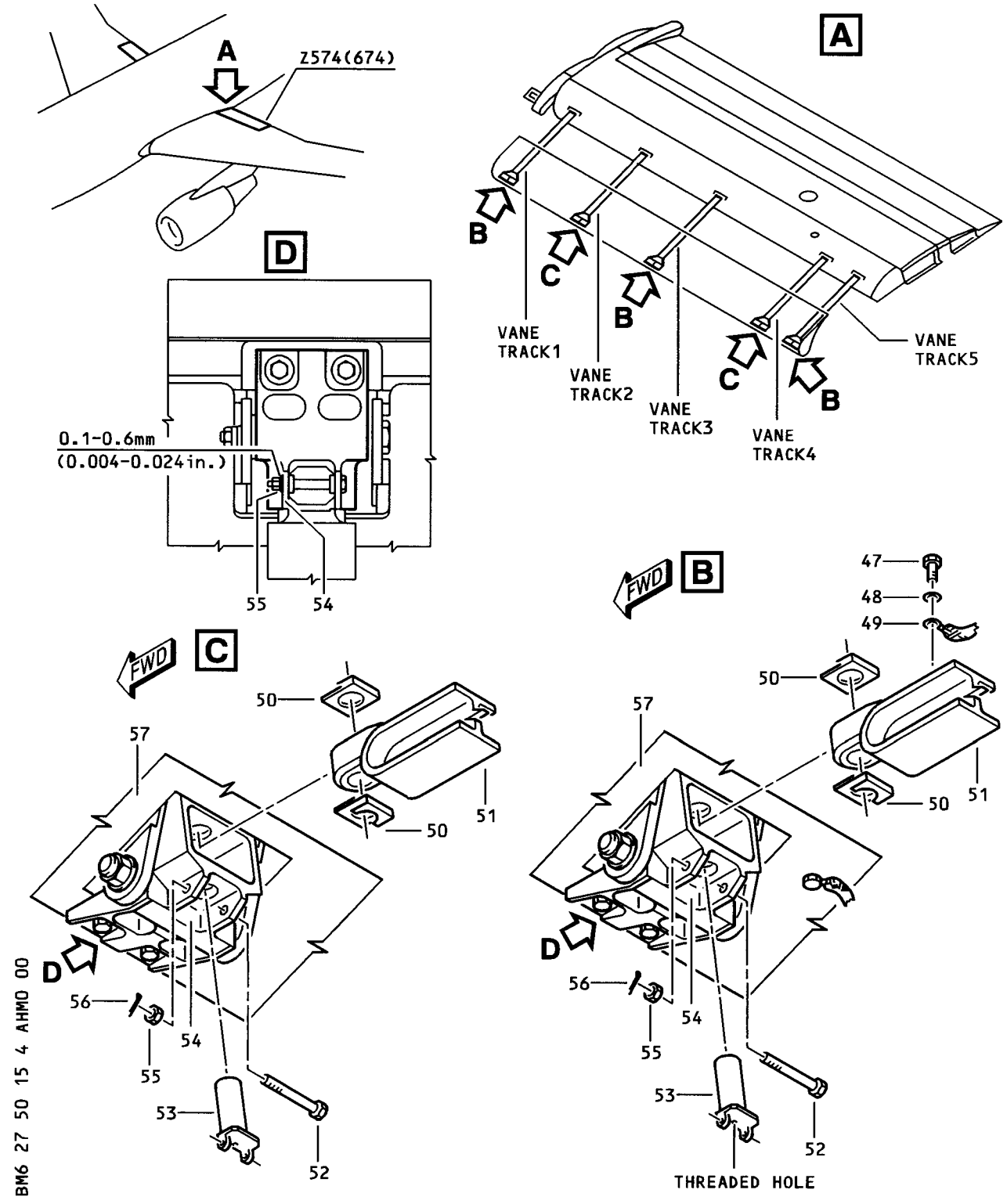
Flap Vane Operating Mechanism with Flap Vane Tracks
Figure 403

R



Flap Vane Tracks Attachment on Flap Vane
Figure 404

R

R PN 98A27508494000 at vane tracks 1 and 5, make certain that gap between flap and vane is correct.

R (Ref. Fig. 405)
(Ref. Fig. 406)

NOTE : Due to spring unit assembly adjustment, it is allowable to have a gap of 0.6 mm (0.023 in.) between the vane trailing edge and the jig.

(m) If the gap between flap and vane is not correct proceed as follows:
1 Remove and discard cotter pin (60), remove nut (61), washer (62) and bolt (63) from spring assemblies (67) at vane tracks 1, 3 and 5.

(n) On vane track 1 and 5 proceed as follows:
1 Make certain that both trailing edge of vane and leading edge of flap are in contact with checking jigs.
2 Push spring assembly forward so that lever (65) is in contact with end stop (66) on vane track.
3 While keeping lever in contact with vane track stop, adjust length of spring assembly rod until rear attachment bolt (63) can be installed without the use of force.
(If necessary remove and discard lockwire from rod end locknut (64) and slacken rod end locknut (64)).

NOTE : If alignment of holes in spring assembly rod end and structure does not agree with lever being in contact with vane track stop, it is permitted to adjust spring assembly rod to obtain a gap of not more than 0.6 mm (0.023 in.) between vane trailing edge and jig with lever and vane track stop in contact.

4 Install bolt (63), washer (62) and nut (61).

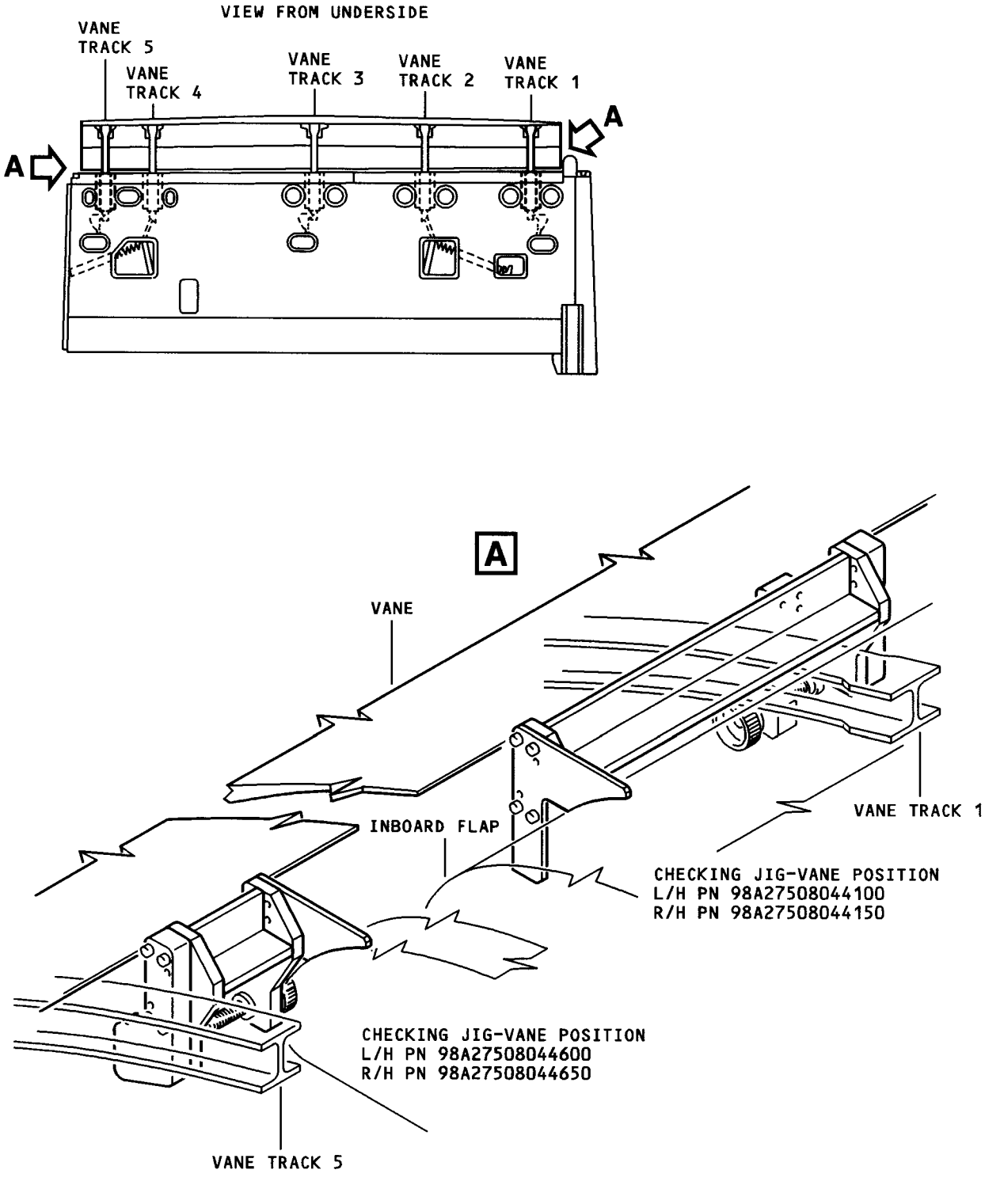
NOTE : Bolt (63) is installed head downward.

5 Tighten nut (61) and safety with new cotter pin (60).
6 Tighten rod end locknut (64) and safety with lockwire.

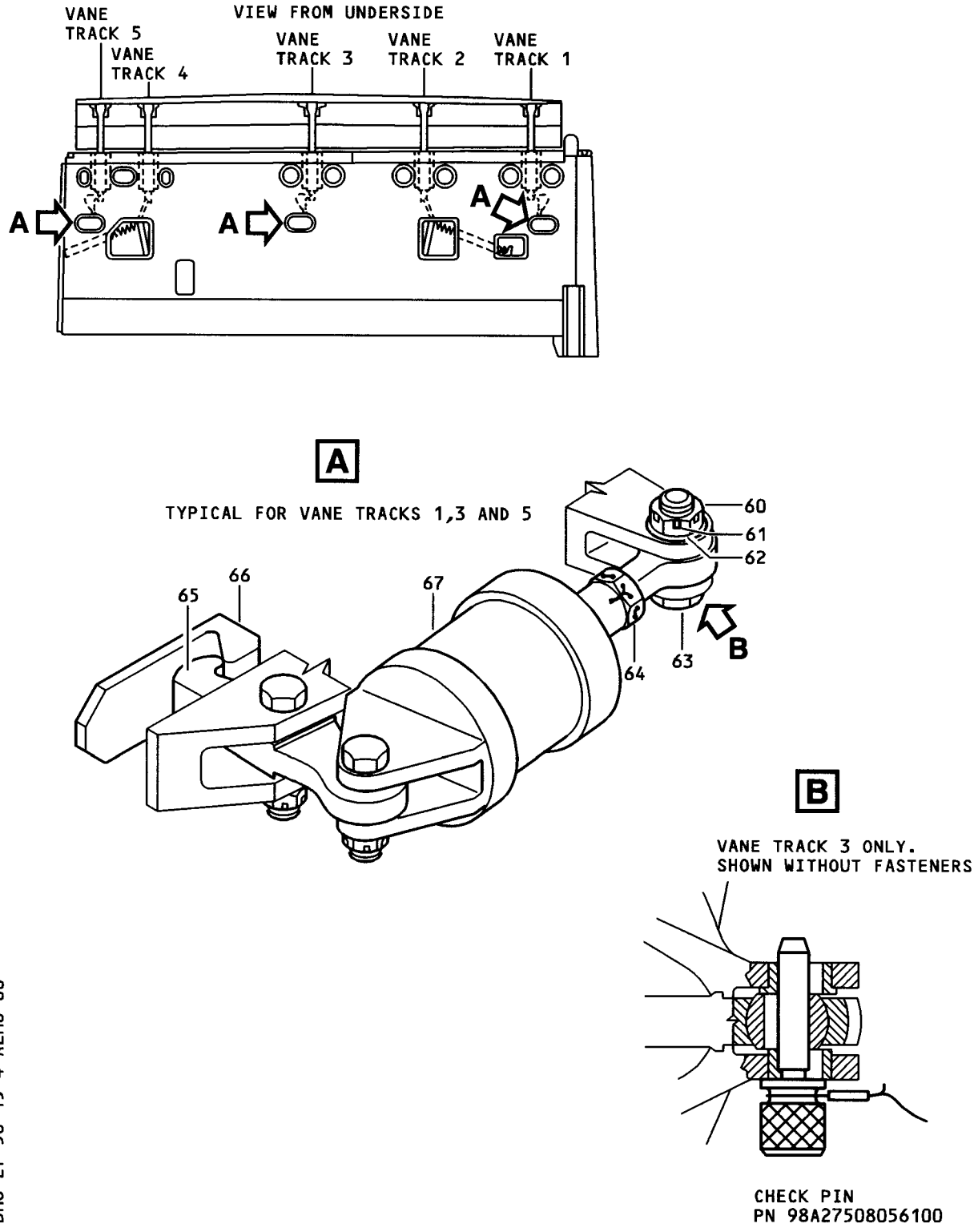
(p) On vane track 3 proceed as follows:
1 Make certain that both trailing edge of vane and leading edge of flap are in contact with checking jigs.

NOTE : Due to adjustment of spring assemblies at vane tracks 1 and 5 a gap of not more than 0.6 mm (0.023 in.) may exist between vane trailing edge and checking jig with the vane held in its extended position.

2 Push spring assembly (67) forward to bring lever (65) into contact with vane track stop (66).
3 Adjust length of spring assembly rod end as follows (If necessary remove and discard lockwire from rod end locknut (64) and slacken rod end locknut (64)):
a Locate the eye end in the structure bracket and hold the spring assembly (67) forward so that the holes are misaligned slightly.



Flap Vane Position Checking Jig
Figure 405



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Spring Assemblies
Figure 406

- It must be possible to insert the small diameter check pin PN 98A27508056100.

NOTE : Check pins PN 98A27508056100 and PN 98A2750805620 of check pin set PN 98A27508056000

- It must not be possible to insert the large diameter check pin PN 98A27508056200.

NOTE : This ensures that when the spring assembly (67) is positioned for insertion of bolt (63), the correct clearance exists between the lever and vane track stop.

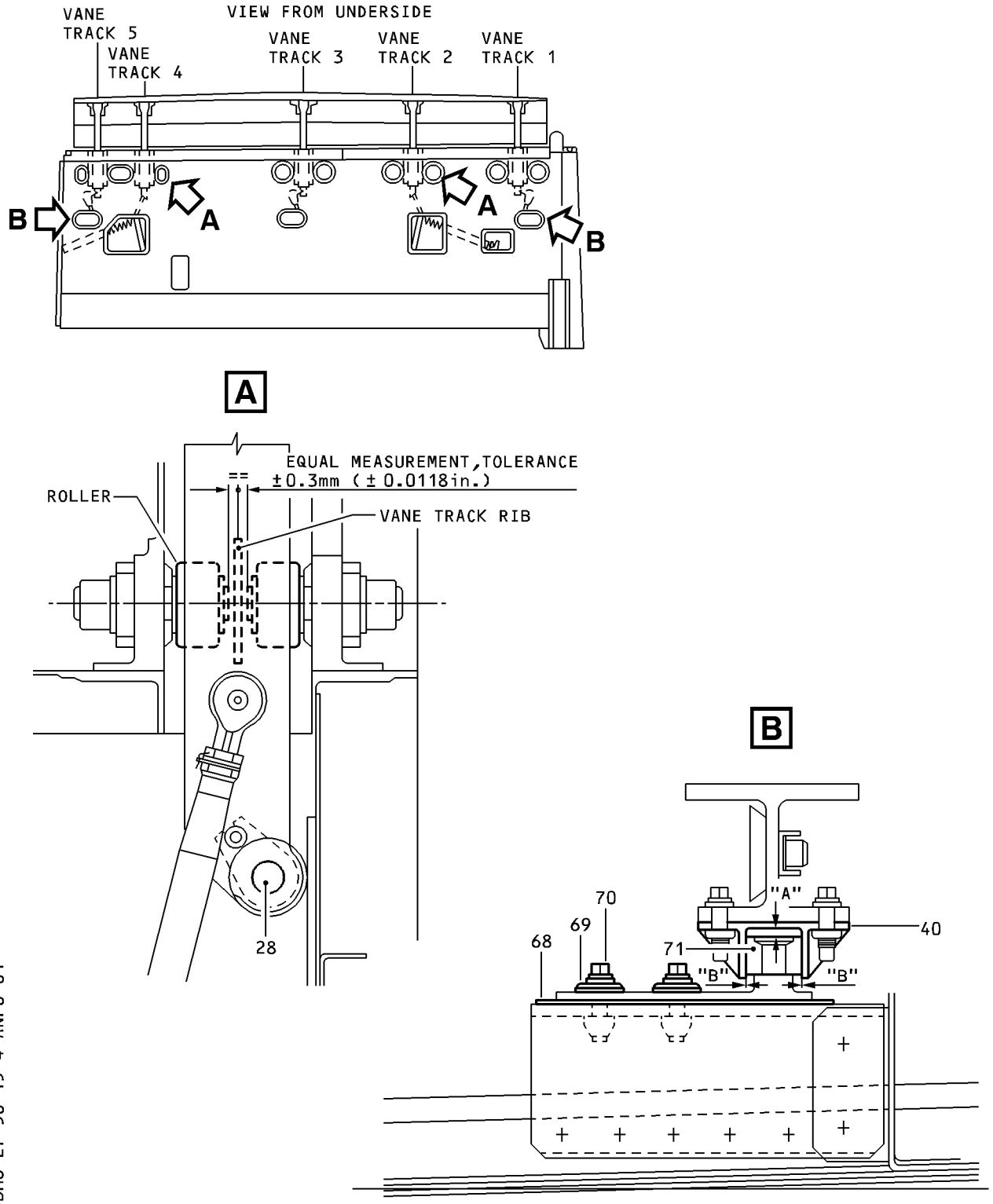
4 Install bolt (63), washer (62) and nut (61).

NOTE : Bolt (63) is installed head downward.

5 Tighten nut (61) and safety with new cotter pin (60).
6 Tighten spring assembly rod end locknut (64) and safety with lockwire.
(q)Remove vane position checking jigs from tracks 1 and 5.
(r)Remove safety clips and tags and close circuit breakers 10CV, 6CV, 5CV, 2CV, 1CV.
(s)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.

(t)Remove safety guard from flap/slat control lever quadrant.
(u)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(v)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(w)Install safety guard on flap/slat control lever quadrant.
(x)Open, safety and tag circuit breakers 10CV, 6CV, 5CV, 2CV, 1CV.
(Ref. Fig. 403)
(y)Apply grease (Material No. 04-004) to bolt (22) and position sarma rod (29) in flap and connect at vane track end with bolt (22), bush (14), and bearing bush (13).
(z)Install washer (12) and, using STA-LOK notched wrench PN SL90-315-3750, install nut (11).
(aa)TORQUE nut (11) to between 1.8 and 2.2 m.daN (13.28 and 16.23 lbf.ft.).
(ab)Using STA-LOK installation tool PN SL90-359-3750, install tab washer (10).
(Ref. Fig. 402)
(ac)Remove lock bolt (6).
(ad)Using STA-LOK notched wrench PN SL90-437-6250, install washer (2) and nut (3) on end of spring rod.
(ae)TORQUE nut (3) to between 2.8 and 3.2 m.daN (20.6 and 23.6 lbf.ft.).
(af)Using STA-LOK installation tool PN SL90-487-6250, install tab washer (4) on end of spring rod.
(ag)Install plug (5) in end of spring rod and seal plug by applying sealant (Material No. 09-013) to circumference of plug head.
(Ref. Fig. 407)



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Adjustment of Bearing at Track 2 and 4 and Guide Assy at Track 1 and 5
Figure 407

R

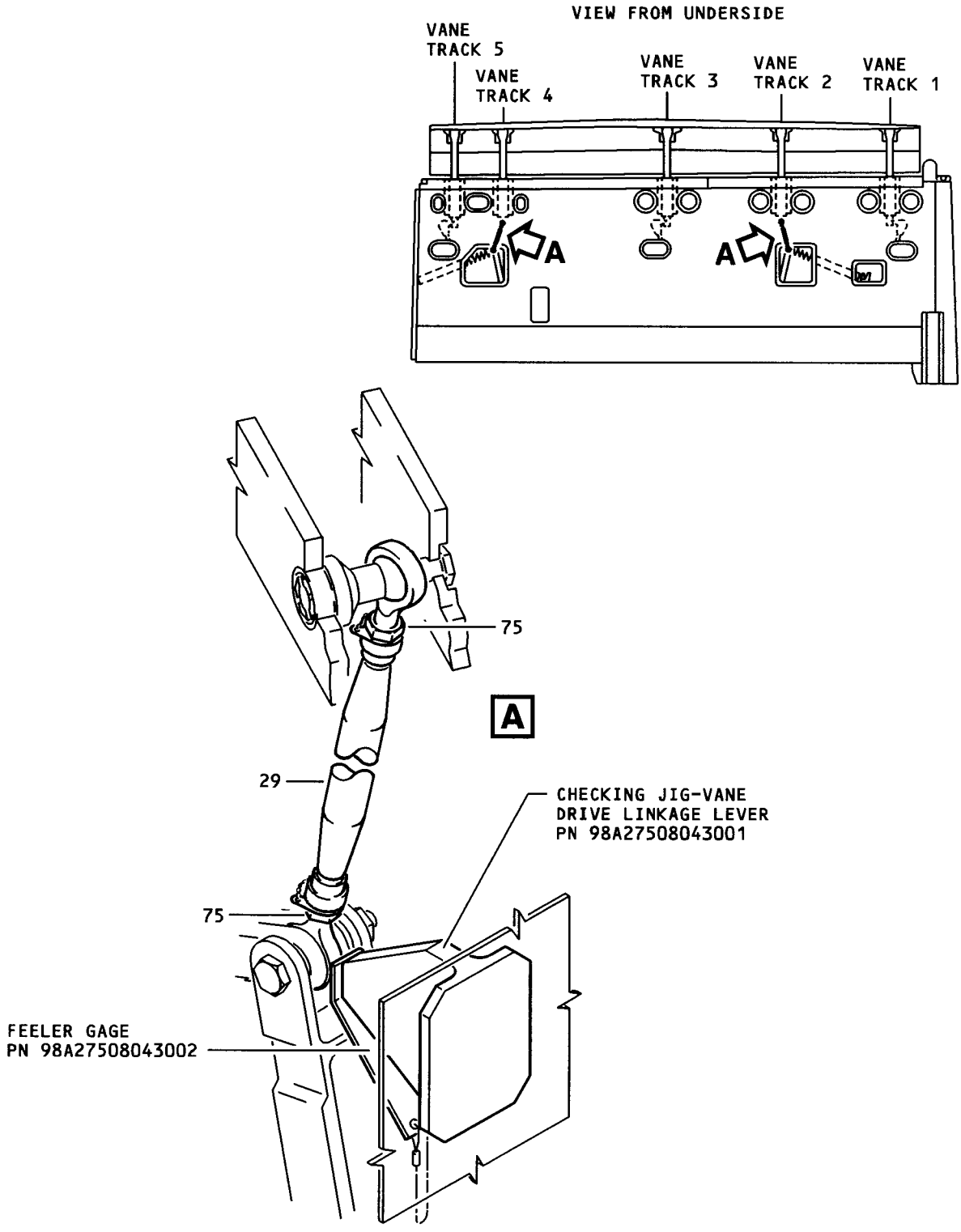
(ah)Make certain that an equal gap with a maximum deviation of 0.6 mm (0.024 in.) is obtained between roller and rib of vane vane track. Adjust with eccentric bolt (28) if necessary.
(aj)TORQUE nut (24) to between 1.5 and 1.7 m.daN (132.75 and 150.345 lbf. in.) and safety with new cotter pin (23).
(ak)Install serrated plate (19) with bolt (27), washer (18) and nut (17).
(al)TORQUE nut (17) to between 0.4 and 0.5 m.daN (35.40 and 44.25 lbf.in.) and safety with new cotter pin (16).
(am)Adjust gaps between slide block and guide assy as follows:
1 Make certain that gap "A" between slide block (40) and guide assy (71) is between 1.5 and 3.5 mm (0.059-0.138 in.).
2 If necessary remove bolts (70) and washers (69) and adjust gap "A" with shims (68).

NOTE : You must not use more than a maximum of three shims.

3 Install bolts (70) and washers (69), but do not tighten bolts (70).
4 Move guide assy (71) together with vane track inboard until vane track rib contacts aft track roller. Mark position on guide assy attachment bracket.
5 Move guide assy (71) together with vane track outboard until vane track rib contacts aft track roller. Mark position on guide assy attachment bracket.
6 Move guide assy (71) to center position between marks on guide assy attachment bracket.
7 TORQUE bolts (70) to 0.3 m.daN (26.55 lbf.in.).
8 Make certain that gaps "B" between slide block (40) and guide assy (71) are between 0.3 and 0.7 mm (0.012 - 0.028 in.).
(an)Remove tags and safety clips, close circuit breakers 10CV, 6CV, 5CV, 2CV, 1CV.
(ap)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE WORKING AREA IS FREE OF TOOLS AND EQUIPMENT AND THAT TRAVEL RANGE OF THE SURFACES IS CLEAR.

(aq)Remove safety guard from flap/slat control lever quadrant.
(ar)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(as)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(at)Install safety guard on flap/slat control lever quadrant.
(au)Open, safety and tag circuit breakers 10CV, 6CV, 5CV, 2CV, 1CV.
(av)Position vane drive linkage checking jig PN 98A27508043000.
(Ref. Fig. 408)
(aw)Using feeler gage supplied with checking device PN 98A27508043000, make certain that gap between linkage connection and jig is correct.
(ax)If gap is incorrect, remove and discard lockwire and loosen locknuts (75) on sarma rod (29).
(ay)Adjust length of sarma rod (29) as required to obtain correct dimension.
(az)Remove vane drive linkage checking jig.
(ba)Tighten locknuts (75) on sarma rod (29).



Gap Adjustment between Drive Linkage Lever and Guide Rail
Figure 408

R

(bb)Safety locknuts (75) with lockwire.

(4)Test
(a)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV and 10CV
(b)Remove safety guard PN98A27503007000 from flap/slat control lever quadrant.

(c)Carry out operational test of flap system (Ref. 27-54-00, P. Block 501).

NOTE : Finish the test with flaps fully retracted.

(5)Close Up
(a)Remove safety collars from aileron servo controls.
(b)Make certain work area is clear and clean of tools and miscellaneous items of equipment.
(c)Install access panels 574 (674), -AB, -BB, -CB, -DB, -EB, FB, -GB, -HB, -JB, -KB, -LB, -MB, -NB, -PB and -QB on LH (RH) inboard flaps.
(d)Remove access platform.
(e)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(f)Remove safety barriers.

FLAP VANE - INSPECTION/CHECK

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 2.7 m (9 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C.	Safety Barriers
	D.	Circuit Breaker Safety Clips and Tags

Referenced Procedure
- 27-50-00, P. Block 301 — Flaps

2. Procedure

A. Job Set-Up

(1)Position safety barriers.

WARNING : BEFORE OPERATING FLAPS MAKE CERTAIN THAT TRAVEL RANGE OF SURFACES IS CLEAR.

(2)Extend flaps to 15° position (Ref. 27-50-00, P. Block 301).

R (3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(5)Position access platform.

B. Inspection/Check

(1)Examine flap vane externally for satisfactory condition (no corrosion, cracks or other damage).

(2)Check flap/vane buffers of vane jam detector units 41CV-A, 37CV-A (LH)

and 42CV-A, 38CV-A (RH) for satisfactory condition (no impacting or other damage).

(3)Check vane leading edge for wear in area of contact with buffer rollers (max. depth of wear 2 mm (0.079 in.)).

C. Close-Up

(1)Remove safety guard from flap/slat control lever quadrant.

(2)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACES IS CLEAR.

(3)Retract flaps (Ref. 27-50-00, P. Block 301).

(4)Remove access platform.

(5)Remove safety barriers.

(6)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE COMMENCING DISASSEMBLY OF MECHANISM, SPRING-STRUT MUST BE LOCKED IN SAFE CONDITION USING LOCKING BOLT, AND WARNING FLAG MUST BE ATTACHED WHENEVER STRUT IS REMOVED FROM AIRCRAFT.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3.5 m (11 ft.)
	B. 98A27108028000	Safety Collar Set - All Speed Aileron Actuator
	C. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	D. 98A27508043000	Checking Jig - Vane Drive Linkage Lever
R	E. 98A27508375000	Removal/Installation Tool, Spring Unit, Vane Tracks 2 and 4
R	or	
R	98A27508679000	
	F. SL90-437-6250	Wrench - Notched, Tightening of Nuts NSA5454
	G. SL90-314-6250	Tool - Extraction, Tab Washers STA-LOK NSA5454
	H. SL90-487-6250	Tool - Installation, Tab Washers STA-LOK NSA5454
	J. SL90-315-3750	Wrench - Notched, Tightening of Nuts NSA5454
	K. SL90-356-3750	Tool - Extraction, Tab Washers STA-LOK NSA5454
	L. SL90-359-3750	Tool - Installation, Tab Washers STA-LOK NSA5454
		NOTE : The tools listed in items F. thru L. were previously part of tool kit PN 98A27508033000.
	M.	Torque Wrench, 0.4 to 3.2 m.daN 3.0 to 23.6 lbf.ft.)
	N.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	P.	Cotter Pins
	Q.	Circuit Breaker Safety Clips and Tags
	R.	Safety Barriers
	S. Material No. 04-004	Common Greases (Ref. 20-31-00)
	T. Material No. 06-002	Lubricants (Ref. 20-31-00)

ITEM	DESIGNATION
U. Material No. 05-002	Special Materials (Ref. 20-31-00)
V. Material No. 09-013	Sealants (Ref. 20-31-00)

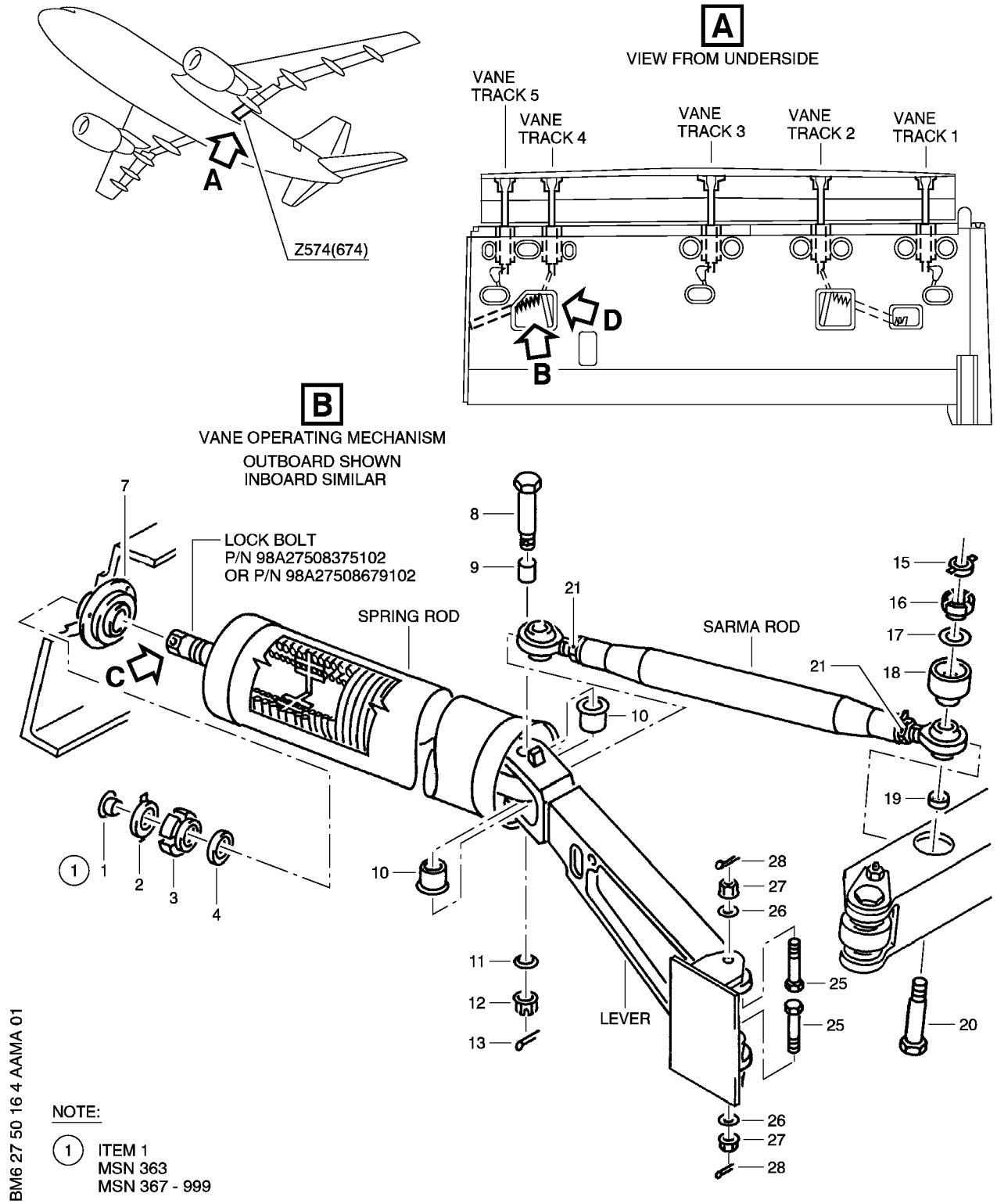
Referenced Procedures
- 24-41-00, P. Block 301 — AC External Power Control
- 27-50-00, P. Block 301 — Flaps
- 29-21-00, P. Block 301 — Green Auxiliary Power

2. Procedure
(Ref. Fig. 401) (Sheet 1/2)
(Ref. Fig. 401) (Sheet 2/2)

A. Job Set-Up
(1)Position safety barriers.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Connect hydraulic ground power supply and pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.
(5)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(6)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(7)For removal of outboard vane operating mechanism only, proceed as follows:
(a)Operate control wheel to deflect aileron on side being worked on fully trailing edge down.
(b)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(c)Install safety collars PN 98A27108028000 on all three servo controls.
(8)Open, safety and tag the following circuit breakers:

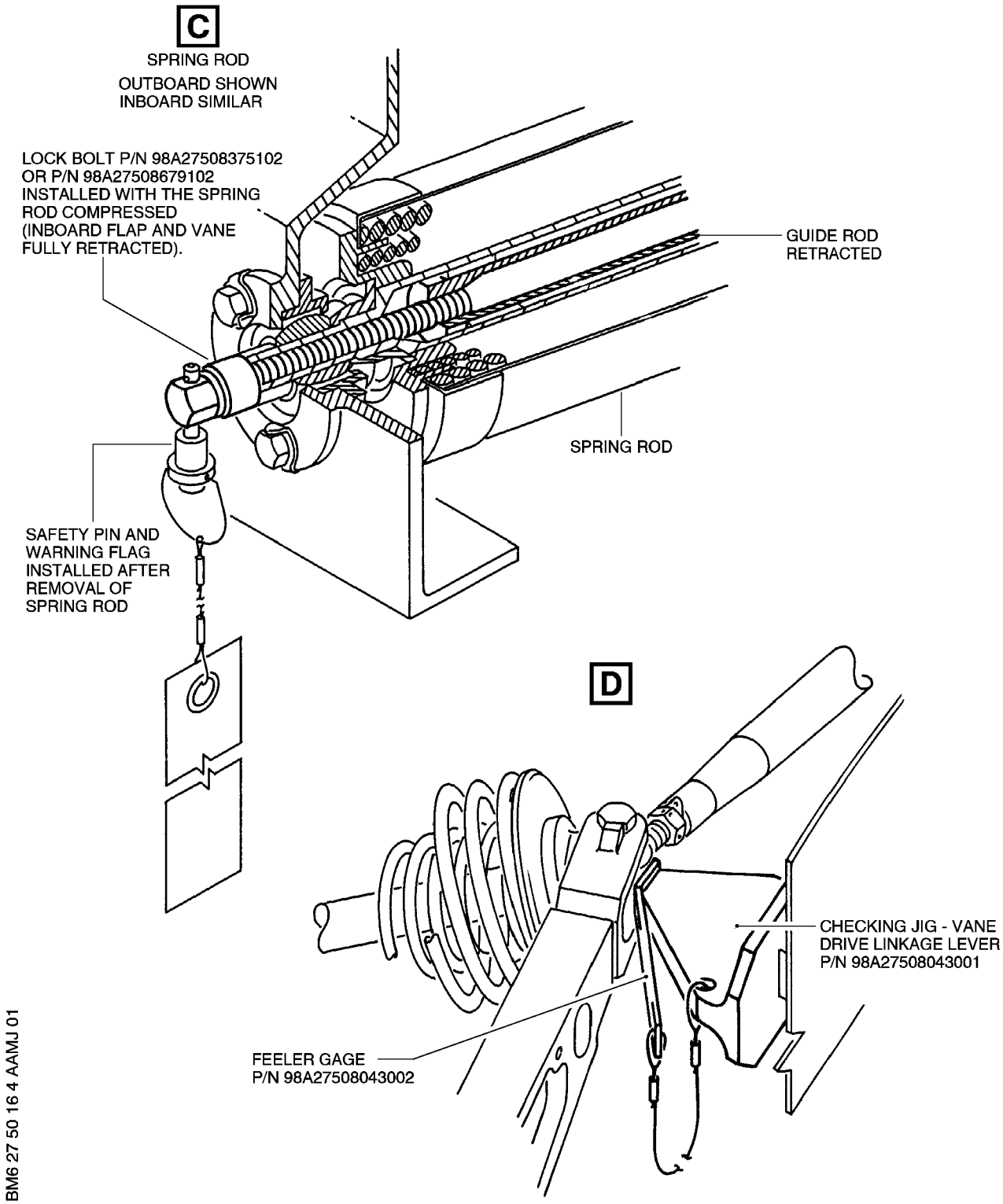
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(9)Depressurize GREEN hydraulic system (if not depressurized at step (7)(b) above) (Ref. 29-21-00, P. Block 301).
(10)Position access platform.
(11)Open following access doors:
(a)For outboard mechanism 574NB (674NB).
(b)For inboard mechanism 574FB (674FB) and 574DB (674DB).
(12)At outboard vane operating mechanism only, remove sealant and extract plug (1) from end of spring rod.



Flap Vane Operating Mechanism (Sheet 1/2)
Figure 401

R



Flap Vane Operating Mechanism (Sheet 2/2)
Figure 401

R

B. Removal
(1)Spring Rod
(a)Using STA-LOK extraction tool PN SL90-314-6250, remove tab washer (2) from structure attachment end of spring rod.
(b)Using STA-LOK notched wrench PN SL90-437-6250, remove nut (3) and washer (4) from structure attachment end of spring rod.
(c)Apply lubricant (Material No. 06-002) to threads of lock bolt
R PN 98A27508375102 or PN 98A27508679102, install lock bolt in spring rod being worked on and tighten sufficiently to remove spring loading from mechanism.

R NOTE : Lock bolt PN 98A27508375102 or PN 98A27508679102 is part of
R Removal/Installation tool set PN 98A27508375000 or
R PN 98A27508679000.

(d)Remove and discard cotter pin (13).
(e)Remove nut (12), washer (11) and bolt (8) connecting spring rod to operating linkage.
(f)Remove spring rod from flap.
(g)Remove bushes (10) from spring rod.
(h)Remove spacer (9) from lever.
(j)Install safety pin and warning flag in spring rod lock bolt.
(2)Sarma Rod
(a)Apply lubricant (Material No. 06-002) to threads of lock bolt
R PN 98A27508375102 or PN 98A27508679102, install lock bolt in spring rod being worked on and tighten sufficiently to remove spring loading from mechanism.
(b)Remove and discard cotter pin (13).
(c)Remove nut (12), washer (11) and bolt (8) connecting sarma rod to spring rod and lever.
(d)Using STA-LOK extraction tool PN SL90-356-3750, remove tab washer (15).
(e)Using STA-LOK notched wrench PN SL90-315-3750, remove nut (16).
(f)Remove washer (17), bolt (20), bush (19) and bearing bush (18) attaching sarma rod to vane.
(g)Remove sarma rod from flap.
(3)Lever
(a)Apply lubricant (Material No. 06-002) to threads of lock bolt
R PN 98A27508375102 or PN 98A27508679102, install lock bolt in spring rod being worked on and tighten sufficiently to remove spring loading from mechanism.
(b)Remove and discard cotter pin (13).
(c)Remove nut (12), washer (11) and bolt (8) connecting lever to sarma rod and spring rod.
(d)Remove and discard cotter pins (28).
(e)Remove nuts (27), washers (26) and bolts (25) securing lever at structure attachment.
(f)Remove spacer (9) and remove lever from flap.

C. Installation
(1)Spring Rod

(a)Install bushes (10) on spring rod.
(b)Remove warning flag from lockbolt.
(c)Position spring rod in flap with structure attachment end correctly located in bearing (7).
(d)Apply anti-corrosion compound (Material No. 05-002) to spacer (9) and install spacer on lever.
(e)Apply anti-corrosion compound (Material No. 05-002) to bolt (8).
(f)Connect linkage attachment end of spring rod to sarma rod and lever, secure with bolt (8), washer (11) and nut (12).
(g)TORQUE nut (12) to between 1.2 and 1.3 m.daN (8.8 and 9.6 lbf.ft.).
(h)Safety nut (12) with cotter pin (13).
(j)Remove lock bolt.
(k)Using STA-LOK notched wrench PN SL90-437-6250, install washer (4) and nut (3) on structure attachment end of spring rod.
(l)TORQUE nut (3) to between 2.8 and 3.2 m.daN (20.6 and 23.6 lbf.ft.).
(m)Using STA-LOK installation tool PN SL90-487-6250, install tab washer (2) on structure attachment end of spring rod.

(2)Sarma Rod
(a)Apply grease (Material No. 04-004) to bolt (20).
(b)Position sarma rod in flap and connect at vane guide rail end with bolt (20), bush (19) and bearing bush (18).
(c)Install washer (17) and, using STA-LOK notched wrench PN SL90-315-3750, install nut (16).
(d)TORQUE nut (16) to between 1.8 and 2.2 m.daN (13.28 and 16.23 lbf.ft.).
(e)Using STA-LOK installation tool PN SL90-359-3750, install tab washer (15).
(f)Apply anti-corrosion compound (Material No. 05-002) to bolt (8).
(g)Connect sarma rod to spring rod and lever using bolt (8).
(h)Secure with washer (11) and nut (12).
(j)TORQUE nut (12) to between 1.2 and 1.3 m.daN (8.8 and 9.6 lbf.ft.).
(k)Safety nut (12) with cotter pin (13).
(l)Remove lock bolt from spring rod.

(3)Lever
(a)Position lever in flap and install bolts (25) at structure attachments.
(b)Secure lever with washers (26) and nuts (27).
(c)TORQUE nuts (27) to between 0.4 and 0.5 m.daN (3.0 and 3.7 lbf.ft.).
(d)Safety with cotter pins (28).
(e)Apply anti-corrosion compound (Material No. 05-002) to spacer (9) and bolt (8) and install spacer in lever.
(f)Connect lever to sarma rod and spring rod using bolt (8).
(g)Secure with washer (11) and nut (12).
(h)TORQUE nut (12) to between 1.2 and 1.3 m.daN (8.8 and 9.6 lbf.in.).
(j)Safety nut (12) with cotter pin (13).
(k)Remove lockbolt from spring rod.

(4)Only applicable after installation of the spring rod, sarma rod and lever of the outboard vane operating mechanism:
Install plug (1) in structure attachment end of spring rod and seal plug by applying sealant (Material No. 09-013) to circumference of plug head.

D. Adjustment

(1)If sarma rod or lever only have been removed, proceed as follows:
(a)Cut and discard lockwire on sarma rod locknuts (21).
(b)Slacken sarma rod locknuts (21) sufficiently to allow adjustment of rod length later.
(c)Remove tags and safety clips, close circuit breakers 10CV, 6CV, 5CV.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE WORKING AREA IS FREE OF TOOLS AND EQUIPMENT AND THAT TRAVEL RANGE OF THE SURFACES IS CLEAR.
(d)Remove safety guard from flap/slat control lever quadrant.
(e)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(f)Install safety guard on flap/slat control lever quadrant.
(g)Open, safety and tag circuit breakers 10CV, 6CV, 5CV.
(h)Position vane drive linkage checking jig PN 98A27508043000.
(i)Using feeler gage supplied with checking jig, make certain that gap between linkage connection and jig is correct.
(j)If gap is incorrect, adjust length of sarma rod as required to obtain correct dimension.
(k)Remove vane drive linkage checking jig.
(l)Remove tags and safety clips, close circuit breakers 10CV, 6CV, 5CV.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.
(m)Remove safety guard from flap/slat control lever quadrant.
(n)Retract flaps.(Ref. 27-50-00, P. Block 301).
(o)Open, safety and tag circuit breakers 10CV, 6CV, 5CV.
(p)Tighten locknuts (19) on sarma rod.
(q)Safety with lockwire.

E. Test
(1)Only if spring rod has been replaced proceed as follows:
(a)Remove tags and safety clips and close circuit breakers 10CV, 6CV, 5CV.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE WORK AREA IS FREE OF TOOLS AND EQUIPMENT AND THAT THE TRAVEL RANGE OF SURFACES IS CLEAR.
(b)Remove safety guard from flap/slat control lever quadrant.
(c)Fully extend flaps (Ref. 27-50-00, P. Block 301) and check that vane operates satisfactorily.
(d)Retract flaps (Ref.27-50-00, P. Block 301).

F. Close-Up
(1)Close the following access doors.
(a)For outboard mechanism: 574NB (674NB).
(b)For inboard mechanism: 574FB (674FB) and 574DB (674DB).
(2)After replacement of outboard spring rod only:
Remove safety collars from ASA servo controls.
(3)Remove access platform.
(4)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(5)Remove safety barriers.

VANE OPERATING MECHANISM - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27508043000	Checking Jig - Vane Drive Linkage Lever
R C. 98A27508494000	Checking Jig - Vane Position
D. 98A27508056000	Check Pin Set - Vane Track 3
E. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
F.	Torque Wrench, 2.8 to 3.2 m.daN (20.5 to 23.5 lb.ft.)
G.	Safety Barriers
H.	Circuit Breaker Safety Clips and Tags
I.	Cotter Pins

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-50-16, P. Block 401	Vane Operating Mechanism
- 27-50-16, P. Block 801	Vane Operating Mechanism
- 27-50-17, P. Block 401	Spring Unit

2. Procedure

(Ref. Fig. 601) (Sheet 1/4)
(Ref. Fig. 601) (Sheet 2/4)
(Ref. Fig. 601) (Sheet 3/4)
R (Ref. Fig. 601) (Sheet 4/4)

A. Job Set-Up

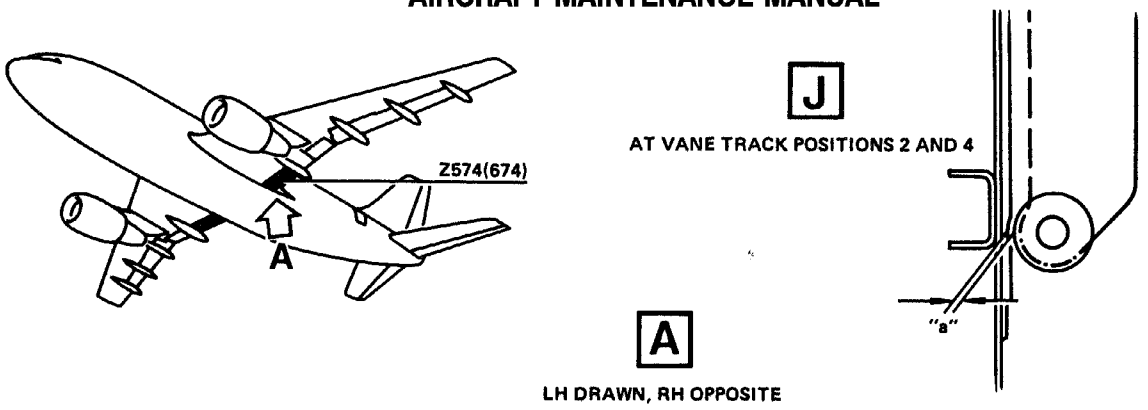
(1)Position safety barriers.

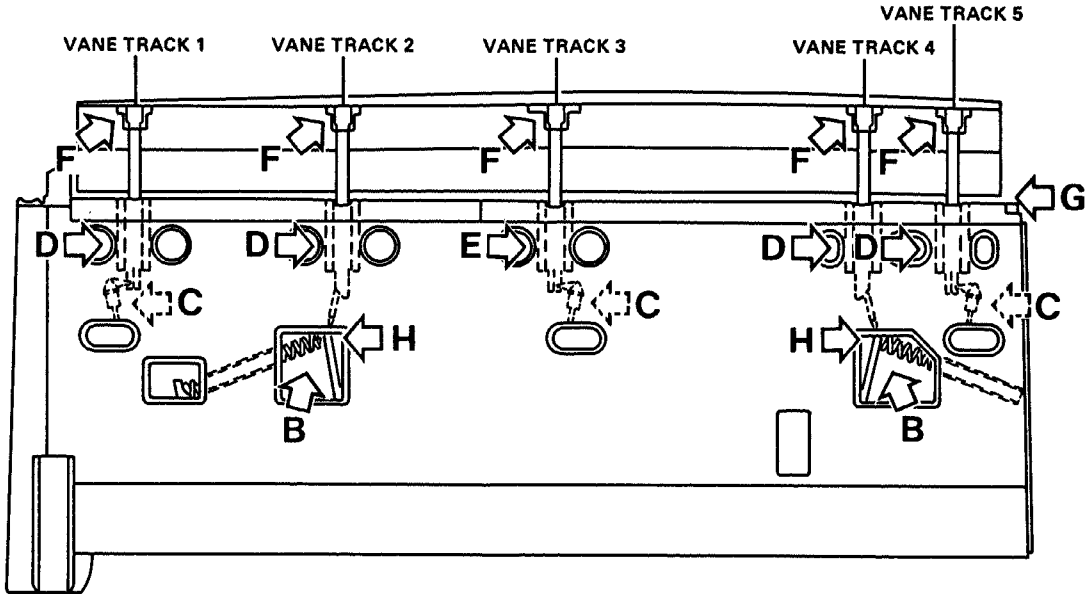
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.

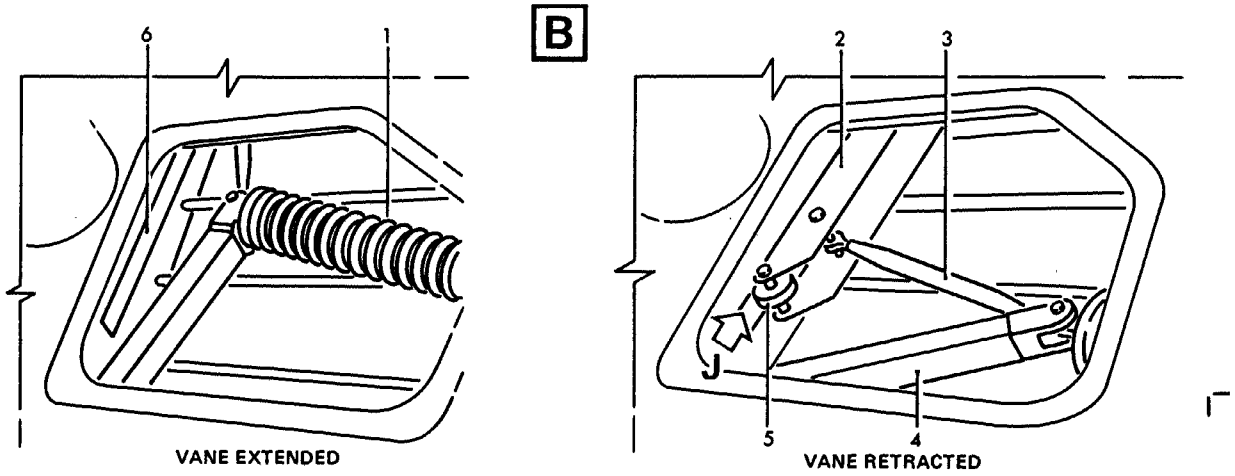
(2)Extend the flaps until the vane is fully extended (Ref. 27-50-00, P. Block 301).

(3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(4)Open, safety and tag the following circuit breakers:







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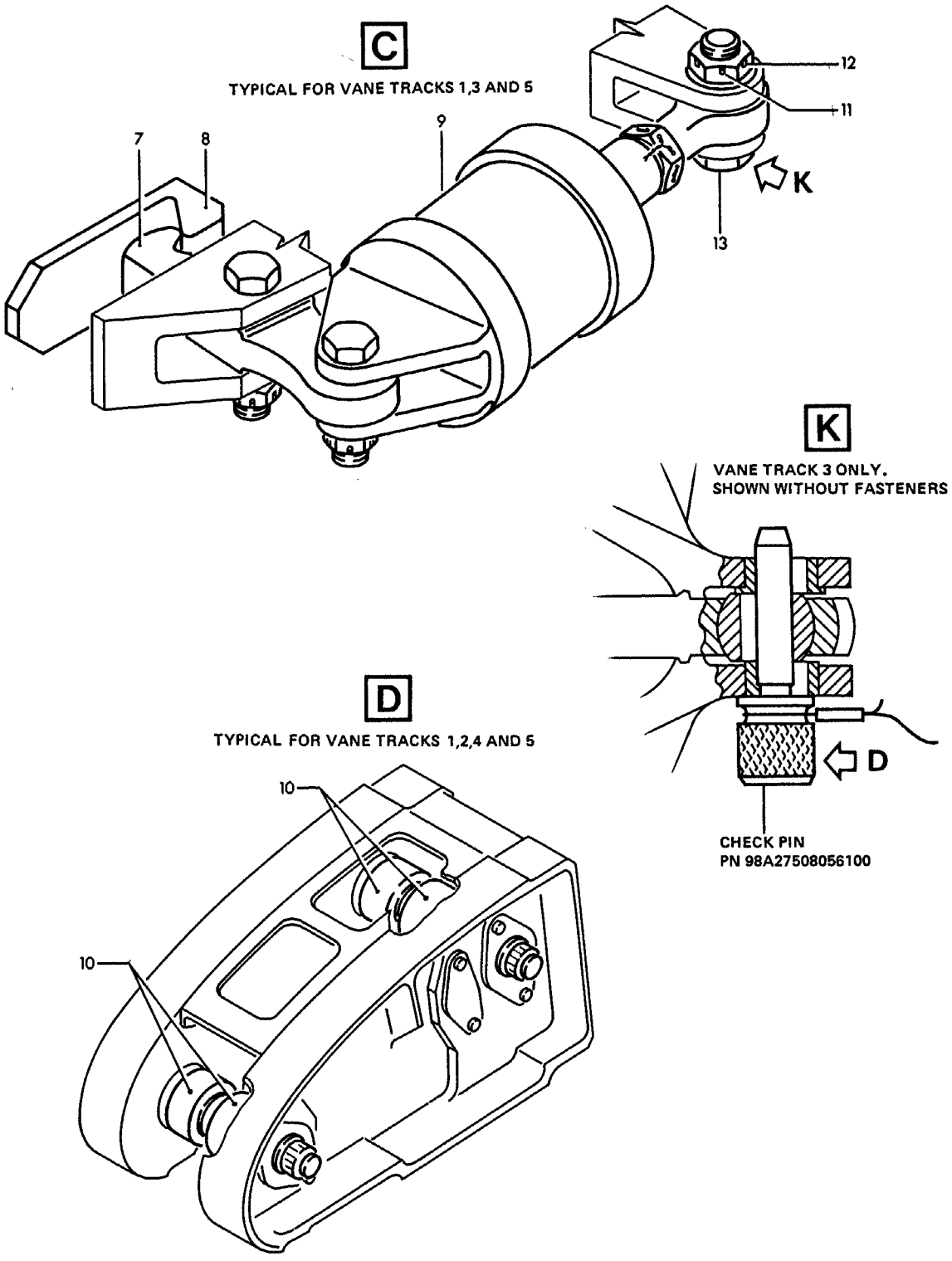
Vane Operating Mechanism
(Sheet 1/4)
Figure 601



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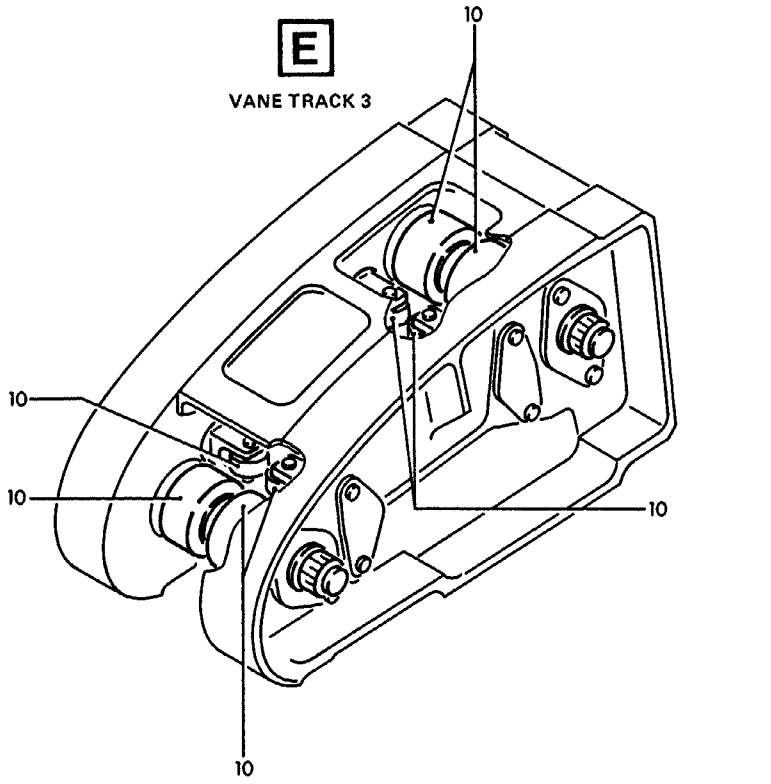
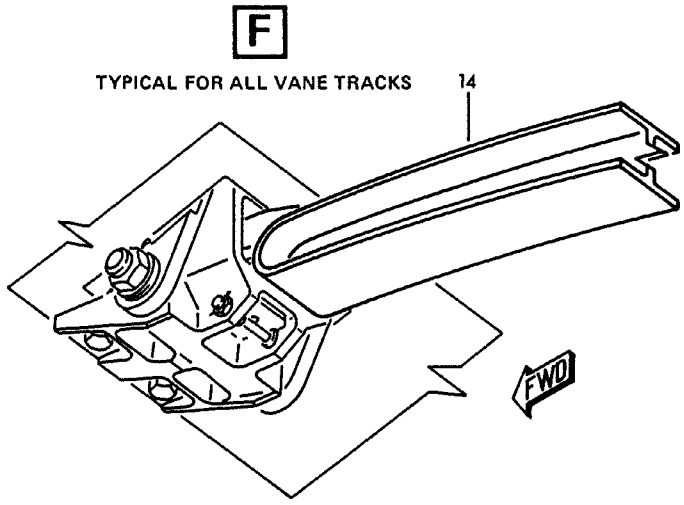
Vane Operating Mechanism
(Sheet 2/4)
Figure 601





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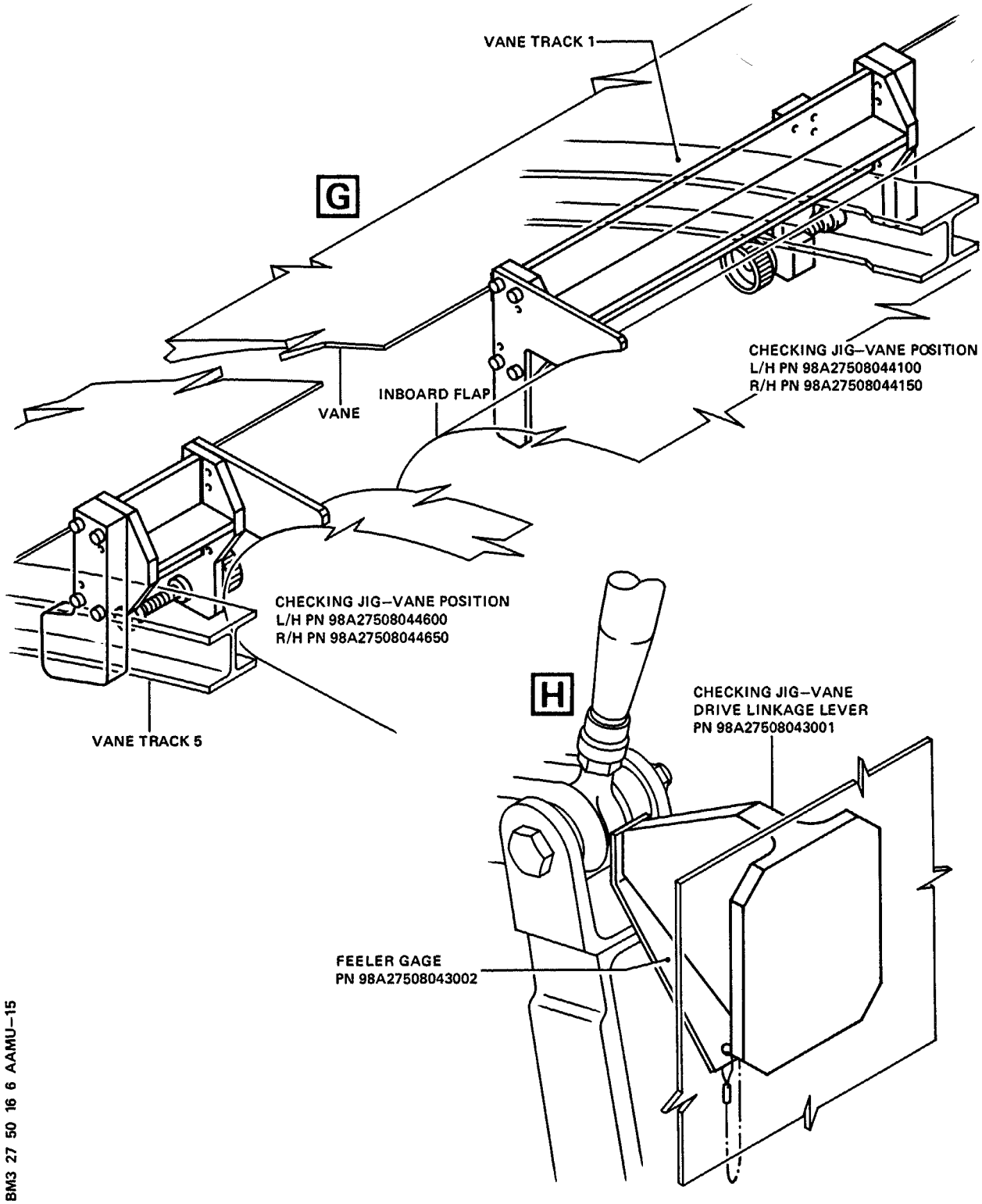
Vane Operating Mechanism
(Sheet 3/4)
Figure 601



Vane Operating Mechanism
(Sheet 4/4)
Figure 601

R

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(5)Position access platform.
(6)Remove access panels 574 (674) -AB, -BB, -CB, -DB, -EB, -FB, -GB, -HB, -JB, -KB, -LB, -MB, -NB, -PB and -QB for LH (RH) inboard flaps.

B. Inspection/Check
(1)Examine the spring rod units (1) for satisfactory condition (security of attachment, absence of corrosion or other damage).
(2)Examine the SARMA rods (3) for satisfactory condition (security of attachment, bowing or other damage).
(3)Examine carriages (2) and levers (4) for satisfactory condition (absence of corrosion or other damage).
(4)Examine rollers (5), (10) for satisfactory condition (freedom of rotation) and absence of corrosion.
(5)Examine runway (6) of guide rollers for satisfactory condition (absence of corrosion, impacting or excessive wear) particularly in the roller to guide rail contact area in the vane retracted position.
R (6)Using the appropriate vane position checking jigs of checking jig set
R PN 98A27508494000 at vane tracks 1 and 5 sheet 4/4, (Ref. Fig. 601)
R make certain that gap between flap and vane is correct.
NOTE : Due to spring unit assembly adjustment, it is allowable to have a gap of 0.6 mm (0.023 in.) between the vane trailing edge and the jig.
(7)Examine vane tracks 1 thru 5 (14) for satisfactory condition (security of attachment, absence of corrosion or other damage).
NOTE : Grooving on the tracks can indicate a stiff or seized roller.
(8)Examine spring assemblies (9) for satisfactory condition (security of attachment, absence of corrosion or other damage).
(9)At track 3 spring assembly proceed as follows:
(a)Remove and discard cotter pin (11), remove nut (12) and bolt (13).
(b)Push spring assembly forward until lever (7) comes into contact with track stop (8).
(c)Make certain that with spring assembly held forward, small diameter check pin PN 98A27508056100 can be inserted through misaligned bolt holes in eye end and structure bracket and large diameter check pin PN 98A27508056200 cannot be inserted.
NOTE : Check pin PN 98A27508056100 and check pin PN 98A27508056200 are part of check pin set PN 98A27508056000.
(d)If conditions detailed in (c) are not obtained, adjust spring assembly (Ref. 27-50-17, P. Block 401).
(e)Install bolt (13) and nut (12).
(f)Tighten nut (12) and safety with cotter pin (11).
(10)Using vane drive linkage lever checking jig and feeler gage

PN 98A27508043000 (supplied with jig), make certain gap between the spring unit linkage and the guide rail is correct at tracks 2 and 4; if gap is not correct adjust linkage (Ref. 27-50-16, P. Block 401).

(11)Remove safety guard from flap/slat control lever quadrant.

(12)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.

(13)Retract the flaps until the vane is fully retracted (Ref. 27-50-00, P. Block 301). During movement of the vane check that the rollers (5) rotate freely.

NOTE : To facilitate observation of rollers it is recommended that only one hydraulic system is utilized to drive the flaps, thus keeping flap speed to a minimum.

(14)Make certain that any wear dimension "a" does not exceed 0.6 mm
R (0.0236 in.). If this dimension is exceeded the runway (6) must be
R replaced (Ref. 27-50-16, P. Block 801).

(15)Extend the flaps until the vane is fully extended (Ref. 27-50-00, P. Block 301). During movement of the vane check that the rollers (5) rotate freely.

(16)Repeat steps B.(13) and B.(15), checking the rollers (10) in turn at tracks 1 thru 5.

(17)Retract the flaps until the vane is fully retracted (Ref. 27-50-00, P. Block 301).

(18)Repeat steps B.(1) thru B.(5) checking parts of mechanism now visible with vane retracted.

D. Close-Up

(1)Make certain that work area is clear and clean of tools and miscellaneous items of equipment.

(2)Install access panels 574 (674), -AB, -BB, -CB, -DB, -EB,-FB, -GB, -HB, -JB, -KB, -LB, -MB, -NB, -PB and -QB on LH (Rh) inboard flaps.

(3)Remove access platform.

VANE OPERATING MECHANISM - APPROVED REPAIRS

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE COMMENCING DISASSEMBLY OF MECHANISM, SPRING-STRUT MUST BE LOCKED IN SAFE CONDITION USING LOCKING BOLT, AND WARNING FLAG MUST BE ATTACHED WHENEVER STRUT IS REMOVED FROM AIRCRAFT.

1. Reason for the Job

To replace the runway of the vane track roller.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27108028000	Safety Collar Set - All Speed Aileron Actuator
R C. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
D. NAS1919C-05-03	Blind Rivets
E. HL11VF5-4	Hi-Lok Rivets
F.	Universal Rivets
G.	Countersunk Rivets
H.	Wooden or Plastic Scraper
J.	Circuit Breaker Safety Clips
K.	Safety Barriers
L. Material No. 04-004	Common Greases (Ref. 20-31-00)
M. Material No. 09-013	Sealants (Ref. 20-31-00)
N. Material No. 11-001	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-50-15, P. Block 401	Flap Vane
- 27-50-16, P. Block 401	Vane Operating Mechanism

- 29-21-00, P. Block 301 Green Auxiliary Power
- 51-22-10, P. Block 601 Corrosion

3. Procedure (Ref. Fig. 801)

A. Job Set-Up
(1)Position safety barriers.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Connect hydraulic ground power supply and pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).

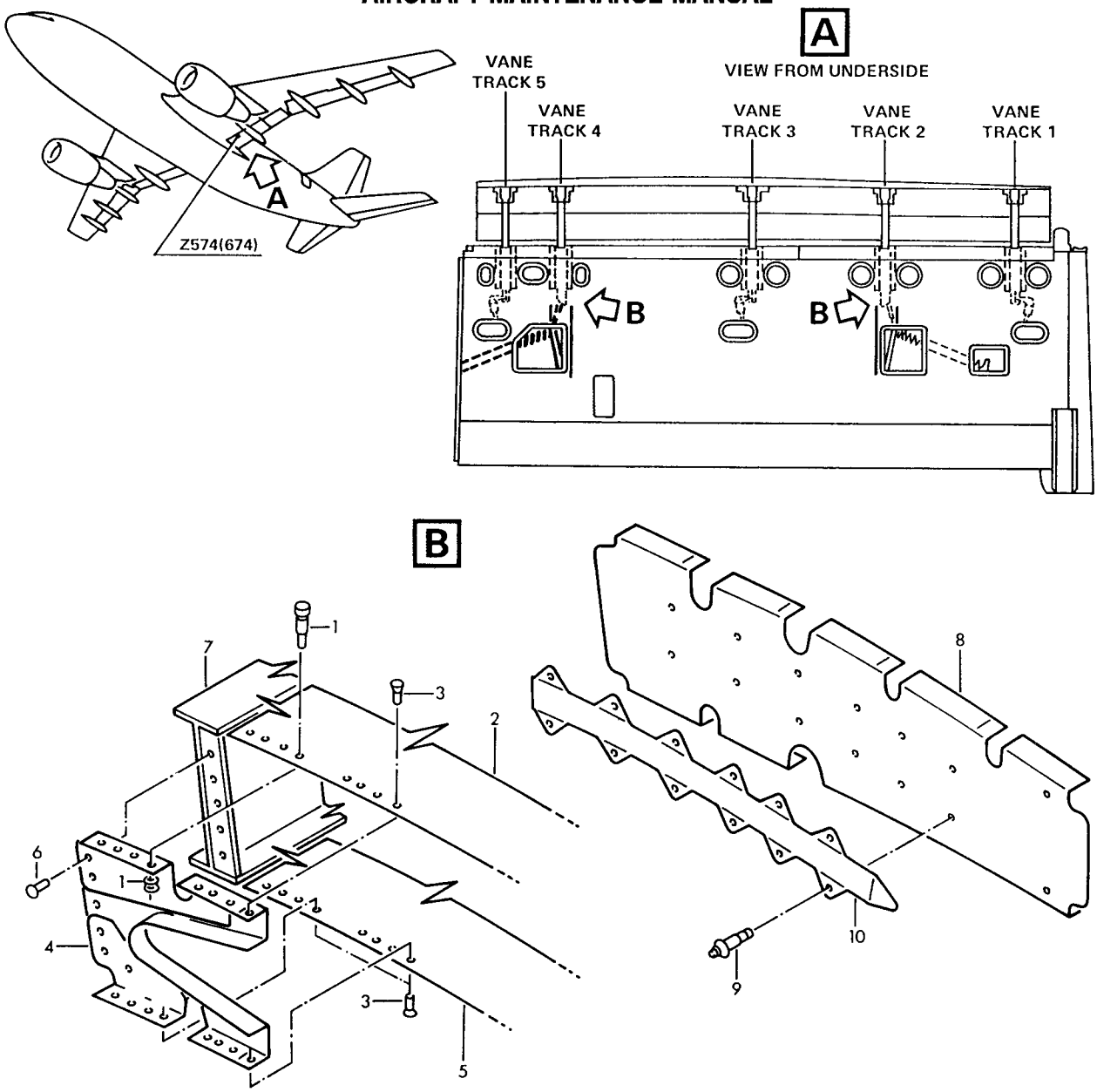
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.

(5)Fully retract flaps (Ref. 27-50-00, P. Block 301).
R (6)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(7)For removal of runway of outboard vane operating mechanism only, proceed as follows:
(a)Operate control wheel to deflect aileron on side being worked on fully trailing edge down.
(b)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(c)Install safety collars PN 98A27108028000 on all three servo controls.
(8)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(9)Depressurize GREEN hydraulic system (if not depressurized at step (7)(b) above) (Ref. 29-21-00, P. Block 301).
(10)Position access platform.
(11)Open following access doors:
(a)For runway of outboard mechanism 574NB (674NB).
(b)For runway of inboard mechanism 574FB (674FB) and 574DB (674DB).
(12)Remove vane with vane tracks (Ref. 27-50-15, P. Block 401).
(13)Remove spring rod assembly with sarma rod (Ref. 27-50-16, P. Block 401).

B. Removal of the Runway
(1)To get access to runway, remove reinforced rib (4) as follows:
(a)Drill out rivets (1) and (3) between reinforced rib (4) and panels (2) and (5).
(b)Drill out rivets (6) between reinforced rib (4) and bracket (7).
(c)Remove reinforced rib (4).



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Runway
Figure 801

(2)Drill out rivets (9) at runway (10).
(3)Remove the runway (10).

C. Preparation for Installation
(1)Remove old sealant from mating surface of rib with a wooden or plastic scraper.
(2)Check mating surface of the runway at the rib (8) for corrosion and remove corrosion as necessary (Ref. 51-22-10, P. Block 601).
(3)Transfer rivet holes from rib (8) to new runway (10).
(4)Deburr rivet holes.
(5)Remove borings.
(6)Clean installation area with cleaning agent (Material No. 11-001).

D. Installation of the Runway
(1)Apply sealant (Material No. 09-013) to the runway (10) and to mating surface of reinforced rib (4).
(2)Put runway (10) in position and wet install rivets NAS1919C-05-03 (9) with sealant (Material No. 09-013).
(3)Put reinforced rib (4) in position and wet install countersunk rivets (3), Hi-Lok rivets HL11VF5-4 (1) and universal rivets (6).
(4)Apply grease (Material No. 04-004) to the runway.

E. Close-Up

(1)Install spring rod assembly with sarma rod (Ref. 27-50-16, P. Block 401).
(2)Install vane with vane tracks (Ref. 27-50-15, P. Block 401).
(3)Close following access doors.
(a)For outboard mechanism: 574NB (674NB).
(b)For inboard mechanism: 574FB (674FB) and 574DB (674DB).
(4)After replacement of outboard spring rod only:
Remove safety collars from ASA servo controls.
(5)Remove access platform.
(6)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(7)Remove safety barriers.

SPRING UNIT - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE SURE THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE SURE THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE SURE THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

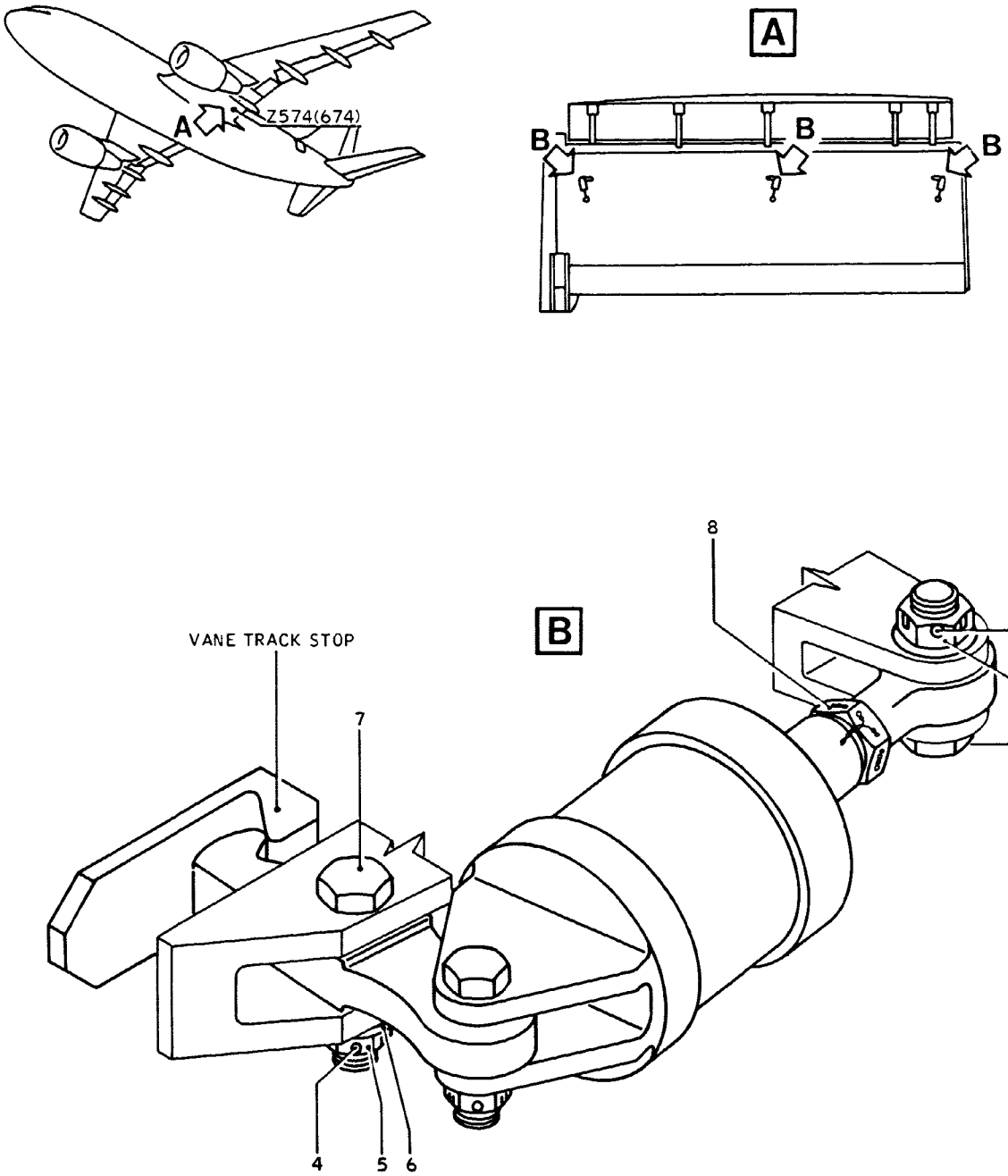
	ITEM	DESIGNATION
	A.	Access Platform, 3.5 m (11 ft.)
	B. 98A27108028000	Safety Collar Set - All Speed Aileron Actuator
	C. 98A27508375000 or 98A27508679000	Removal/Installation Tool, Spring Unit, Vane Tracks 2 and 4
	D. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
R	E. 98A27508494000	Checking Jig - Vane Position
	F. 98A27508053002	Wing Tip Brake Test Tool
	G. 98A27508056000	Check Pin Set - Vane Track 3
	H. SL90-437-6250	Wrench - Notched, Tightening of Nuts NSA5454
	J. SL90-314-6250	Tool - Extraction, Tab Washers STA-LOK NSA5454
	K. SL90-487-6250	Tool - Installation, Tab Washers STA-LOK NSA5454
	L.	Torque Wrench, 2.8 to 3.2 m.daN (20.5 to 23.5 lbf.ft.)
	M.	Safety Barriers
	N.	Circuit Breaker Safety Clips and Tags
	P.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	Q.	Cotter Pins
	R. Material No. 09-001	Sealants (Ref. 20-31-00)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 29-21-00, P. Block 301	Green Auxiliary Power

2. Procedure

(Ref. Fig. 401)



Flap Vane Spring Assembly
Figure 401

(Ref. Fig. 402)

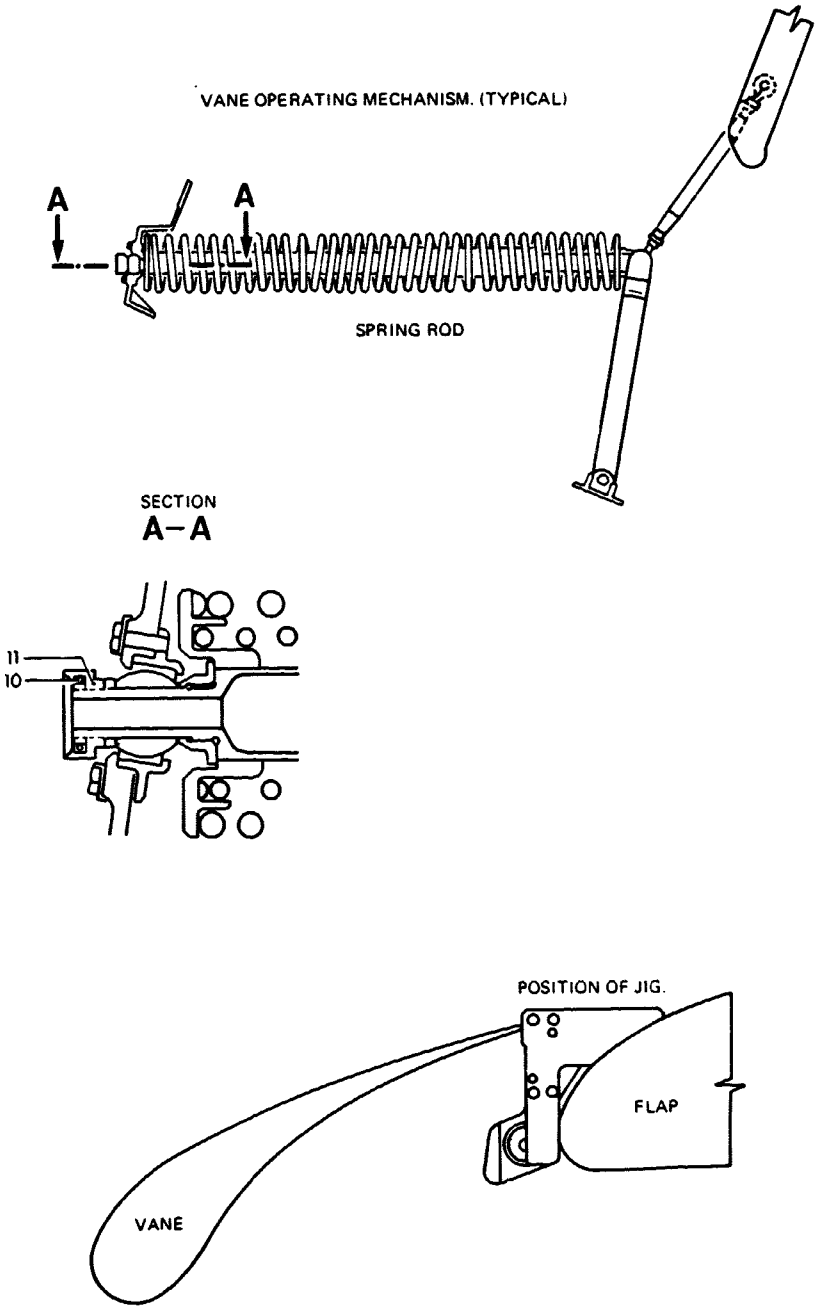
A. Job Set-Up
(1)Position safety barriers.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(5)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(6)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(7)Position aileron on side being worked on at full deflection (trailing edge down).
(8)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(9)Install all three safety collars PN 98A27108028000 on aileron servo controls.
(10)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63

(11)Position access platform.
(12)Open the following access panels:
(a)For all spring assembly positions:
574DB,FB,NB (674DB,FB,NB).
(b)For vane track 1 spring assembly:
574BB (674BB).
(c)For vane track 3 spring assembly:
574KB (674KB).
(d)For vane track 5 spring assembly:
574QB (574QB).
(13)Remove plastic plug on lower surface of flap nearest to spring assembly being worked on.
(14)Using STA-LOK extraction tool PN SL90-314-6250, remove tab washer (10) from spring rod attachments.
(15)Using STA-LOK notched wrench PN SL90-437-6250, remove nut (11) from spring rod attachments.
R (16)Install locking bolts PN 98A27508375102 or 98A27508679102 from spring
R rod tool set PN 98A27508375000 or 98A27508679000 in both spring rods.
(17)Remove safety clips and tags and close circuit breakers 10CV, 6CV, 5CV.

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.

NOTE : Extension of the flaps with the vane locked in its retracted



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Flap Vane Spring Assembly
Figure 402

position must be performed using WTB Test Tool PN 98A27508053002 as otherwise the system will shut down automatically on detection of incorrect vane operation.

(18)Remove safety guard from flap/slat control lever quadrant.
(19)Extend flaps to 15° position (Ref. 27-50-00, P. Block 301).
(20)Install safety guard on flap/slat control lever quadrant.
(21)Open, safety and tag circuit breakers 10CV, 6CV, 5CV.

B. Removal
(1)Remove and discard cotter pin (1).
(2)Remove nut (2) and bolt (3) securing rear attachment of spring assembly.
(3)Remove and discard cotter pin (4).
(4)Remove nut (5), washer (6) and bolt (7) securing forward attachment of spring assembly.
(5)Remove spring assembly from flap.

C. Preparation for Installation
(1)Clean old sealant material from structure surrounding spring assembly forward attachment access hole in lower surface.

D. Installation
(1)Position spring assembly in flap, install bolt (7) at forward attachment.
(2)Secure with washer (6) and nut (5), tighten nut sufficiently to obtain between 0.2 and 0.6 mm (0.008 and 0.023 in.) end float of bolt (7).
(3)Safety with cotter pin (4).
(4)Do not connect aft attachment at this stage.

E. Adjustment
R (1)Manually extend vane and install vane position checking jigs on
R PN 98A27508494000 tracks 1 and 5.
(2)If track 1 or 5 spring assemblies are being worked on proceed as follows:
(a)Make certain that both trailing edge of vane and leading edge of flap are in contact with checking jigs.
(b)Push spring assembly forward so that lever is in contact with end stop on vane track.
(c)While keeping lever in contact with vane track stop, adjust length of spring assembly rod until rear attachment bolt (3) can be installed without the use of force.
(If necessary remove and discard lockwire from rod end locknut (8) and slacken rod end locknut (8)).

NOTE : If alignment of holes in spring assembly rod end and structure does not coincide with lever being in contact with vane track stop, it is permitted to adjust to obtain a gap of not more than 0.6 mm (0.023 in.) between vane trailing edge and jig with lever and vane track stop in contact.

(d)Install bolt (3), secure with nut (2).

NOTE : Bolt (3) is installed head downward.

(e)Tighten nut (2) safety with cotter pin (1).
(f)Tighten rod end locknut (8) and safety with lockwire.
(3)If track 3 spring assembly is being worked on, proceed as follows;
(a)Make certain that both trailing edge of vane and leading edge of flap are in contact with checking jigs.

NOTE : Due to adjustment of spring assemblies at vane tracks 1 and 5 a gap of no more than 0.6 mm (0.023 in.) may exist between vane trailing edge and checking jig with the vane held in its extended position.

(b)Push spring assembly forward to bring lever into contact with vane track stop.
(c)Adjust length of spring assembly rod end as follows (If necessary remove and discard lockwire from rod end locknut (8) and slacken rod end locknut (8)):
1 Locate the eye end in the structure bracket and hold the spring assembly forward such that the holes are misaligned.
a It must be possible to insert the small diameter check pin PN 98A27508056100.

NOTE : Check pins PN 98A27508056100 and PN 98A27508056200 are part of check pin set PN 98A27508056000.

b It must not be possible to insert the large diameter check pin PN 98A27508056200.

NOTE : This ensures that when the spring assembly is positioned for insertion of bolt (3), the correct clearance exists between the lever and vane track stop.

(d)Install bolt (3) and secure with nut (2).

NOTE : Bolt (3) is installed head downward.

(e)Tighten nut (2) safety with cotter pin (1).
(f)Tighten spring assembly rod end locknut (8) and safety with lockwire.
(4)Remove vane position checking jigs from tracks 1 and 5.
(5)Manually retract vane, making certain that spring rod ends locate in their respective bearings.
(6)Using STA-LOK notched wrench PN SL90-437-6250, install nuts (11) on spring rods.
(7)TORQUE nuts (11) to between 2.8 and 3.2 m.daN (20.6 and 23.6 lbf.ft.).
(8)Using STA-LOK installation tool PN SL90-487-6250, install tab washers (10) in nuts (11).
(9)Remove locking bolts from spring rods.

F. Close Up
(1)Make sure that work area is clean and clear of tools and miscellaneous

items of equipment.
(2)Close panels opened at step A.(12) above.
(3)Apply a small quantity of sealant (Material No. 09-001) to plastic plug and install plug in lower surface of flap.
(4)Remove safety clips and tags and close circuit breakers 10CV, 6CV, 5CV, 1CB and 3CG.
(5)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).

WARNING : BEFORE OPERATING FLAPS, MAKE SURE THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.

(6)Remove safety guard from flap/slat control lever quadrant.
(7)Remove safety collars from aileron servocontrols.
(8)Retract flaps (Ref. 27-50-00, P. Block 301).
(9)Centralize ailerons.
(10)Remove access platform.
(11)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(12)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(13)Remove safety barriers.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 to 4 m (10 to 16 ft.)
B. 98A27508021000	Mounting Pin - Flap Fairing
C. 98A27508011000	Control Setting Device - Flap Track Fairings
D.	Torque Wrench, 0.15 to 2.2 m.daN (13.3 to 195 lbf.in.)
E.	Safety Barriers
F.	Circuit Breaker Safety Clips and Tags
G.	Warning Notice Prohibiting the Pressurization of Hydraulic Systems
H.	Lockwire, Corrosion-Resistant Steel, Dia. 1 mm (0.04 in.)
I.	Cotter Pins
J. Material No. 04-004	Common Greases (Ref. 20-31-00)
K. Material No. 05-002	Special Materials (Ref. 20-31-00)
L. Material No. 05-027	Special Materials (Ref. 20-31-00)
M. Material No. 09-016	Sealants (Ref. 20-31-00)

Referenced Procedures

- 06-41-57, P. Block 1	Access Provision - Wings
- 20-28-11, P. Block 1	Electrical Bonding
- 27-50-00, P. Block 301	Flaps
- 57-20-35, P. Block 401	Fillets and Fairings

2. Procedure

A. Job Set-Up

(1)Position safety barriers.

R (2)Extend flaps to 20° position (Ref. 27-50-00, P. Block 301).

(3)Display warning notice prohibiting the pressurization of hydraulic systems.

(4)Position access platform.

(5)Open, safety and tag the following circuit breakers:

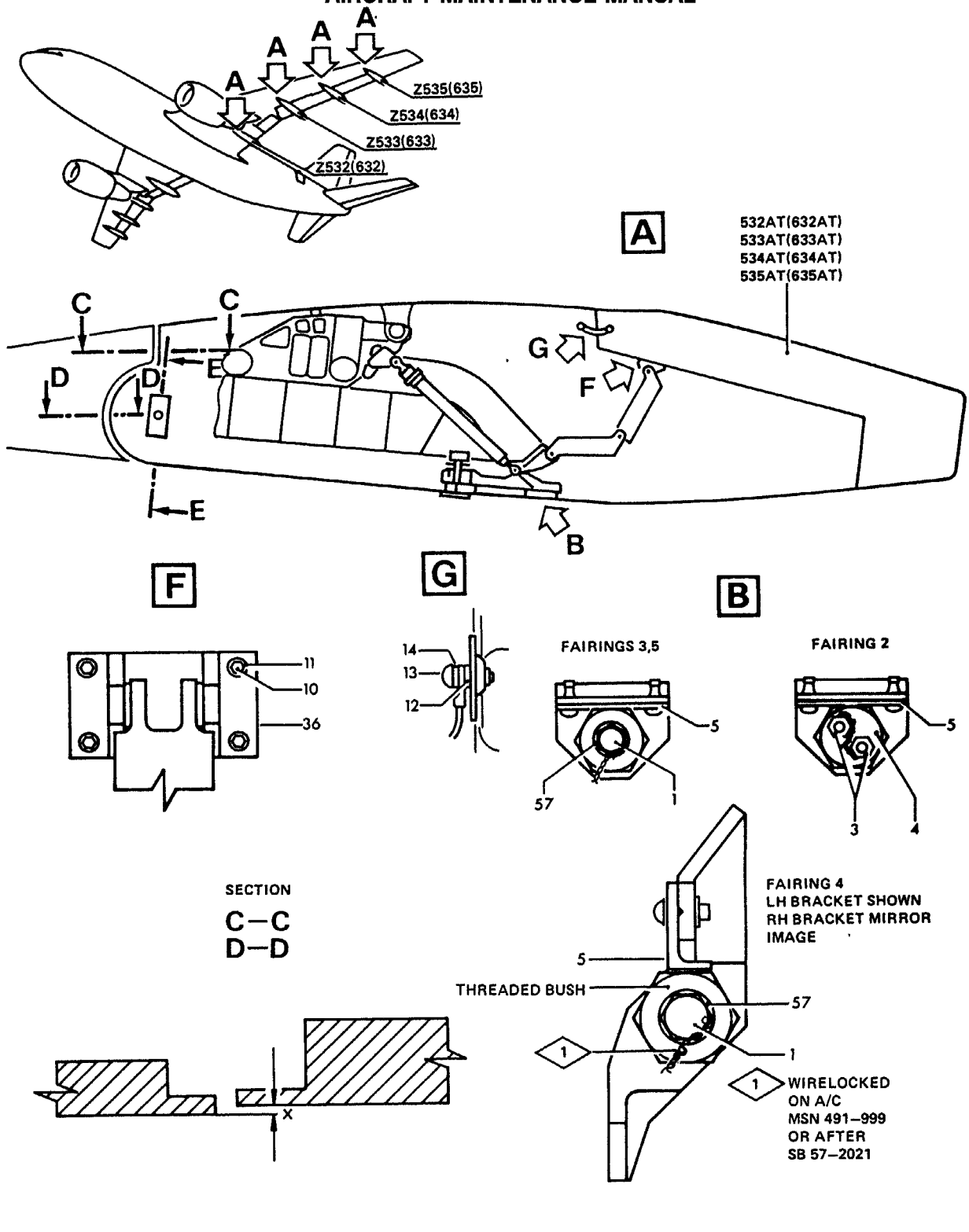
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/FLAPS/SYS 1	10CV	335/R67

B. Removal of Fairings for Access Only
(Ref. Fig. 401) (Sheet 1)
(Ref. Fig. 401) (Sheet 2)
(1)Remove the following access panels:
(a)For fairing 2, 532 (632) AL, AR, HL (HR).
(b)For fairing 3, 533 (633) AL, AR, FL.
(c)For fairing 4, 534 (634) AL, AR, EL, ER.
(d)For fairing 5, 535 (635) AL, AR, FL.
NOTE : For further details Ref. to 06-41-57, P. Block 1.
(e)For all fairings, remove screws securing panel AT, slide panel aft and remove screw (13) and washers (12),(14) securing bonding strap. Remove panel AT from fairing.
(2)Remove fixed fairing associated with fairing being removed (Ref. 57-20-35, P. Block 401).
(3)Remove four bolts (10) and washers (11) securing side load stay upper attachment.
(4)Disconnect bonding straps at fairing forward pivot points as detailed in step C.(4) below.
(5)Cut and discard lockwire at forward pivot bolts (6) and operating strut lower attachment bolts (1),(3).
(6)Not applicable
(7)Support fairing and remove
- at fairing 2, two bolts (3) and washer (4)
- at fairings 3 and 5, bolt (1) and washer (57).
- at fairing 4, bolt (1) and washer (57) from both operating struts.

NOTE : It is desirable that splined hollow bolt (7) is prevented from rotating during removal of bolt (6). However, this may not be possible and therefore it is suggested that a reference mark be made on the hollow bolt and surrounding structure to facilitate correct positioning of hollow bolt on re-assembly (Ref. Fig. 401) (Sheet 2/2).

(8)Remove bolts (6) and washers (8) at forward pivots and withdraw splined hollow bolt (7).
(9)Remove fairing from aircraft.

C. Removal of Fairing for Replacement
(Ref. Fig. 402) (Sheet 1/3)
(Ref. Fig. 402) (Sheet 2/3)
(Ref. Fig. 402) (Sheet 3/3)
(1)Remove the following access panels:



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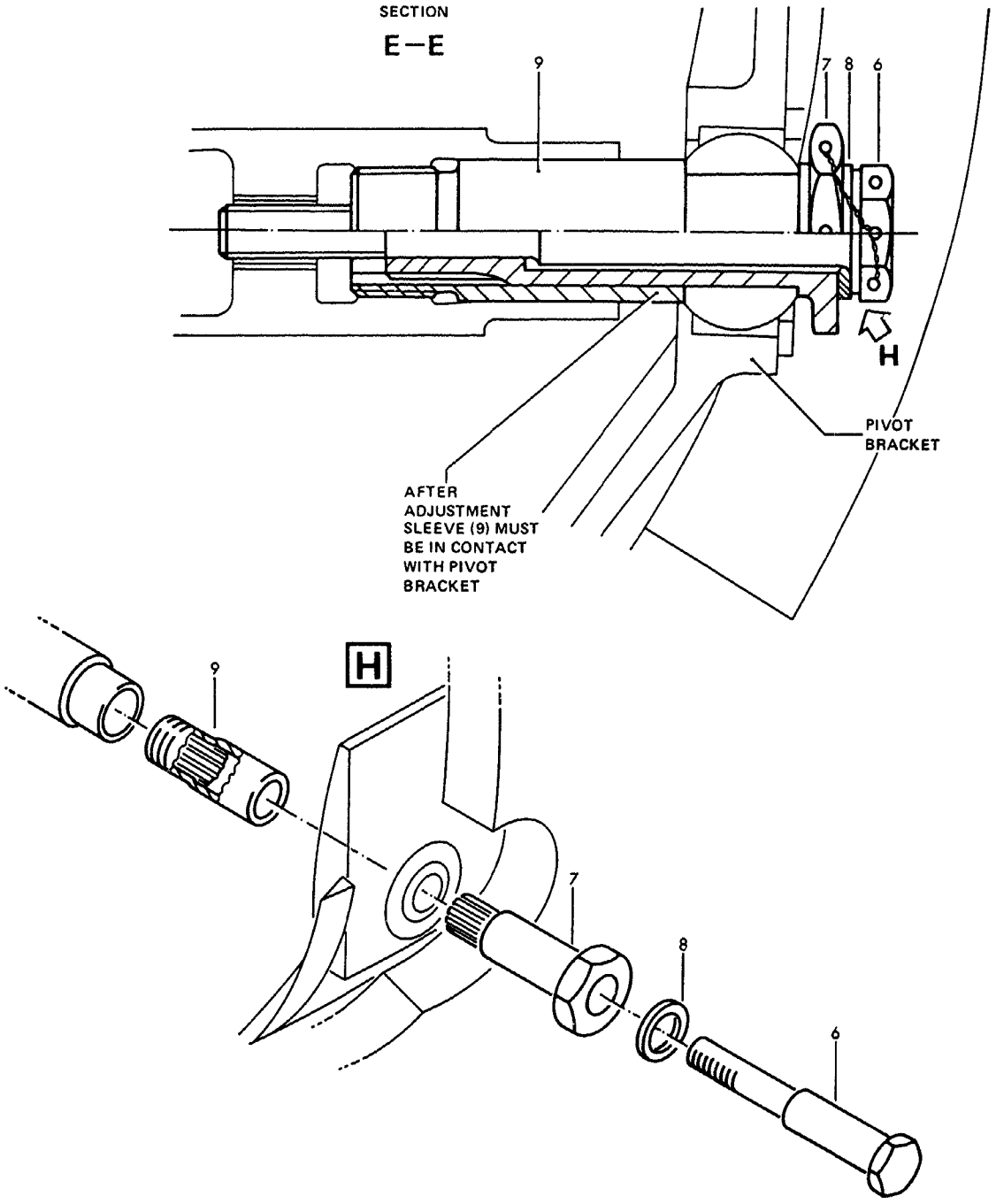
Flap Track Fairings - Removal For Access
Sheet 1/2
Figure 401



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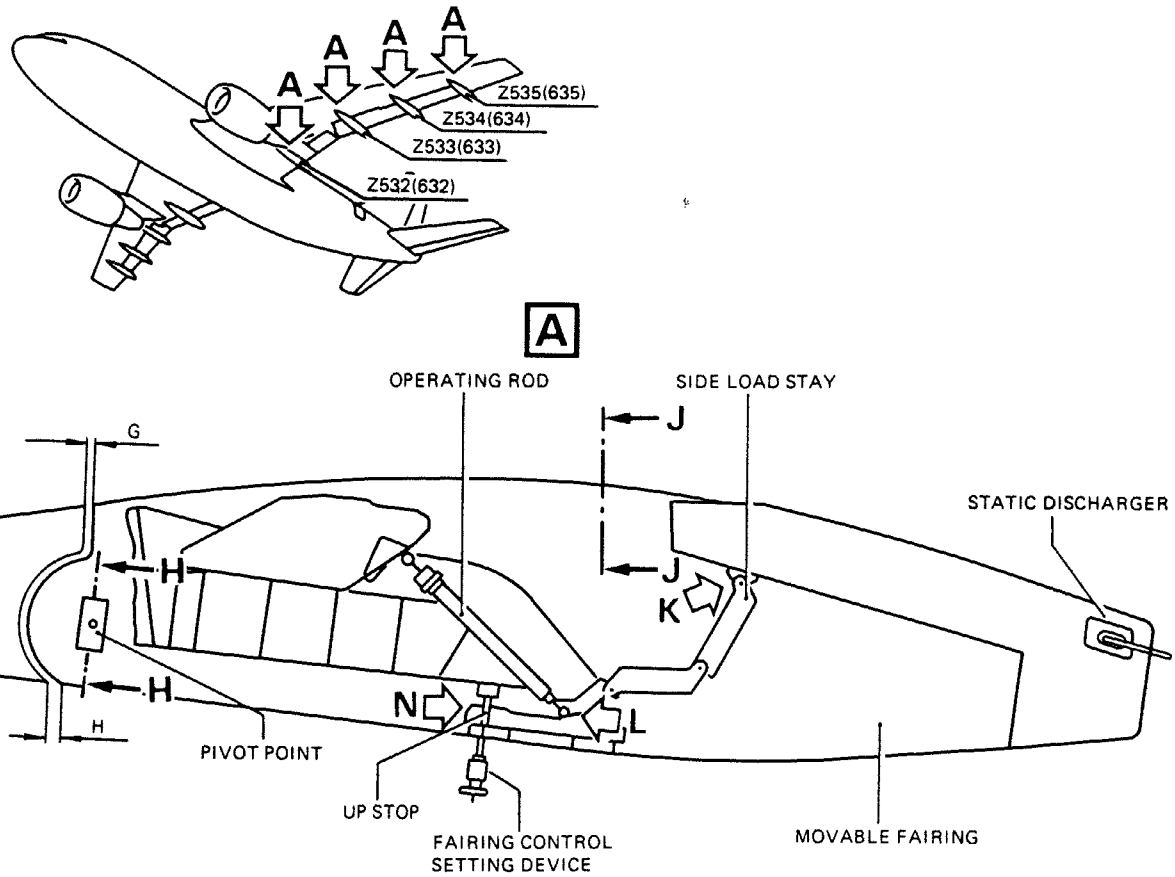
Flap Track Fairings - Removal For Access
Sheet 2/2
Figure 401



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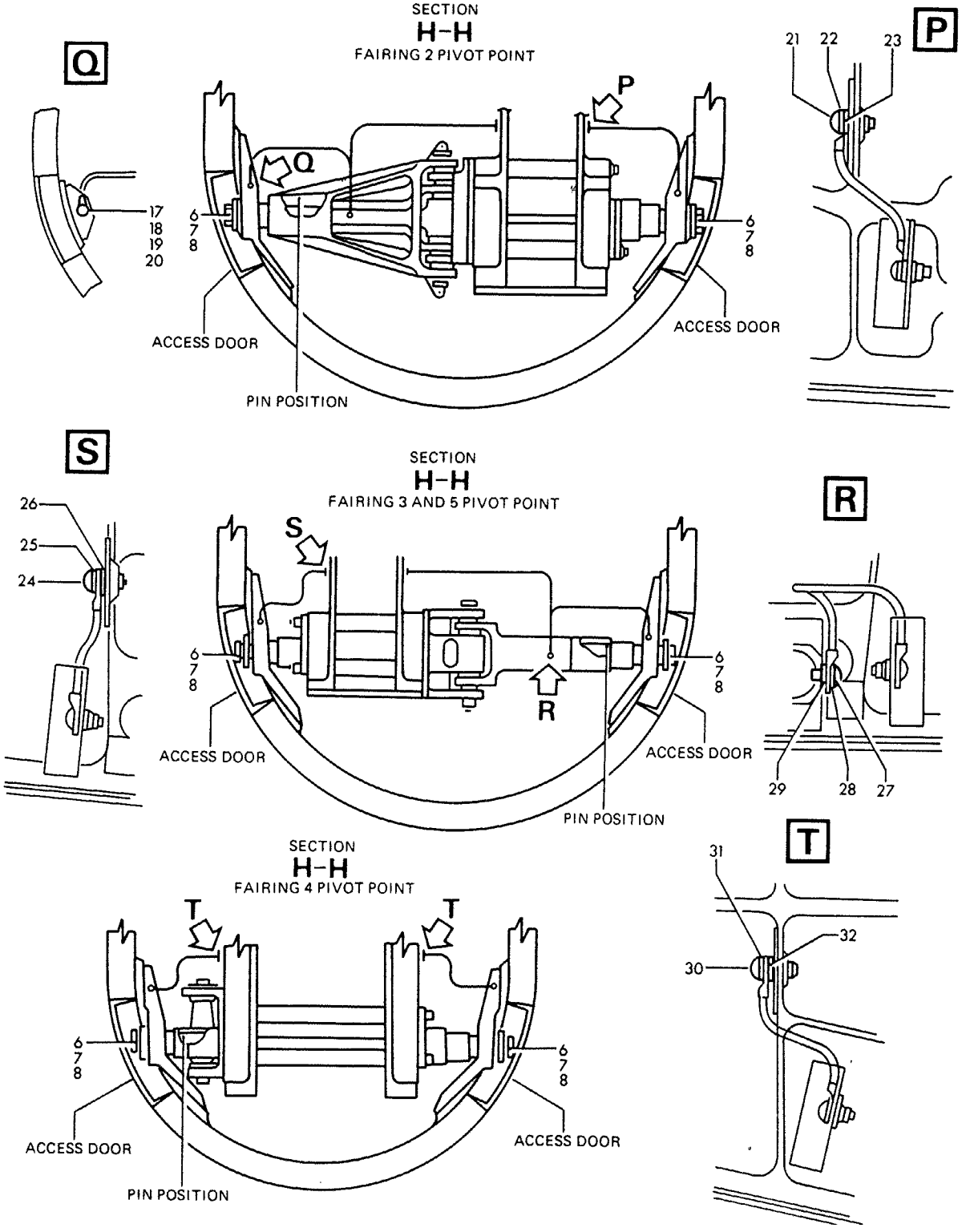
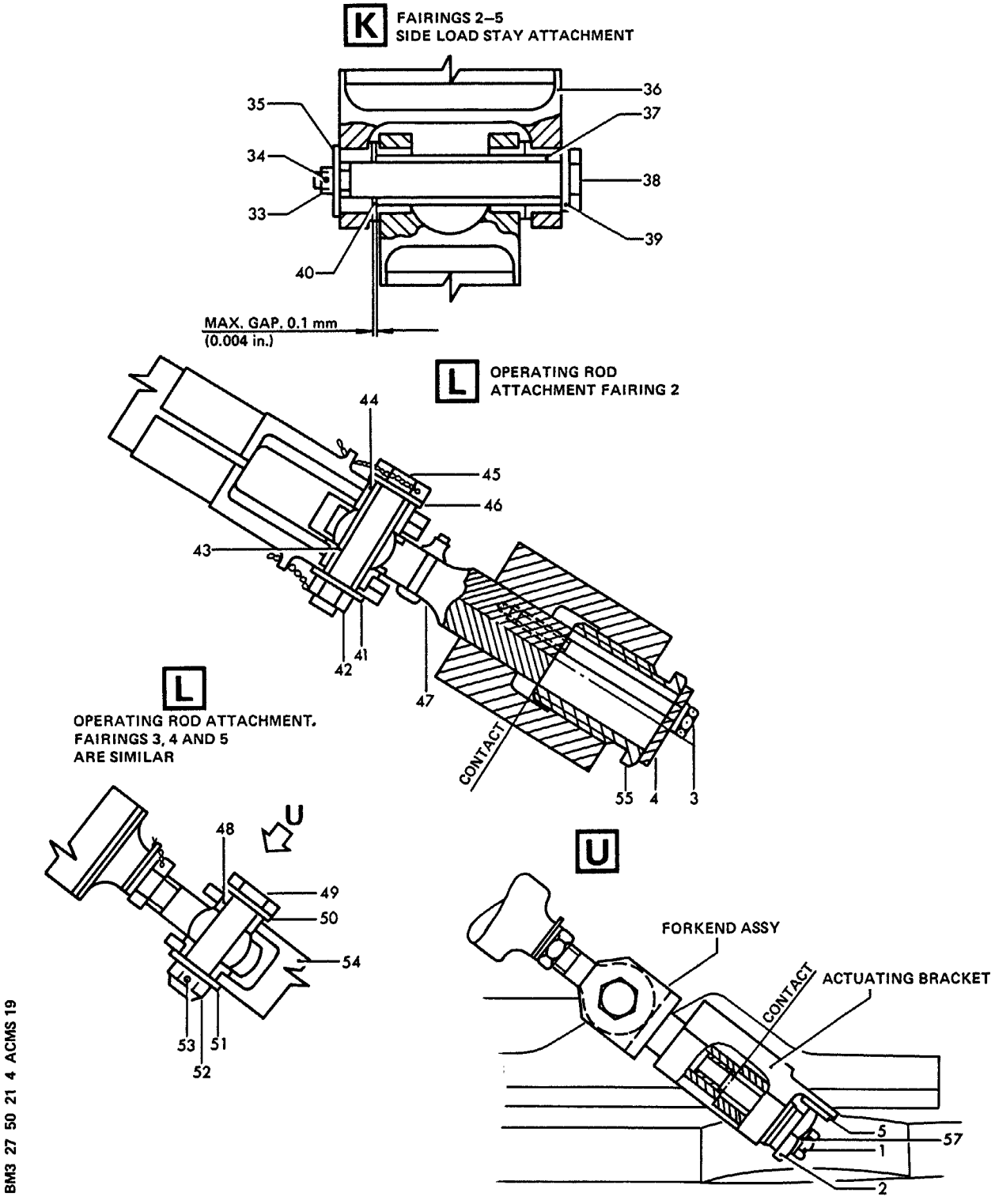
Flap Track Fairings - Attachment
Sheet 1/3
Figure 402



Flap Track Fairings - Attachment
Sheet 2/3
Figure 402



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Flap Track Fairings - Attachment
Sheet 3/3
Figure 402

(a)For fairing 2, 532 (632) AL, AR, GR and HL (GL and HR)
(b)For fairing 3, 533 (633) AL, AR, DL and FL
(c)For fairing 4, 534 (634) AL, AR, DL, EL and ER
(d)For fairing 5 (535 (635) AL, AR, DL and FL
NOTE : For further details Ref. to 06-41-57, P. Block 1.
(e)For all fairings, remove screws securing panel AT, slide panel aft and remove screw (13) and washers (12),(14) securing bonding strap. Remove panel AT from fairing.
(2)Remove fixed fairing associated with fairing being removed (Ref. 57-20-35, P. Block 401).
(3)Remove four bolts (10) and washers (11) securing side load stay upper attachment.
(4)Remove bonding straps.
(a)Fairing 2:
1 At track connection remove screw (21) and washers (22),(23).
2 At fairing bracket remove nut (17), washers (18),(19) and screws (20). Disconnect bonding strap.
NOTE : The screws at movable link bonding strap are installed with non-removable adhesive and should not be removed.
(b)Fairings 3 and 5:
At track and movable link connection remove screws (24),(27) and washers (25),(26),(28),(29). Disconnect bonding straps.
(c)Fairing 4:
At track connection remove screws (30) and washers (31),(32). Disconnect bonding straps.
(5)Cut and discard lockwire at forward pivot bolts (6) and operating strut lower attachment bolts (1),(3).
(6)Not applicable
(7)Support fairing and remove bolt (1) with washer (57) or bolts (3) with washer (4).
(8)At forward pivot point remove bolts (6) and washers (8) and withdraw hollow bolt (7).
(9)Remove fairing from aircraft.
(10)Applicable if a new fairing is being installed:
(a)At side load stay remove and discard cotter pin (34), remove castle nut (33), washer (35), bolt (38), washer (39), tube (37) and special washer (40). Disconnect side load stay upper attachment bracket (36).
(b)Fairing 2:
At operating rod lower attachment cut and discard lockwire. Remove nut (42), washer (41), bolt (45), washer (46), tube (43) and tube (44). Disconnect fork end assy (47) from operating rod.
(c)Fairings 3, 4 and 5:
NOTE : The following step applies to both operating rods at fairing 4.
At operating rod lower attachment remove and discard cotter pin (53). Remove castle nut (52), washer (51), bolt (49), washer (50) and tube (48). Disconnect fork end assy (54) from operating rod.
NOTE : New side load stay upper attachment bracket (36) and fork end assys (47),(54) are supplied with new fairing.

D. Preparation of Replacement Component (Ref. Fig. 402) (Sheets 1/3 and 3/3)

(1)Install side load stay upper attachment bracket (36) supplied with new fairing to side load stay as follows:
(a)Remove bolts (10) and washers (11) from bracket (36) (Ref. Fig. 401) (Sheet 1/2).
(b)Position bracket (36) on side load stay and install special washer (40), tube (37), washer (39), bolt (38), washer (35) and castle nut (33). TORQUE castle nut (33) to between 1.18 and 1.30 m.daN (104 and 115 lbf.in.).
(c)Make certain that gap between side load stay and bracket (36) does not exceed 0.1 mm (0.004 in.). If necessary, change thickness of special washer (40).
(d)Safety castle nut (33) with new cotter pin (34).
(2)Install fork end assy supplied with new fairing on operating rod as follows:
(a)Fairing 2:
1 Remove bolts (3) and washer (4) attaching fork end assy (47) to fairing. Withdraw fork end assy (47).
2 Apply anti-corrosion compound (Material No. 05-002) to tube (43).
3 Position fork end assy (47) on operating strut and install tubes (44),(43) and bolt (45) with washers (46),(41) and nut (42). TORQUE nut to between 1.95 and 2.2 m.daN (173 and 195 lbf.in.).
4 Safety nut (42) and bolt (45) with lockwire.
(b)Fairings 3, 4 and 5
NOTE : The following steps apply to both operating rods at fairing 4.
1 Remove bolt (1) and washer (57) attaching fork end assy (54) to fairing. Withdraw fork end assy.
2 Apply anti-corrosion compound (Material No. 05-002) to tube (48).
3 Position fork end assy (54) on operating strut and install tube (48) and bolt (49) with washers (50) (51) and nut (52). TORQUE nut (52) at fairing 4 to between 1.5 and 1.7 m.daN (132 and 150 lbf.in.). TORQUE nut (52) at fairings 3 and 5 to between 1.95 and 2.2 m.daN (173 and 195 lbf.in.).
4 Safety nut (52) with new cotter pin (53).
(3)Unscrew hollow bolt (15) until it is flush with up stop bracket.
(4)Remove screws, washers and locking plate (5).

E. Installation after Removal for Access Only (Ref. Fig. 401) (Sheets 1/2 and 2/2).
(1)Position fairing and install splined hollow bolt (7), making certain that it engages correctly with threaded sleeve (9).
(2)Apply a smear of grease (Material No. 04-004) to bolts (1) or (3), support aft portion of fairing and install:
- at fairing 2, washer (4), two bolts (3) and safety with lockwire
- at fairings 3,4 and 5, bolt (1) and washer (57), safety bolt (1) with lockwire (at fairing 4, if bolts (1) and threaded bushes are provided with lockwire holes).
(3)Apply sealant (Material No. 09-016) to mating surfaces of side load stay upper attachment.
(4)Connect side load stay upper attachment to fairing structure, secure using washers (11) and bolts (10). TORQUE bolts (10) to between 0.15 and

0.17 m.daN (13.3 and 15 lbf.in.).
(5)Connect bonding straps at forward pivots as detailed in step F.(8) below.
(6)Not applicable
(7)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(8)Install fixed fairing sections (Ref. 57-20-35, P. Block 401).
(9)Check dimension 'X' (Ref. Fig. 401) (Sheet 1/2; section D-D) ±1.27 mm (±0.05 in.)
NOTE : Dimension 'X' at the upper 50 mm (2 in.) of the gap (section C-C) should be ±3 mm (±0.12 in.).
(10)If dimensions detailed in (9) are not obtained, adjust as required by rotating splined hollow bolt (7), making certain that sleeve (9) remains in contact with inner surface of pivot point.
(11)Apply a smear of grease (Material No. 04-004) to bolt (6) and install in splined hollow bolt (7).
(12)Tighten bolt (6), making certain that splined hollow bolt (7) does not rotate.
(13)TORQUE bolt (6) to between 1.4 and 1.6 m.daN (124 and 142 lbf.in.) and safety with lockwire.
(14)Position access panel AT on fairing, slightly aft of installed position, connect bonding strap securing with washers (12),(14) and screw (13) (Ref. 20-28-11, P. Block 1).
(15)Install access panel AT.
(16)Install access panels removed at step B.(1) above.

F. Installation of Replacement Fairings (Ref. Fig. 401) (Sheets 1/2 and 2/2) (Ref. Fig. 402) (Sheets 1/3, 2/3 and 3/3)
(1)Install threaded sleeves (9) at pivot points making certain that they contact the links.
(2)Secure movable link assembly in neutral position using mounting pin PN 98A27508021200 at fairings 2, 3 and 5; mounting pin PN 98A27508021500 at fairing 4.
NOTE : The mounting pins are content of flap fairing mounting pin set PN 98A27508021000.
(3)Position movable fairing at pivot points and install hollow bolts (7), LH and RH making certain that they engage correctly with threaded sleeves (9).
(4)Remove mounting pins using extractor PN 98A27508021300.
(5)Install washers (8) and bolts (6) at LH and RH pivot points. Do not tighten at this stage.
(6)Apply grease (Material No. 04-004) to spigot of fork end assy.
(7)Insert spigot of fork end assy into actuating bracket and install bolt (1) with washer (57) or bolts (3) with washer (4). Do not tighten bolts at this stage.
(8)Install bonding straps between movable fairing and link assy and track as follows:
NOTE : Installation of bonding straps must be performed in accordance with 20-28-11, P. Block 1.
(a)Fairing 2
1 Install bonding strap at fairing bracket using screw (20), washers (18),(19) and nut (17).
2 Install bonding strap at track using screw (21) and washers (22),

(23).
3 Apply protective film (Material No. 05-027) on electrical bonding connections.
(b)Fairings 3 and 5
1 Position bonding strap between fixed link and track and install screws (24) with washers (25),(26).
2 Position bonding strap between movable link and track and install screws (27) with washers (28),(29).
3 Apply protective film (Material No. 05-027) on electrical bonding connections.
(c)Fairing 4
1 Position bonding strap on track and install screws (30) with washers (31),(32).
2 Apply protective film (Material No. 05-027) on electrical bonding connections.
(9)Not applicable
(10)Apply sealant (Material No. 09-016) to mating surfaces of side load stay upper attachment.
(11)Connect side load stay upper attachment to fairing structure using washers (11) and bolts (10). TORQUE bolts (10) to between 0.15 and 0.17 m.daN (13.3 and 15 lbf.in.).
(12)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(13)Adjust movable fairing using control setting device PN 98A27508011000.
(a)Remove handwheel and threaded spindle from control setting device.
(b)Remove hollow bolt (16) and nut (15).
(c)Install threaded spindle in slotted hole of track.
(d)Apply grease (Material No. 04-004) to hollow bolt (16) and nut (15) and install on fairing.
(e)Install control setting device on fairing.
(f)Remove threaded sleeve (2 or 55) from actuating bracket.
(g)Turn handwheel of control setting device and adjust fairing until dimension 'Z' = 11.6 ±3 mm (0.456 ±0.118 in.) is obtained.
(h)Bring hollow bolt (16) into contact with track and lock with nut (15).
(i)TORQUE nut (15) to max 4.52 m.daN (398 lbf.in.)
(j)Bring threaded sleeve (2 or 55) into contact with spigot of fork end assy (47 or 54). Loosen threaded sleeve at fairing 2 by 180°; at fairings 3, 4 and 5 by 360°.
(k)Install locking plate (5) with screws and washers.
(l)Install bolt (1) with washer (57) or bolts (3) with washer (4), safety bolts (3) (at fairing 2 only) and bolts (1) with lockwire (at fairing 4, if bolts (1) and threaded bushes are provided with lockwire holes).
(m)Remove control setting device.
(n)Safety hollow bolt (16) and nut (15) with lockwire.
(14)Install fixed fairing (Ref. 57-20-35, P. Block 401).
(15)Check dimensions 'G' and 'H'
at fairing 2
'G' = minimum 2 mm (0.078 in.); maximum 9 mm (0.354 in.)
'H' = minimum 6 mm (0.234 in.); maximum 11 mm (0.429 in.)
at fairings 3,4 and 5
'G' = minimum 2 mm (0.078 in.); maximum 6 mm (0.234 in.)

'H' minimum 6 mm (0.234 in.); maximum 11 mm (0.429 in.)

(16)Check lateral loft offset between fixed and movable fairing and adjust at LH and RH pivot points as follows (Ref. Fig. 401) (Sheets 1/2 and 2/2):

(a)Make certain that threaded sleeve (9) is in contact with pivot bracket. If not, turn threaded sleeve (9) as necessary using hollow bolt (7).

(b)Check dimension 'X' (Ref. Fig. 401) (Sheet 1/2; section D-D): 'X' = ±1.27 mm (±0.05 in.)

NOTE : Dimension 'X' at the upper 50 mm (2 in.) of the gap (section C-C) should be ±3 mm (±0.12 in.).

(c)Rotate hollow bolt (7) as necessary to position movable fairing leading edge correctly in relation to fixed fairings dimension 'X' (Ref. Fig. 401) (Sheets 1/2 and 2/2).

(d)Install washer (8) and bolt (6). TORQUE bolt (6) to between 1.4 and 1.6 m.daN (124 and 142 lbf.in.) and safety with lockwire.

G. Test

(1)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV and 10CV.

(2)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).

(3)Check that movable fairing connections and actuating components function correctly when flaps are extending.

(4)Fully retract flaps (Ref. 27-50-00, P. Block 301).

(5)Check that movable fairing connections and actuating components function correctly when flaps are retracting.

H. Close-Up

(1)Install access panels.

(2)Remove access platform.

(3)Remove safety barriers and warning notices.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Flap Track Fairings - General Check

A. Reason for the Job

(1)To inspect flap track fairings for general condition and security of attachment.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.5 to 4.6 m (11 to 15 ft.)
R (2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
(3)	Circuit Breaker Safety Clips and Tags
(4)	Safety Barriers

Referenced Procedure

- 27-50-00, P. Block 301	Flaps

C. Procedure

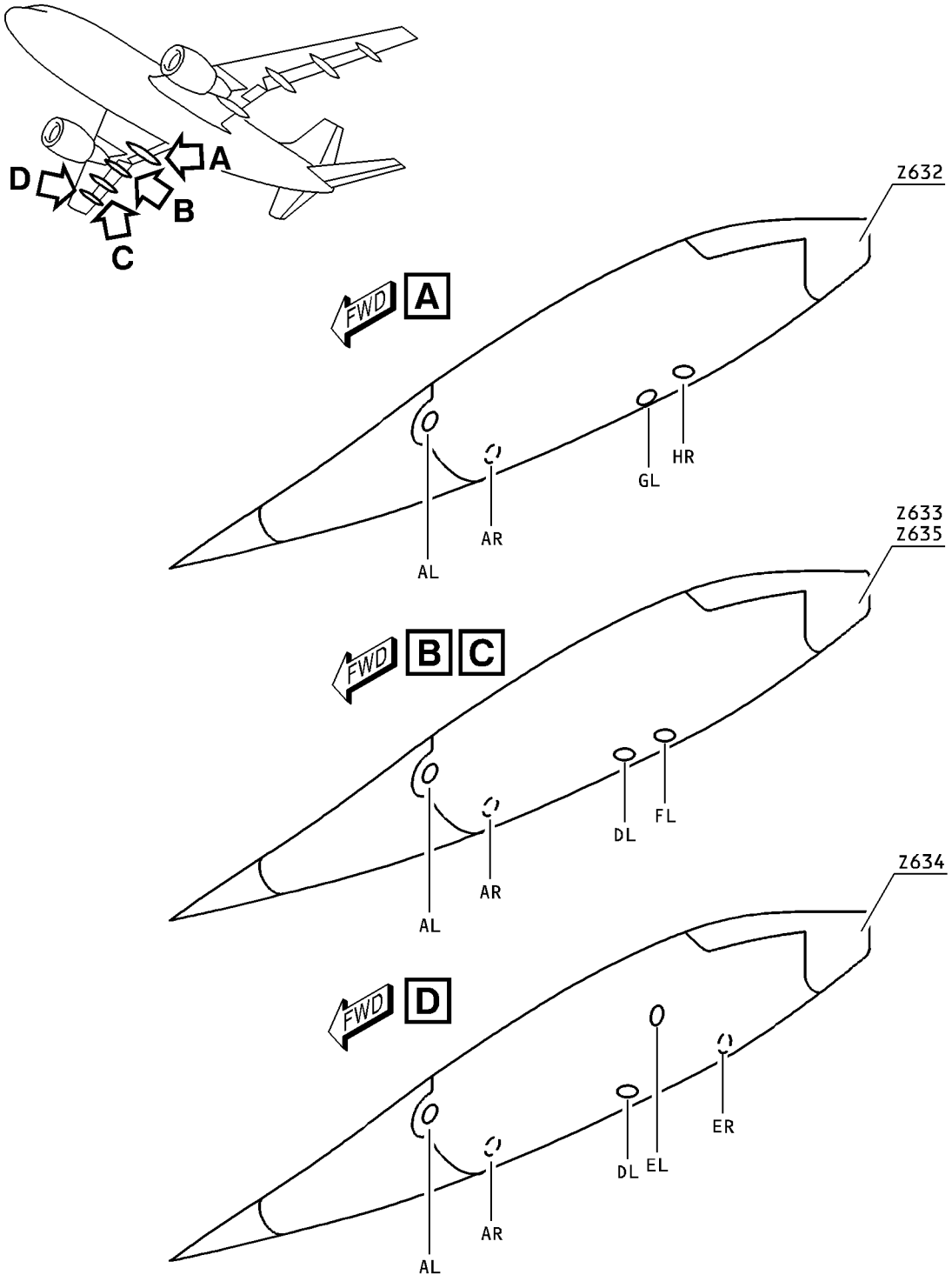
(Ref. Fig. 601)
(Ref. Fig. 602)

(1)Job Set-Up

(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00 P. Block 301).
(c)Install safety guard on flap/slat control lever quadrant.
(d)Open safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.
(f)Remove the following access panels from flap track fairings 2,3,4,5:



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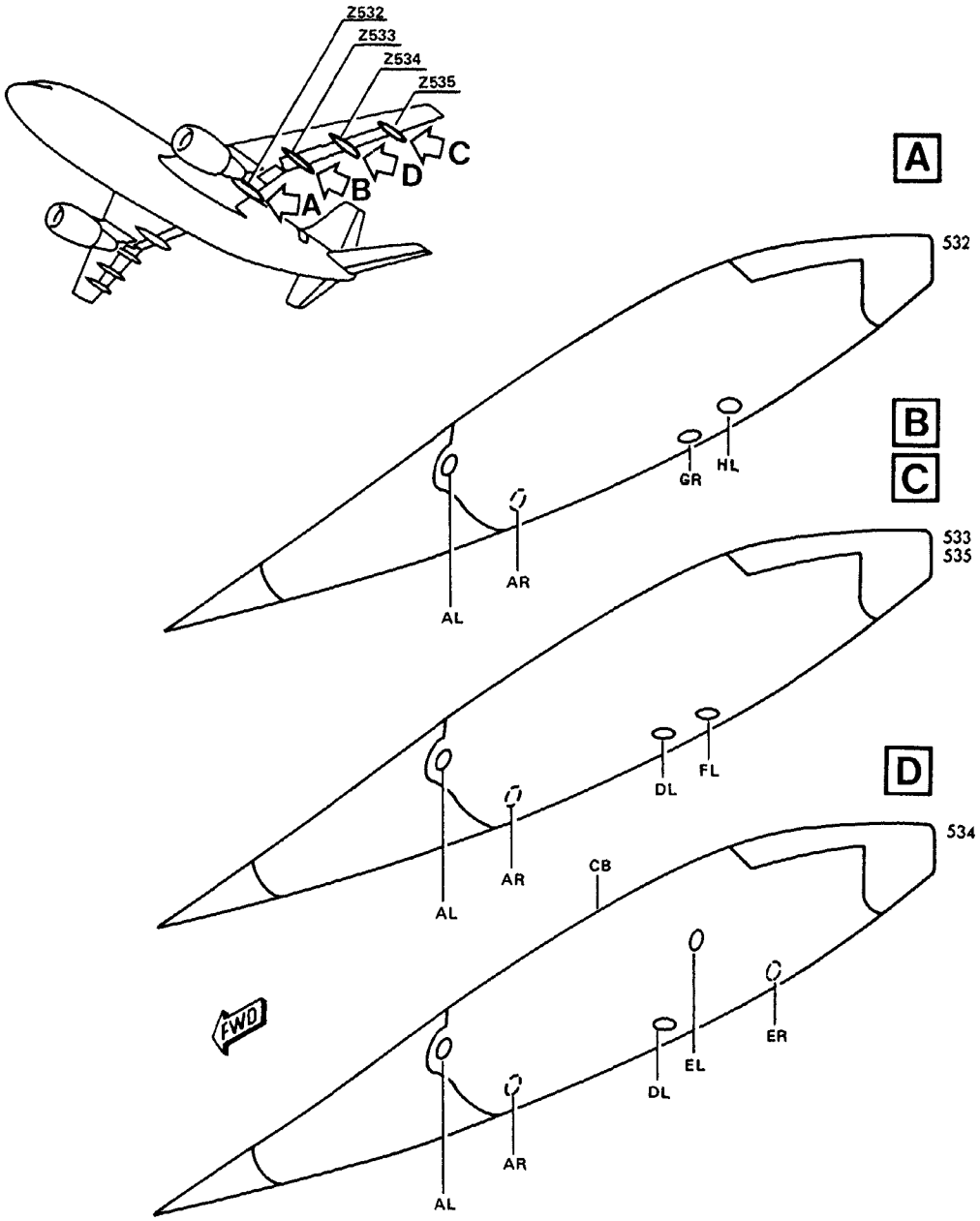
Flap Track Fairings
Figure 601

R



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Flap Track Fairings
Figure 602

1 Flap track fairing 2: 532AL (632AL), 532AR (632AR), 532GR (632GL) and 532HL (632HR).
2 Flap track fairing 3: 533AL (633AL), 533AR (633AR), 533DL (633DL) and 533FL (633FL).
3 Flap track fairing 4: 534AL (634AL), 534AR (634AR), 534DL (634DL), 534EL (634EL) and 534ER (634ER).
4 Flap track fairing 5: 535AL (635AL), 535AR (635AR), 535DL (635DL) and 535FL (635FL).

(2)Inspection/Check
(a)Inspect each flap track fairing for corrosion, cracks or other damage.
(b)Inspect inner contours of fairings for evidence of chafing.
(c)At attachment points check that
- all nuts and bolts are properly tightened.
- all nuts and bolts are in satisfactory condition (no corrosion).
(d)Check that bonding straps and attachments are in satisfactory condition (no fraying or corrosion) and are properly connected.
(e)Check that all safetying devices are intact.

(3)Close-Up
(a)Install access panels.
(b)Remove access platform.
(c)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(d)Remove safety guard from flap/slat control lever quadrant.
(e)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).
(f)Remove safety barriers.
(g)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

R 2. Flap Track Movable Fairings - Special Inspection of Internal and External Surfaces

R A. Reason for the Job
R To inspect the internal and external surfaces of the fairing for
R contamination by moisture and/or hydraulic fluid.

R (1)Do a pencil hardness test on the inner surface of the flap track movable
R fairings.
R (2)Do the corrosion pressure test on the outer surface of the flap-track
R movable fairings.

R B. Pencil Hardness Test

R (1)Equipment and Materials

R ITEM	DESIGNATION
R (a)	Abrasive Paper 400 grit or finer
R (b)	Felt-Tip Pen
R (c)	Pencils, grades 2H, 4H, 6H and 8H

R Referenced Procedure
R - 27-50-21, P. Block 401 Flap Track Fairings
R - 27-50-21, P. Block 701 Flap Track Fairings
R - 51-10-09, P. Block 101 NTM - Visual Inspection
R - 57-20-35, P. Block 201 SRM - Flap Track Fairings

R (2)Procedure
R (Ref. Fig. 603)

R (a)Job Set-Up
R 1 Remove the applicable movable fairing (Ref. 27-50-21, P. Block 401).
R 2 Make sure that the fairing is clean and dry (Ref. 27-50-21, P. Block 701).
R 3 Square the tip of each pencil as follows:
R a Hold the pencil in a vertical position.
R b Move the pencil forward and backward across the abrasive paper.

R NOTE : The tip of each pencil must be kept square throughout the test by frequent use of the abrasive paper.

R 4 Put the fairing to be tested in a horizontal position.
R 5 Do the hardness test with the pencils in the order type 8H first, then, 6H, 4H and 2H.

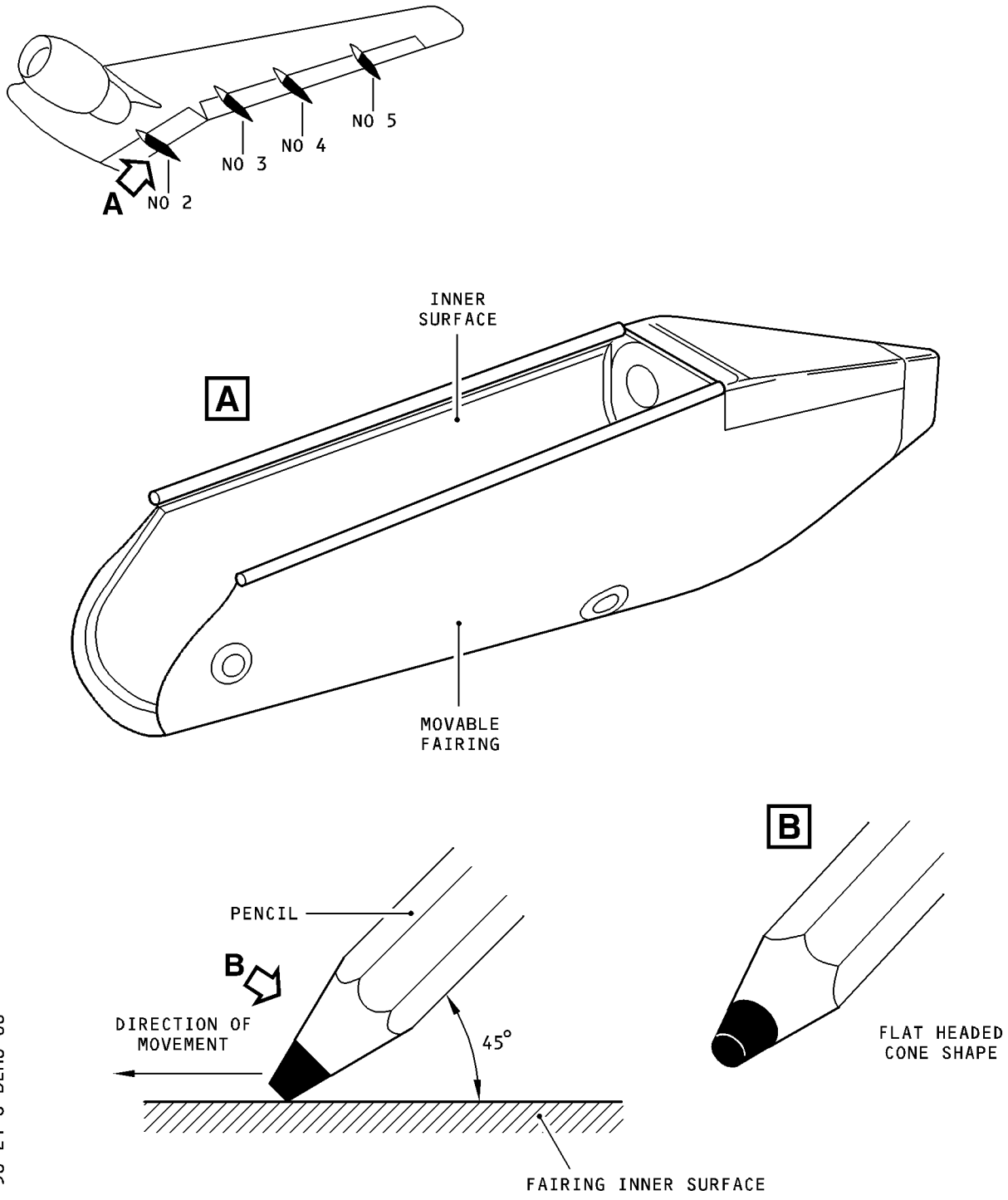
R NOTE : Pencil type 8H is the hardest pencil and type 2H is the softest pencil.

R (b)Procedure

R NOTE : Do the pencil hardness test immediately after cleaning the fairing.

R 1 Hold the 8H pencil at a 45 degree angle and with a firm, steady pressure, push it across the surface of the fairing. Move the pencil parallel to the fiber direction of the surface ply.
R 2 Do step (b) (1) again, with each grade of pencil in the correct order of pencil hardness. When the fairing surface has been cut or scratched, note the type of pencil used.
R 3 For fairing No. 2:
R a Do the test over the whole of the inner surface of the fairing, with a grid pattern of 50 mm (2 in).
R b Use a felt-tip pen to mark each grid with the grade of pencil that did not cut or scratch the fairing surface.
R 4 For fairing Nos. 3 thru 5:
R a Do the test on suspected areas detected by the visual inspection (Ref. NTM 51-10-09, P. Block 101), with a grid pattern of 50 mm (2 in.).
R b Use a felt-tip pen to mark each grid with the grade of pencil that did not cut or scratch the fairing surface.

R (c)Evaluation procedure



Pencil Hardness Test - Movable Fairing
Figure 603

R

R 1 The areas of damage to the fairing hardness are put into groups in
R table 401.

R NOTE : The fairing hardness is the hardness of the pencil that
R did not cut or scratch the fairing surface.

PENCIL HARDNESS	2H - 4H	6H	8H
DEGREE OF SURFACE ATTACK BY SKYDROL	HEAVY	LIGHT	NONE

Table 401

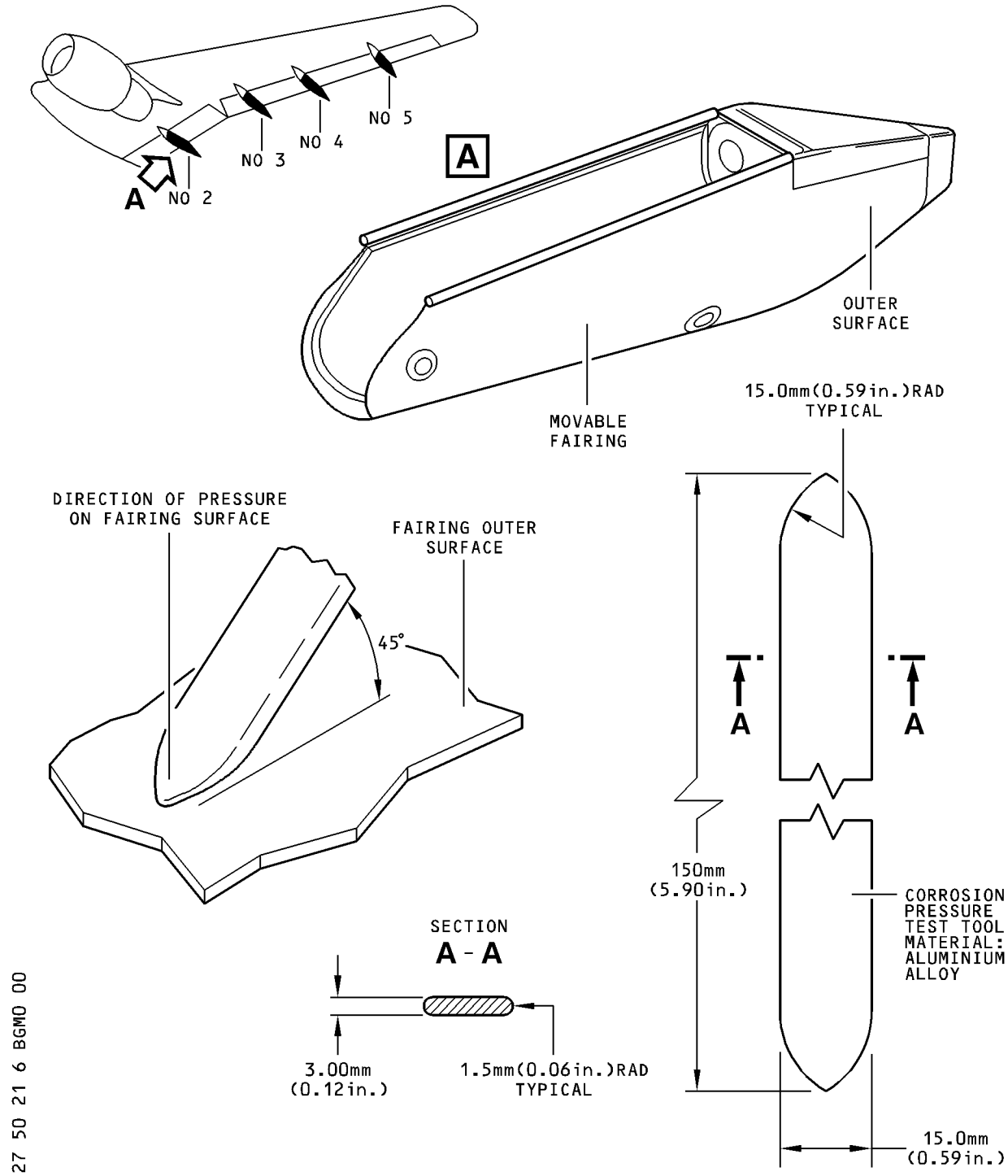
R 2 Use a felt-tip pen to mark the areas of light and heavy attack on the
R fairing.
R 3 Repair the fairing as required, (Ref. SRM 57-20-35, P. Block 201).
R (d)Close-Up
R 1 Install the applicable movable fairing (Ref. 27-50-21, P. Block 401).
R 2 Make sure that the work area is clean and clear of tools and
R miscellaneous items of equipment.

R C. Corrosion Pressure Test
R (1)Equipment and Materials

R ITEM	DESIGNATION
R (a)	Corrosion Pressure Test Tool (Local Manufacture)
R (b)	Felt-Tip Marker Pen

R Referenced Procedure
R - 27-50-21, P. Block 401 Flap Track Fairings
R - 27-50-21, P. Block 701 Flap Track Fairings
R - 51-10-09, P. Block 101 NTM - Visual Inspection
R - 57-20-35, P. Block 201 SRM - Flap Track Fairings

R (2)Procedure
R (Ref. Fig. 604)
R (a)Job Set-Up
R 1 Remove the applicable movable fairing (Ref. 27-50-21, P. Block 401).
R 2 Make sure that the fairing is clean and dry (Ref. 27-50-21,
R P. Block 701).
R (b)Procedure
R 1 Carefully push the end of the corrosion-pressure test tool against
R the surface of the fairing, with a grid pattern of 25 mm (1 in.).
R Do a very careful check of the potted areas that follow:
R - around hinges
R - rubbing plates
R - around brackets and fasteners,



Corrosion Pressure Test - Movable Fairing
Figure 604

R

R and in suspected areas detected by visual inspection (Ref. NTM
R 51-10-09, P. Block 101).
R 2 Use a felt-tip pen to mark the areas where core corrosion has been
R found.

R NOTE : Core corrosion is where the surface of the movable fairing can
R be pushed (in) easily without damage to the surface being
R caused.

R (c)Evaluation procedure
R 1 In areas where the surface cannot be pushed (in) easily, the core will
R be in good condition.
R 2 In areas where the surface can be pushed (in) easily without damage to
R the surface, the core is corroded.
R 3 Repair the fairing as required, (Ref. SRM 57-20-35, P. Block 201).
R (d)Close-Up
R 1 Install the applicable movable fairing (Ref. 27-50-21, P. Block 401).
R 2 Make sure that the work area is clean and clear of tools and
R miscellaneous items of equipment.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. General

WARNING : DO NOT INGEST LIQUIDS. DO NOT INHALE FUMES. DO NOT ALLOW THE MATERIALS TO CONTACT YOUR SKIN OR SPLASH INTO YOUR EYES.

A. Obey the manufacturer's instructions when you work with cleaning materials.

B. Observe the general safety precautions that follow:
- Comply with the applicable local regulations.
- Apply the cleaning materials in well ventilated areas.
- Wear an apron, protective gloves, and goggles or a face mask.

C. In case of excessive fume inhalation, move to fresh air and obtain medical aid. Do not walk the patient about.

D. If the skin is contaminated, immediately wash it off with water.

E. If the eyes are contaminated, rinse the eyes with water and get medical aid.

2. Reason for the Job

A. To clean the flap-track movable fairing.

B. To do a pre-bond clean of a damaged area of flap-track movable fairing.

C. To do a water break test of the flap-track movable fairing.

D. To dry the flap-track movable fairing.

3. Equipment and Materials

ITEM	DESIGNATION
A.	Brush, Soft Bristle
B.	Brush, Stiff Bristle
C.	Cotton Gloves
D.	Container, 10 liter (2.6 US gal)
E.	De-ionised or distilled water, 0.5 liter (0.13 US gal)
F.	Hose connected to the normal mains-water system
G.	Lint-Free Cleaning Cloths
H.	Masking Film, made of Polyethylene, Polyester, FEP or Nylon
J.	Masking Tape, Polyester, Nylon or PTFE with a rubber-based or fully cured silicone adhesive
K.	Oven, Air-Circulated
L.	Polyethylene Bottle, 1 liter, with a small spray nozzle
M.	Polyethylene Cover
N.	Pressure-Sensitive Adhesive tape
P.	Protective Apron
Q.	Protective Gloves
R.	Protective Goggles or Face Mask
S.	Scotch Brite, Very Fine
T.	Spatula - Soft plastic
U.	Vacuum Cleaner
V. Material No. 11-001A	Cleaning Agents (Ref. 20-31-00)
W. Material No. 11-010	Cleaning Agents (Ref. 20-31-00)
Referenced Procedure	
- 27-50-21, P. Block 401	Flap Track Fairings
- 27-50-21, P. Block 601	Flap Track Fairings

4. Procedure

A. Job Set-Up
(1)Remove the applicable flap-track movable fairing (Ref. 27-50-21, P.Block 401).

B. General Cleaning
(1)Examine the fairing for obvious damaged areas which are to stay dry during the cleaning procedure.
(2)Use a clean lint-free cloth to remove all moisture and dirt in and around the damaged area(s).
(3)Use a clean lint-free cloth moistened with cleaning agent (Material No. 11-010) to clean in and around the damaged area(s).
(4)Cover the damaged area(s) with masking film.
(5)Smooth the masking film to the shape of the damaged area(s).
(6)Hold each corner of the masking film in position with small pieces of adhesive tape.

(7)Put adhesive tape along all the edges of the masking film. If the masking film is folded, hold down the fold with a piece of adhesive tape. Make sure that the tape around the edges covers the edge of the masking film at the fold.
(8)Use a soft plastic spatula or your fingers to press down on the surface of the adhesive tape. Push any air bubbles to the edge and out.
(9)Make sure that the edges of the masking film are firmly held down with adhesive tape so that water can not get into the damaged area(s).

C. Cleaning the Non-damaged Area of the Fairing.

WARNING : OBEY THE APPLICABLE SAFETY PRECAUTIONS.

(1)Use lint-free cloths to clean the fairing as much as possible.
(2)Prepare the cleaning solution in a suitable container in accordance with the manufacturer's instructions. Use a mixing ratio of 1:10 up to 1:20 cleaning agent (Material No. 11-001A) to water. For very greasy areas use a mixing ratio of 1:2 cleaning agent (Material No. 11-001A) to water.
(3)Use a soft bristle brush to apply the cleaning solution to the inside and outside of the fairing. For the cleaning solution to take effect it must stay on the fairing for 15 minutes.
(4)Use a stiff bristle brush or a cloth to scrub the wet surface of the fairing.

CAUTION : WHEN YOU USE A HOSE TO RINSE THE CLEANING SOLUTION OFF THE FAIRING, MAKE SURE THAT, TO PREVENT DAMAGE TO THE FAIRING:
- THE WATER PRESSURE IS NOT MORE THAN 0.1 BAR (1.5 psi)
- YOU HOLD THE HOSE AT LEAST 300 mm (12 in) AWAY FROM THE SURFACE OF THE FAIRING.

(5)Use a hose and clean mains water to rinse the cleaning solution off the fairing. Do not use pressurized water or more water than necessary to remove the cleaning solution.
(6)In areas of extensive contamination or if the fairing is still not clean, do the cleaning procedure again.
(7)Use clean, dry, lint-free cloths to carefully dry the fairing at ambient temperature between 15 and 25 deg. C. (60 and 77 deg. F.).

D. Pre-bond Cleaning and Surface Cleanliness Check.

WARNING : OBEY THE APPLICABLE SAFETY PRECAUTIONS.

(1)Clean the fairing in accordance with para 4.B. thru C. before pre-bond cleaning.

CAUTION : WHEN YOU USE SCOTCH BRITE TO SMOOTH THE SURFACE, DO NOT DAMAGE THE FIBERS.

(2)Use very fine Scotch Brite to smooth the area to be bonded.

CAUTION : DO NOT USE COMPRESSED AIR TO REMOVE THE DUST AS YOU MAY DAMAGE

THE FAIRING.

(3)Use a vacuum cleaner to remove the dust.
(4)Use a clean lint-free cloth moistened with cleaning agent (Material No. 11-010) to wipe the surface of the area to be bonded plus a radius of approximately 100 mm (4 in.) beyond it.
(5)Immediately after applying the cleaning agent, use a new clean, dry, lint-free cloth to wipe the area before the cleaning agent evaporates.
(6)Do the procedure again until a clean part of the cloth stays clean after the area has been wiped.
(7)Do the last wipe of the area with a clean, dry lint-free cloth.
(8)Let the fairing dry for between 15 and 45 minutes at ambient temperature between 15 and 25 deg. C. (60 and 77 deg. F.).

E. Water Break Test

NOTE : A water break test is done to find out if:
- any oil or grease stays on the surface of the area to be bonded when the cleaning has been completed
- the area can be bonded satisfactorily.

(1)Put the distilled or de-ionised water into a clean, polyethylene bottle that has a small spray nozzle.
(2)Spray the water onto the surface to be bonded until the surface is just covered, or use a clean lint-free cloth moistened with distilled or de-ionised water and wipe over the surface to be bonded to leave a thin film of water.
(3)Look at the water on the surface. The water should form a continuous, thin layer over the surface with no areas where the surface tension causes the water to separate into drops or beads. The water should cover all of the surface under test.
(4)Leave the water on the surface for 30 seconds, the water should stay on all of the surface. If the water separates, or drops or beads form within the 30 seconds, then do the pre-bond cleaning procedure again, ref. para 4.D.. Do the water break test again, ref. para 4.E..
(5)Use a clean, dry, lint-free cloth to dry the area.
(6)Let the fairing dry for between 30 minutes and 12 hours at ambient temperature between 15 and 25 deg. C. (60 and 77 deg. F.).

NOTE : Use clean cotton gloves if you need to touch the cleaned area after a satisfactory water break test.

(7)If no repair has started within one hour, put the polyethylene cover over the fairing to protect the surface from contamination.
(8)To prevent contamination, bonding must begin within 12 hours of the pre-bond cleaning procedure. If bonding is not started within 12 hours then do the pre-bond cleaning procedure and the water break test again, ref. paras. 4.D and 4.E.

F. Dry the Fairing

(1)Dry the fairing to get a bondable surface, in an air-circulated oven for one of the times that follows:
- 4 hours at 60 deg. C. (140 deg. F.) or,
- 2 hours at 70 deg. C. (160 deg. F.) or,
- 1 hour at 80 deg. C. (175 deg. F.).

(2)After drying, do a visual check of the fairing surface for contamination. If signs of skydrol contamination appear on the fairing then do the inspection procedure (Ref. 27-50-21, P. Block 601).

NOTE : During drying, the surface of the fairing can be contaminated by absorbed skydrol.

FLAP TRACK FAIRINGS - DEACTIVATION/REACTIVATION

Ref.: CDL Sect. 6.01.01, Chap 27 Item 1
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE CDL.
FLAP TRACK FIXED FAIRINGS MUST NOT BE REMOVED WITHOUT ALSO REMOVING MOVABLE FAIRING.
MOVABLE FAIRING MAY BE REMOVED WITHOUT REMOVING FIXED FAIRINGS.

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2 to 3.5 m (6.5 to 11.5 ft.)
(2)	Red Tie-Wraps

Referenced Procedures

- 27-50-21, P. Block 401	Flap Track Fairings
- 27-50-22, P. Block 401	Fairing Operating Rod
- 27-50-23, P. Block 401	Fairing Side Load Stay
- 27-50-24, P. Block 401	Fairing Link Assy
- 57-20-35, P. Block 401	Fillets and Fairings

B. Procedure

(1) Job Set-Up
  (a) Position access platform.

(2) Deactivation
  (a) Remove appropriate fixed fairing (only if necessary) (Ref. 57-20-35, P. Block 401).
  (b) Remove movable fairing (Ref. 27-50-21, P. Block 401).
  (c) Remove fairing operating rod (Ref. 27-50-22, P. Block 401).
  (d) Remove fairing side load stay (Ref. 27-50-23, P. Block 401).
  (e) Remove fairing link assy (Ref. 27-50-24, P. Block 401).

(3) Close-Up
  (a) Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
  (b) Remove access platform.
  (c) Install a temporary warning notice in flight compartment to warn flight crew that movable (and fixed) fairing(s) No. 2 (3,4,5) is (are) removed and that aircraft performance is consequently degraded to the limits given in the CDL.
  (d) Make an entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2 to 3.5 m (6.5 to 11.5 ft.)

Referenced Procedures

- 27-50-21, P. Block 401	Flap Track Fairings
- 27-50-22, P. Block 401	Fairing Operating Rod
- 27-50-23, P. Block 401	Fairing Side Load Stay
- 27-50-24, P. Block 401	Fairing Link Assy
- 57-20-35, P. Block 401	Fillets and Fairings

B. Procedure

(1)Job Set-Up

(a)Position access platform.

(2)Reactivation

(a)Install fairing link assy (Ref. 27-50-24, P. Block 401.

(b)Install fairing operating rod (Ref. 27-50-22, P. Block 401).

(c)Install fairing side load stay (Ref. 27-50-23, P. Block 401).

(d)Install flap track movable fairing (Ref. 27-50-21, P. Block 401).

(e)If removed, install fixed fairing, (Ref. 57-20-35, P. Block 401).

(3)Close-Up

(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(b)Remove access platform.

(c)Remove temporary **DEACTIVIATION** warning notice from flight compartment.

(d)Record reactivation in aircraft technical log.

FAIRINGS OPERATING ROD - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE SURFACES THEY OPERATE.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 to 4 m (10 to 16 ft.)
B.	Torque Wrench, 1.2 m.daN (106 lbf.in.) to 1.35 m.daN (119 lbf.in.)
C.	Torque Wrench, 1.5 m.daN (132 lbf.in.) to 1.7 m.daN (150 lbf.in.)
D.	Torque Wrench, 1.95 m.daN (172.6 lbf.in.) to 2.2 m.daN (195 lbf.in.)
E.	Warning Notice Prohibiting the Pressurization of Hydraulic Systems
F.	Safety Barriers
G.	Circuit Breaker Safety Clips and Tags
H.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
I.	Cotter Pins
J. Material No. 05-002	Special Materials (Ref. 20-31-00)
K. Material No. 09-015	Sealants (Ref. 20-31-00)
Referenced Procedure	
- 27-50-00, P. Block 301	Flaps

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

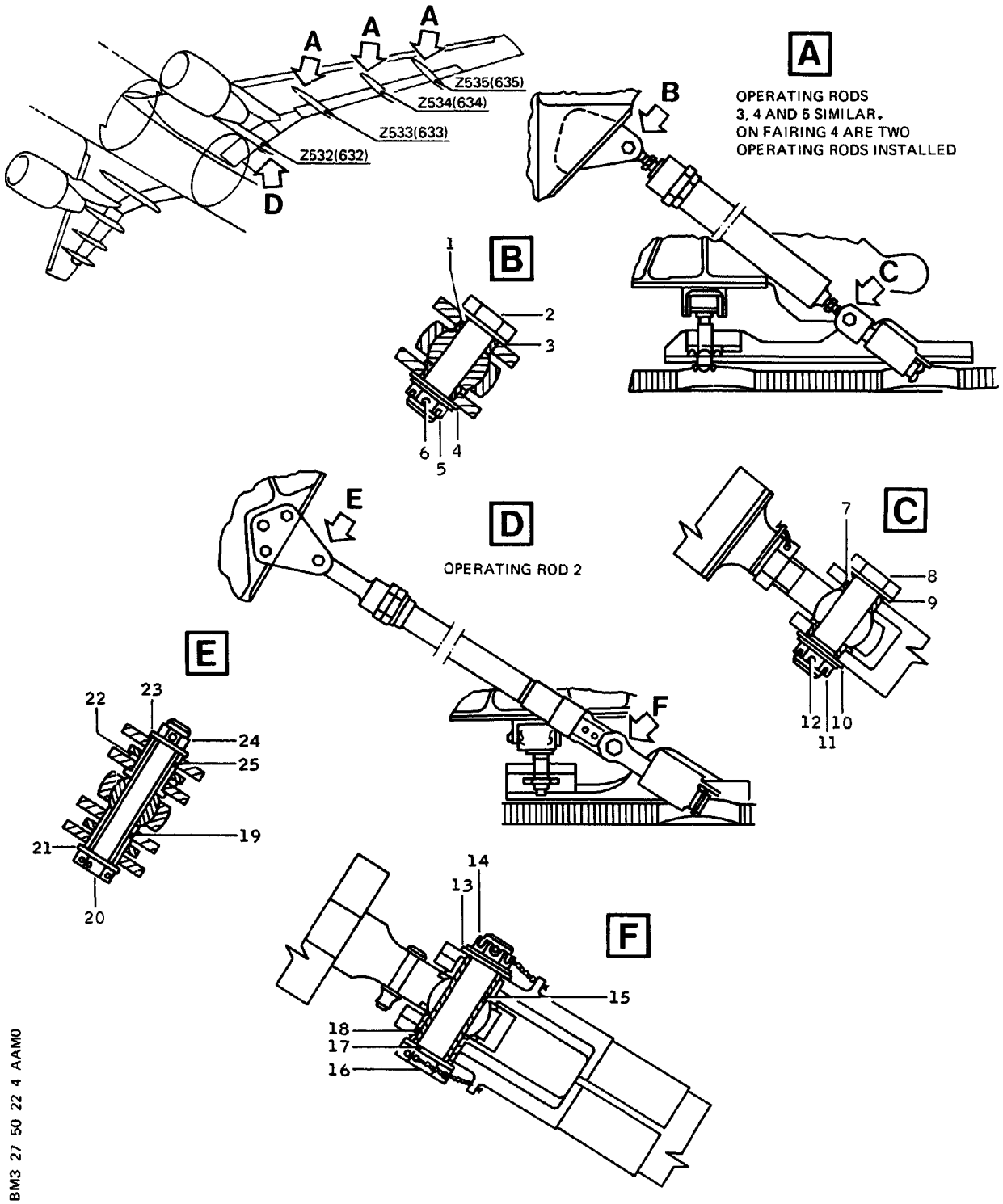
(1)Position safety barriers.

(2)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).

(3)Display warning notice prohibiting the pressurization of hydraulic systems.

(4)Position access platform.

(5)Open, safety and tag the following circuit breakers:



Operating Rod-Fairings
Figure 401

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/FLAPS/SYS 1	10CV	335/R67

B. Removal
(1)Fairings operating rods 3, 4 or 5
(a)Remove and discard cotter pin (12).
(b)Remove castle nut (11), washer (10), bolt (8), washer (9) and tube (7).
(c)Remove and discard cotter pin (6).
(d)Remove castle nut (5), washer (4), bolt (2), washer (3) and tube (1).
(e)Remove operating rod.
(2)Fairings operating rod 2
(a)Cut and remove lockwire.
(b)Remove castle nut (14), washer (13), bolt (16), washer (17), tube (18) and tube (15).
(c)Cut and remove lockwire.
(d)Remove castle nut (24), washer (23), bolt (20), washer (21), tube (19), washer (22) and tube (25).
(e)Remove operating rod.

C. Installation
(1)Fairings operating rods 3, 4 or 5
(a)Apply anti-corrosion compound (Material No. 05-002) to tube (1).
(b)Position operating rod and install tube (1), washer (3), bolt (2), washer (4) and castle nut (5).
(c)For fairings operating rods 3 and 5: TORQUE castle nut (5) to between 1.9 and 2.2 m.daN (172.6 and 195 lbf.in.).
(d)For fairings operating rod 4: TORQUE castle nut (5) to between 1.5 and 1.7 m.daN (132 and 150 lbf.in.).
(e)Safety with cotter pin (6).
(f)Apply anti-corrosion compound (Material No. 05-002) to tube (7).
(g)Install tube (7), washer (9), bolt (8), washer (10) and castle nut (11).
(h)For fairings operating rods 3 and 5: TORQUE castle nut (11) to between 1.95 and 2.2 m.daN (172.6 and 195 lbf.in.).
(i)For fairing operating rod 4: TORQUE castle nut (11) to between 1.5 and 1.7 m.daN (132 and 150 lbf.in.).
(j)Safety with cotter pin (12).
(2)Fairing operating rod 2
(a)Apply anti-corrosion compound (Material No. 05-002) to tube (25).
(b)Position operating rod and install tube (25), washer (23) and castle nut (24). TORQUE castle nut (24) to between 1.2 and 1.35 m.daN (106 and 150 lbf.in.).
(c)Safety with lockwire.
(d)Apply anti-corrosion compound (Material No. 05-002) to tube (18).
(e)Install tube (18), tube (15), washer (17), bolt (16), washer (13)

and castle nut (14). TORQUE castle nut (14) to between 1.95 and 2.2 m.daN (172.6 and 195 lbf.in.).

(f)Safety castle nut (14) and bolt (16) with lockwire.

D. Test

(1)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.

(2)Fully retract flaps (Ref. 27-50-00, P. Block 301).

(3)Check that operating rod performs satisfactory.

E. Close-Up

(1)Install access panels.

(2)Remove access platform.

(3)Remove safety barriers and warning notices.

FAIRING OPERATING ROD - INSPECTION/CHECK

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. General Check

A. Reason for the job.
(1)To inspect operating rods for general condition and security.

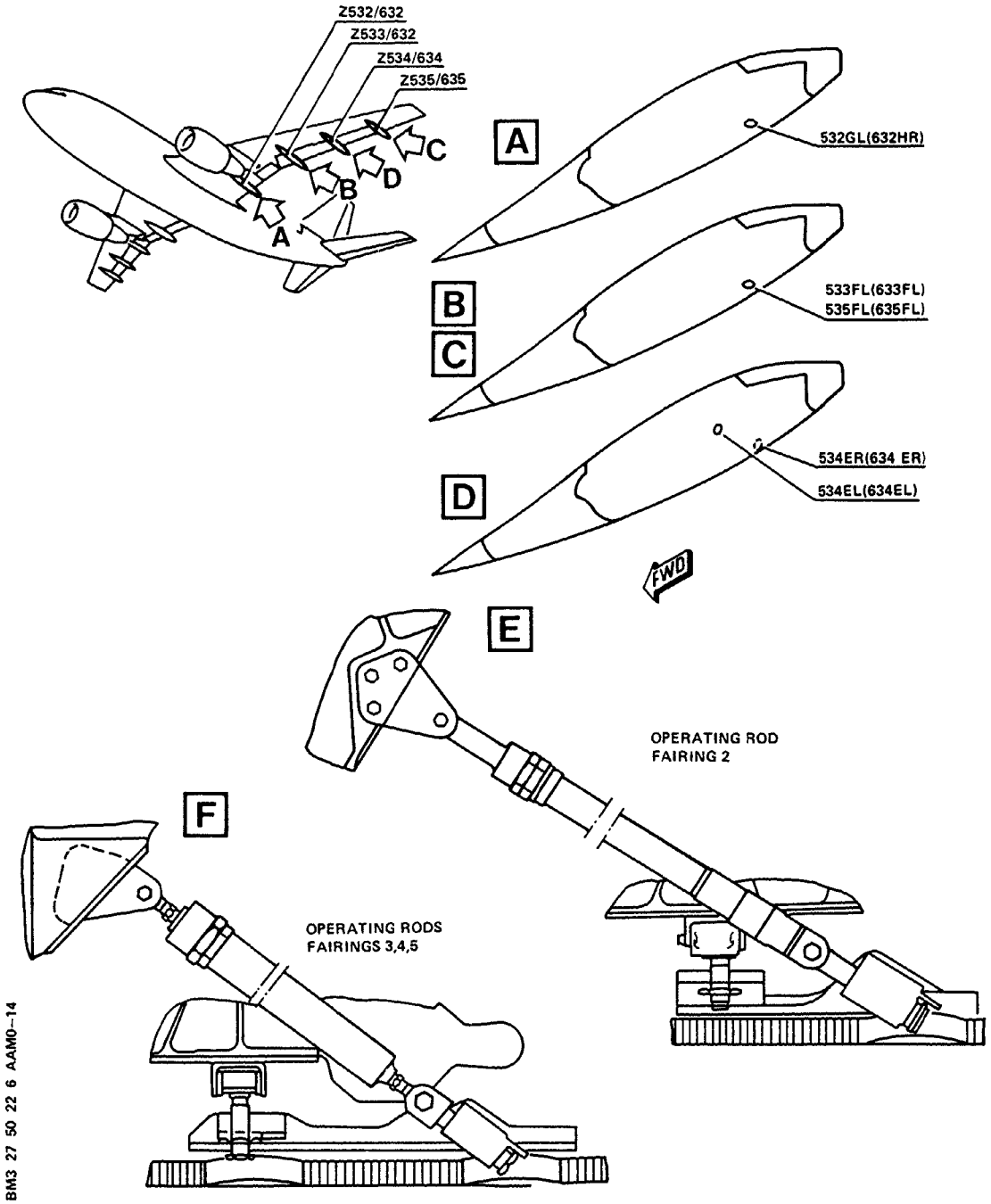
B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.5 to 4.6 m (11 to 15 ft.)
R (2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
(3)	Circuit Breaker Safety Clips and Tags
(4)	Safety Barriers
Referenced Procedure - 27-50-00, P. Block 301	Flaps

C. Procedure
(Ref. Fig. 601)
(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap/slat control lever.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.
(f)Remove the following access panels from flap track fairings 2, 3, 4 and 5.
1 Flap track fairing 2: 532GL (632HR).



Operating Rod - Fairings
Figure 601

2 Flap track fairing 3: 533FL (633FL).
3 Flap track fairing 4: 534EL (634EL) and 534ER (634ER).
4 Flap track fairing 5: 535FL (635FL).

(2)Inspection/Check
(a)Inspect each operating rod for corrosion, cracks or any other damage.
(b)At attachment points of operating rods, check that:
- all nuts and bolts are properly tightened.
- all nuts and bolts are in satisfactory condition (no corrosion).
(c)Check that all safetying devices are intact.

(3)Close-Up
(a)Install access panels.
(b)Remove access platform.
(c)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(d)Remove safety guard from flap/slat control lever quadrant.
(e)Retract flaps to 0° position (Ref. 27-50-00 P. Block 301).
(f)Remove safety barriers.

FAIRING SIDE LOAD STAY - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 to 4.6 m (11 to 15 ft.)
B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C.	Torque Wrench, 0 to 1.30 m.daN (0 to 115 lbf.in.)
D.	Safety Barriers
E.	Cotter Pins
F.	Circuit Breaker Safety Clips and Tags
G. Material No. 09-016	Sealants (Ref. 20-31-00)
H. Material No. 05-005	Special Materials (Ref. 20-31-00)

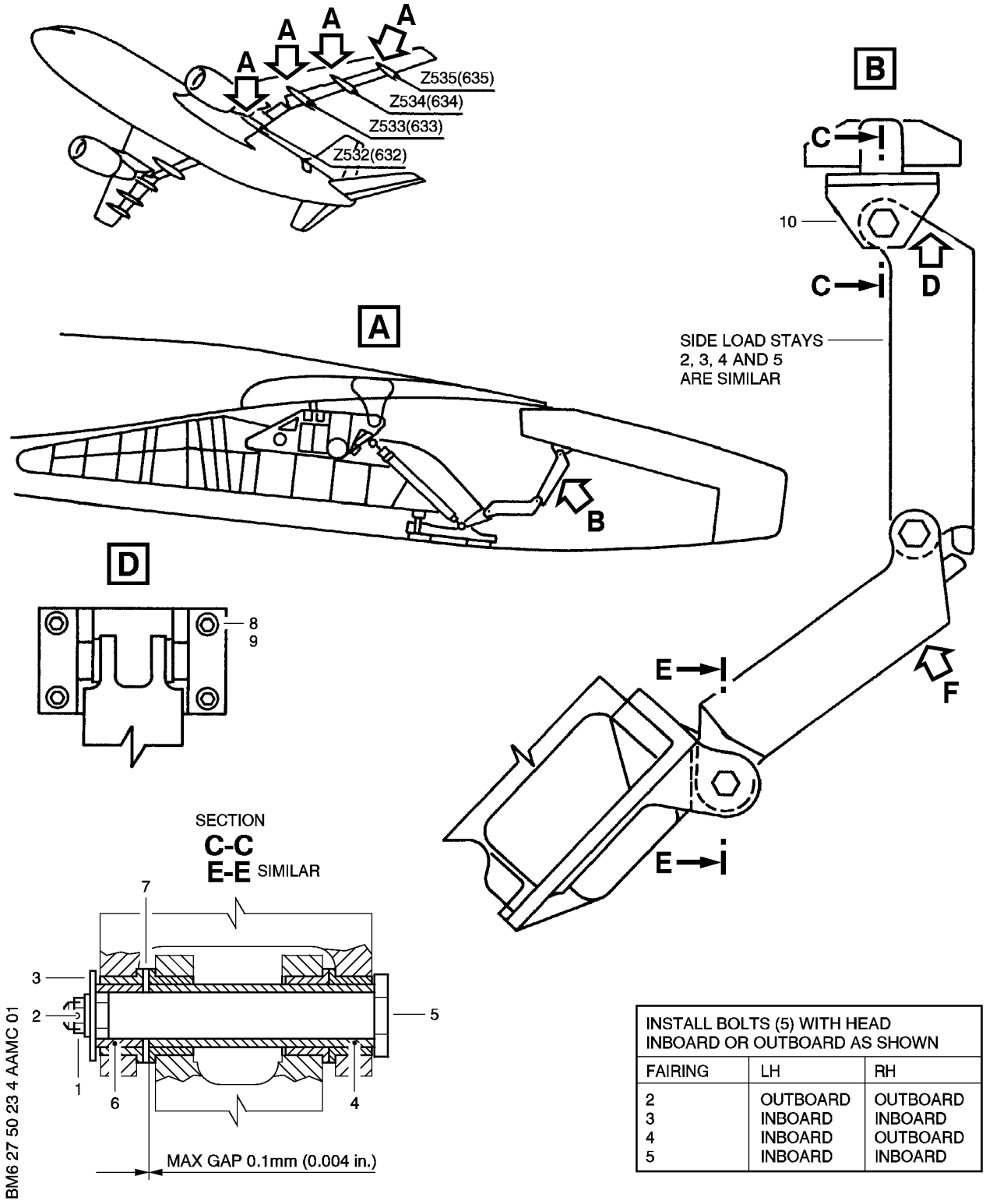
Referenced Procedure

- 27-50-00, P. Block 301	Flaps

2. Procedure

R (Ref. Fig. 401) (Sheet 1 of 2)
(Ref. Fig. 401) (Sheet 2 of 2)

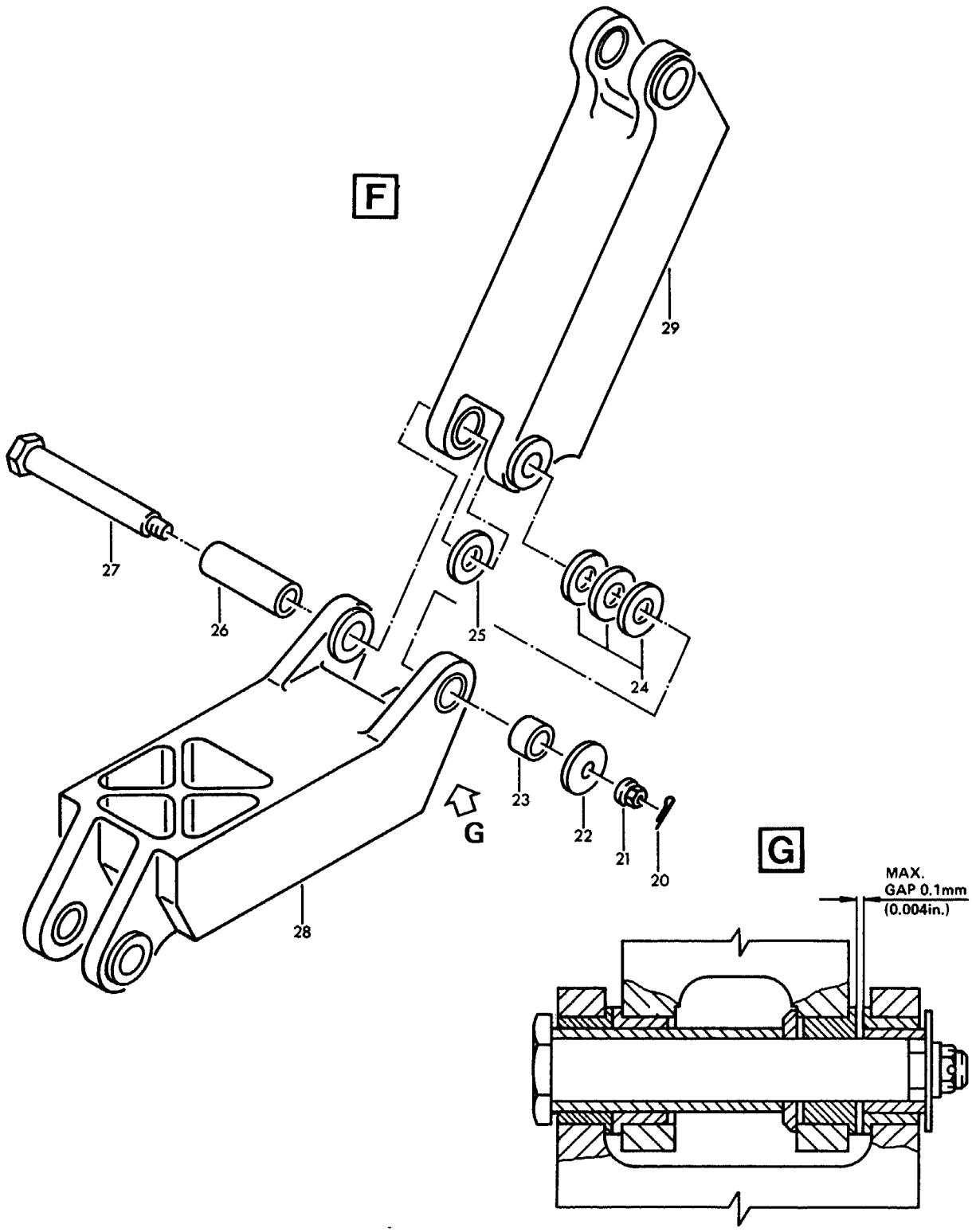
A. Job Set-Up
(1)Position safety barriers.
(2)Extend flaps to 20° position (Ref. 27-50-00, P. Block 301).
(3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)Position access platform.



INSTALL BOLTS (5) WITH HEAD INBOARD OR OUTBOARD AS SHOWN		
FAIRING	LH	RH
2	OUTBOARD	OUTBOARD
3	INBOARD	INBOARD
4	INBOARD	OUTBOARD
5	INBOARD	INBOARD

Side Load Stay - Fairings
Figure 401

R



Side Load Stay - Fairings
Figure 401

R

(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(6)Open the following access panels on flap track fairing associated with side load stay to be removed.
(a)Flap track fairing 2: 532AT (632AT).
(b)Flap track fairing 3: 533AT (633AT).
(c)Flap track fairing 4: 534AT (634AT).
(d)Flap track fairing 5; 535AT (635AT).

B. Removal
(1)Remove four bolts (8) and washers (9) securing side load stay upper bracket (10).
(2)Remove and discard cotter pin (2) at lower side load stay/track attachment.
R (3)Remove castle nut (1), washer (3), bolt (5), sleeve (4), bush (6) and
R washer set (7).
(4)Disconnect side load stay from track.
(5)Disassembly of the side load stay.
(Ref. Fig. 401) (Sheet 2 of 2)
(a)Remove and discard cotter pin (20).
(b)Remove nut (21), washer (22) and bolt (27).
(c)Remove sleeve (26).
(d)Separate swing arms (28),(29) and remove washer (25), bush (23) and washer set (24).

C. Preparation of Replacement Component
(1)If a new side load stay is to be installed or the bushes are to be checked, proceed as follows:
(a)Remove and discard cotter pin (2) at bracket (10).
R (b)Remove castle nut (1), washer (3), bolt (5), sleeve (4) and washer
R set (7).
R (c)Position bracket (10) at new side load stay and install washer
R set (7), sleeve (4), bush (6), bolt (5), washer (3) and castle
R nut (1).
(d)TORQUE castle nut (1) to between 1.18 and 1.30 m.daN (104.4 and 115 lbf.in.).
(e)Make certain that gap between washer set (7) and the face of the bush does not exceed 0.1 mm (0.004 in.). If necessary, change washer set (7).
(f)Safety castle nut (1) with new cotter pin (2).

D. Installation
(1)Assembly of side load stay
(Ref. Fig. 401) (Sheet 2 of 2)

(a)Put swing arm (28) in installation position of swing arm (29).
(b)Install washer (25), sleeve (26), bush (23) and bolt (27).
(c)Measure gap between bushes and select washers from washer set (24) to provide a gap of max. 0.1 mm (0.004 in.).
(d)Remove bolt (27) and install washer set (24).
(e)Install bolt (27), washer (22) and nut (21).
(f)TORQUE nut (21) to between 1.18 and 1.30 m.daN (104.4 and 115 lbf.in.).

NOTE : The side load stay swing arms must be movable.

(g)Safety nut (21) with new cotter pin (20).
(h)Apply corrosion preventive (Material No. 05-005) to nut (21).

R (2)Position side load stay on track and install washer set (7),
R sleeve (4), bush (6), bolt (5), washer (3) and castle nut (1).
R TORQUE castle nut (1) to between 1.18 and 1.30 m.daN (104.4 and
R 115 lbf.in.).
(3)Make certain that gap between washer set (7) and the face of the bush does not exceed 0.1 mm (0.004 in.); if necessary, change washer set (7).
(4)Safety castle nut (1) with new cotter pin (2).
(5)Apply sealant (Material No. 09-016) to mating surface of bracket (10) and install bracket to fairing structure using bolts (8) and washers (9).
(6)TORQUE bolts (8) to between 0.15 and 0.17 m.daN (13.3 and 15 lbf.in.).

E. Test
(1)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(2)Remove safety guard from flap/slat control lever quadrant.
(3)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).
(4)Check that operation of side load stay is satisfactory.
(5)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
(6)Check that operation of side load stay is satisfactory.
(7)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).

F. Close-Up
(1)Install access panels removed at step 2.A.(6).
(2)Remove access platform.
(3)Remove safety barriers.

FAIRING SIDE LOAD STAY - INSPECTION/CHECK

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. General Check

A. Reason for the job

(1)To inspect side load stays for general condition and security of attachment.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 3.5 m (11 ft.) to 4.6 m (15 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)	Circuit Breaker Safety Clips and Tags
	(4)	Safety Barriers
	(5)	Feeler Gage

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-50-23, P. Block 401	Fairing Side Load Stay

C. Procedure

(Ref. Fig. 601)

(Ref. Fig. 602)

(1)Job Set-Up

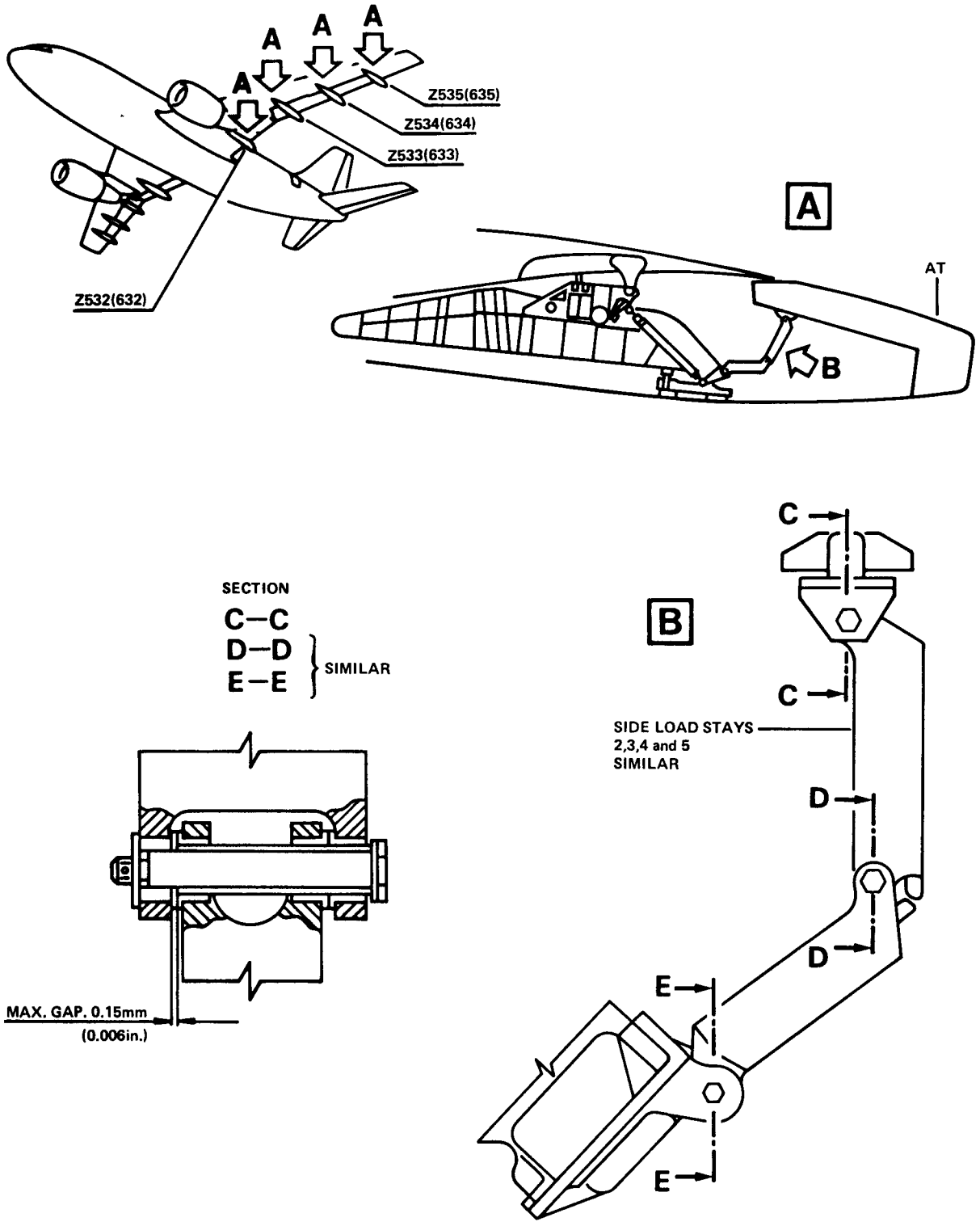
(a)Position safety barriers.

(b)Extend flaps to 15° position (Ref. 27-50-00, P. Block 301).

R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

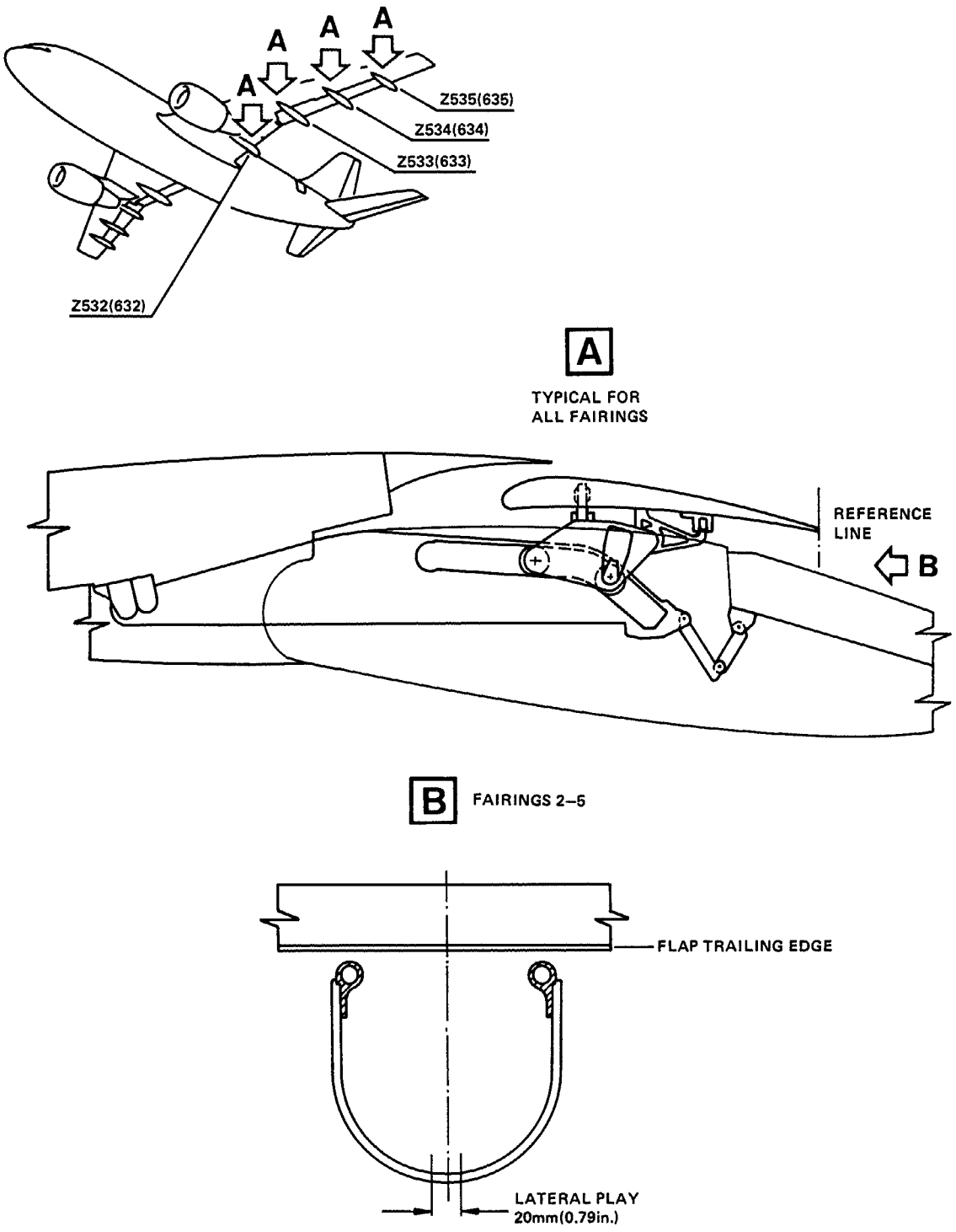
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67



Side Load Stay - Fairings
Figure 601

R



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Lateral Play of Fairings
Figure 602

(e)Position access platform.
(f)Make a reference mark on fairings (2 thru 5) and on the trailing edge of the flaps for later reference (Ref. Fig. 602).
(g)Move trailing edge of fairings sidewards in both directions to check lateral play. The play from maximum inboard to outboard movement should not exceed 20 mm (0.79 in.).
(h)If the play exceeds the above limits, proceed as follows:
1 Remove side load stay and disassemble it (Ref. 27-50-23, P. Block 401).
2 Visually inspect the bushes. If the teflon lining is damaged, replace the bushes.
3 Visually inspect swing arm for cracks and corrosion.
4 Assemble side load stay and install it (Ref. 27-50-23, P. Block 401).
(i)Remove access platform.
(j)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(k)Remove safety guard from flap/slat control lever quadrant.
(l)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
(m)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(n)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(o)Position access platform.
(p)Remove the following access panels from flap track fairings 2, 3, 4 and 5.
1 Flap track fairing 2: 532AT (632AT).
2 Flap track fairing 3: 533AT (633AT).
3 Flap track fairing 4: 534AT (634AT).
4 Flap track fairing 5: 535AT (635AT).

(2)Inspection/Check
NOTE : If the side load stay has been removed above, steps (a) and (b) are not necessary.
(a)Check lateral play of side load stay swing arms of fairings 2 thru 5 by using feeler gage (Ref. Fig. 601).
NOTE : The max. in service play is 0.15 mm (0.006 in.). If the play exceeds the max. limits, change the thickness of the washers or replace the side load stay (Ref. 27-50-23, P. Block 401).
(b)Inspect each side load stay for corrosion, cracks or any other damage.
(c)At attachment points of side load stay, check that:
- all nuts and bolts are properly tightened.
- all nuts and bolts are in satisfactory condition (no corrosion).
(d)Check that all safety devices are intact.

(3)Close-Up
(a)Install access panels.
(b)Remove access platform.
(c)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(d)Remove safety guard from flap/slat control lever quadrant.
(e)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).
(f)Remove safety barriers.
(g)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

FAIRING LINK ASSY - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2 to 3.5 m (6.5 to 11.5 ft.)
B. 98A27508021000	Mounting Pin - Flap Fairing
C.	Torque Wrench, 0.6 to 1.7 m.daN (53 to 150.5 lbf.in.)
D.	Circuit Breaker Safety Clips and Tags
E. Material No. 05-027	Special Materials (Ref. 20-31-00)
F. Material No. 08-013	Bonding and Adhesive Compounds (Ref. 20-31-00)

Referenced Procedures

- 20-28-11, P. Block 1	Electrical Bonding
- 27-50-21, P. Block 401	Flap Track Fairings

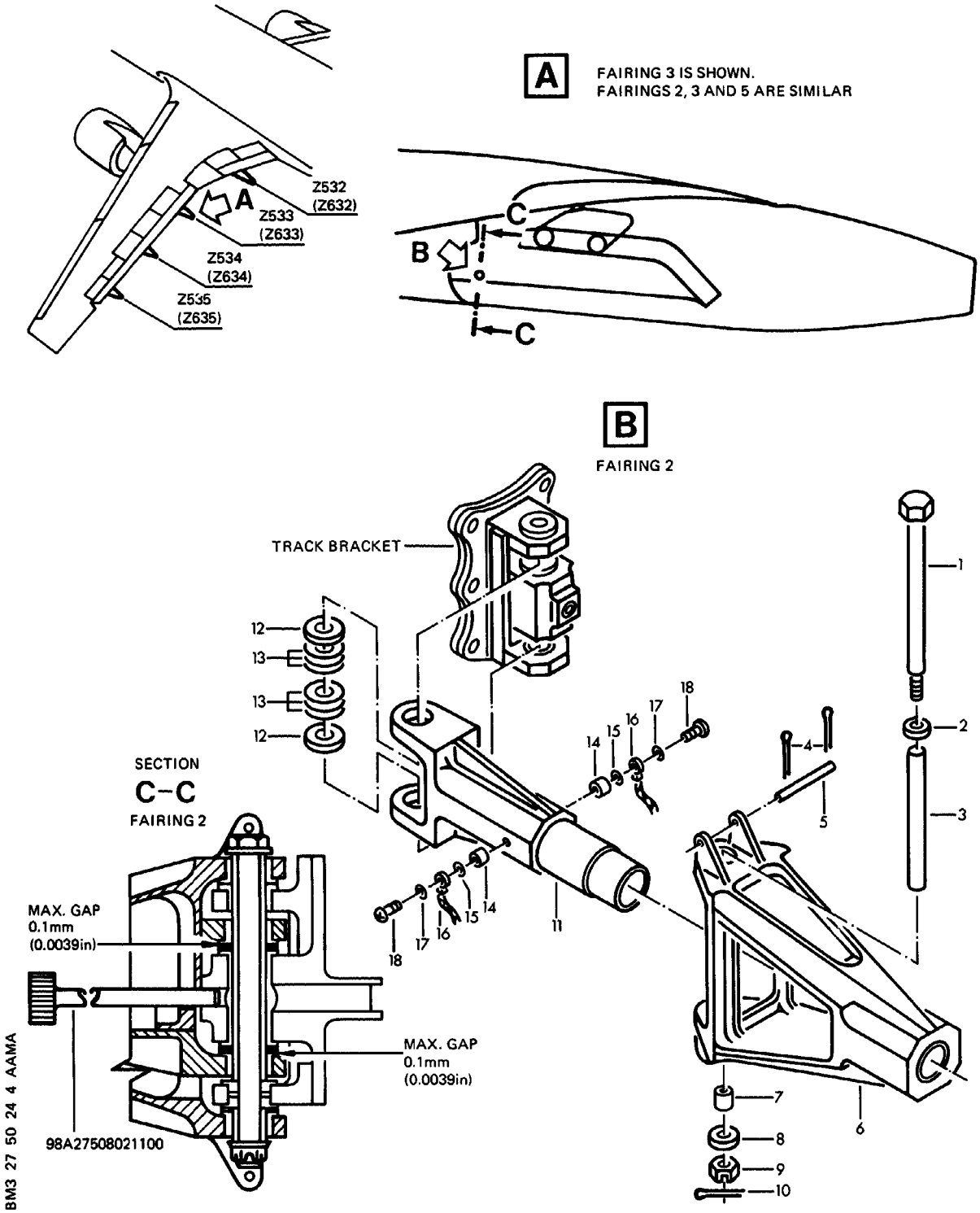
2. Procedure

(Ref. Fig. 401) (Sheet 1)
(Ref. Fig. 401) (Sheet 2)

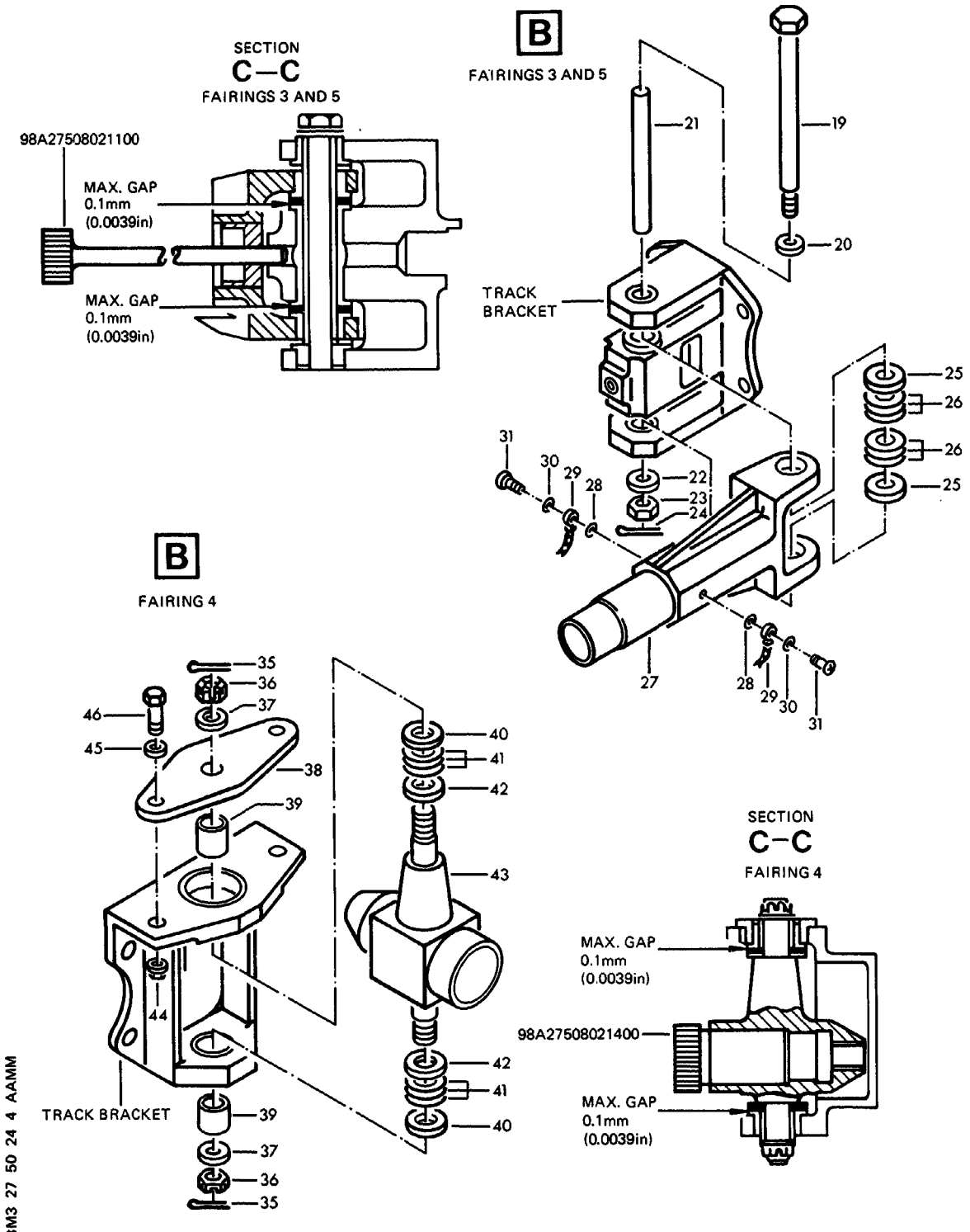
A. Job Set-Up
(1)Position access platform.
(2)Remove appropriate flap track fairing (Ref. 27-50-21, P. Block 401).
(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

B. Removal
(1)Fairing 2
(a)Remove screws (18), washers (17), bonding straps (16), washers (15) and spacers (14) from link (11).



Fairing Link Assy (Sheet 1/2)
Figure 401



Fairing Link Assy (Sheet 2/2)
Figure 401

(b)Remove one cotter pin (4) and pins (5) at top and bottom connection.
(c)Remove cotter pin (10), castle nut (9) and washer (8).
(d)Remove bolt (1), washer (2) and bushes (3), (7).
(e)Carefully remove links (6),(11), washers (12) and washer sets (13).
NOTE : To facilitate installation of links record position of washers.

(2)Fairings 3 and 5
(a)Remove screws (31), washers (30), bonding straps (29) and washers (28) from link (27).
(b)Remove cotter pin (24), castle nut (23) and washer (22).
(c)Remove bolt (19), washer (20) and bush (21).
(d)Carefully remove link (27), washers (25) and washer set (26).
NOTE : To facilitate installation of links record position of washers.

(3)Fairing 4
(a)Remove cotter pins (35), castle nuts (36) and washers (37) from link spigots.
(b)Remove nuts (44), washers (45) and bolts (46) at flanged bearing (38).
(c)Remove flanged bearing (38).
(d)Carefully remove link (43), bushes (39), washers (40),(42) and washer sets (41).
NOTE : To facilitate installation of link record position of washers.

C. Installation
NOTE : The mounting pins PN 98A27508021100 and PN 98A27508021400 are part of mounting pin set PN 98A27508021000.

(1)Fairing 2
(a)Position link (11) at track bracket and install mounting pin PN 98A27508021100.
(b)Install washers (12) and washer sets (13) such that link has freedom of movement with a maximum gap of 0.1 mm (0.0039 in.) between track bracket and washers.
(c)Remove mounting pin.
(d)Position link (6) over link (11), align holes and install bush (3).
(e)Insert bush (7) into link (6) and install bolt (1), washers (2),(8) and castle nut (9).
(f)TORQUE castle nut (9) to between 1.2 and 1.35 m.daN (106 and 119.5 lbf.in.) and safety with cotter pin (10).
(g)Install pins (5) at top and bottom connection and safety with cotter pins (4).
(h)Apply thread locking compound (Material No. 08-013) to screws (18).
(i)Install bonding straps (16) to link (11) using screws (18), washers (17),(15) and spacer (14) (Ref. 20-28-11, P. Block 1).
(j)Apply protective film (Material No. 05-027) to bonding connections.

(2)Fairings 3 and 5
(a)Position link (27) at track bracket and install mounting pin PN 98A27508021100.
(b)Install washers (25) and washer sets (26) so that link has freedom of movement with a maximum gap of 0.1 mm (0.0039 in.) between track bracket and washers.
(c)Remove mounting pin.
(d)Install bush (21), bolt (19), washers (20),(22) and castle nut (23).

(e)TORQUE castle nut (23) to between 1.2 and 1.35 m.daN (106 and 119.5 lbf.in.) and safety with cotter pin (24).
(f)Install bonding straps (29) using screws (31) and washers (28),(30) (Ref. 20-28-11, P. Block 1).
(g)TORQUE screws (31) to between 0.8 and 0.9 m.daN (70.8 and 79.7 lbf.in.)
(h)Apply protective film (Material No. 05-027) to bonding connections.

(3)Fairing 4
(a)Position link (43) with washers (40),(42) at track bracket and install mounting pin PN 98A27508021400.
(b)Install flanged bearing (38) and attach temporarily with bolts (46), washers (45) and nuts (44).
(c)Measure gap between washers (40),(42) and bushes in track bracket to determine thickness of washer set (41). A max. gap of 0.1 mm (0.0039 in.) is permissible.
(d)Remove mounting pin, flanged bearing (38), bolts (46), washers (45), nuts (44) and link (43) with washers (40),(42).
(e)Position link (43) complete with washers (40),(42) and washer set (41) as determined above to track bracket.
(f)Install flanged bearing (38) using bolts (46), washers (45) and nuts (44). Tighten but do not torque nuts at this stage.
(g)Install mounting pin PN 98A27508021400 and check max. gap of 0.1 mm (0.0039 in.). Remove mounting pin.
(h)Install bushes (39), washers (37) and castle nuts (36).
(i)TORQUE castle nuts (36) to between 0.6 and 0.7 m.daN (53 and 62 lbf.in.) and safety with cotter pins (35).
(j)TORQUE nuts (44) to between 1.5 and 1.7 m.daN (133 and 150.5 lbf.in.).

D. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Install flap track fairing (Ref. 27-50-21, P. Block 401).
(3)Remove access platform.
(4)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.

MECHANICAL AND ELECTRICAL CONTROL (FLAPS) - DESCRIPTION AND OPERATION

1. General

Operation of the flaps is controlled from the flight compartment by a mechanical control system, comprising a slat flap control lever and a Command Sensor Unit (CSU).

The mechanical control system provides position demand signals for an electrical control loop, comprising two Slat/Flap Control Computers (SFCC 1 and 2) and a Feedback Position Pick-off Unit (FPPU). The electrical control loop generates commands for the Power Control Unit (PCU) valve blocks, which control the mechanical drive to the flap control surfaces.

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
	LEVER ASSEMBLY-CONTROL	9VU	211		27-51-11
	ROD-PUSH-PULL		211		
51CV	COMMAND SENSOR UNIT		211	121BL	27-51-17
17CV	FAULT ANNUNCIATOR (FLAP SYS 1 & 2)	428VU	211		
21CV	CONTROL COMPUTER 1-SLAT FLAP	92VU	122		27-51-18
22CV	COMPUTER COMPUTER 2-SLAT FLAP	93VU	122		27-51-18
23CV	PCU VALVE BLOCK-YELLOW		148		27-54-33
	SOLENOID VALVE-EXTEND		148		27-54-33
	SOLENOID VALVE-RETRACT		148		27-54-33
	SOLENOID VALVE-ENABLE		148		27-54-33
	SOLENOID VALVE-HIGH SPEED		148		27-54-33
	PRESSURE SWITCH-SUPPLY		148		27-54-33
	PRESSURE SWITCH-HIGH SPEED		148		27-54-33
	PRESSURE SWITCH-DRIVE		148		27-54-33
24CV	VALVE BLOCK PCU-GREEN		148		27-54-33
	SOLENOID VALVE-EXTEND		148		27-54-33
	SOLENOID VALVE-RETRACT		148		27-54-33
	SOLENOID VALVE-ENABLE		148		27-54-33
	SOLENOID VALVE-HIGH SPEED		148		27-54-33
	PRESSURE SWITCH-SUPPLY		148		27-54-33
	PRESSURE SWITCH-HIGH SPEED		148		27-54-33
	PRESSURE SWITCH-DRIVE		148		27-54-33
27CV	POSITION PICK-OFF UNIT-FEEDBACK		148		27-51-19
52CV	INDICATOR SFCC 1-BITE DISPLAY MAINTENANCE (SLATS/FLAPS CMPTR 1)	471VU	212		
53CV	INDICATOR SFCC 2-BITE DISPLAY MAINTENANCE (SLATS/FLAPS CMPTR 2)	471VU	212		
90CV	RELAY-COMPUTER REMOVED (SLAT SFCC 1)	90VU	122		
91CV	RELAY-COMPUTER REMOVED (FLAP SFCC 1)	90VU	122		
92CV	RELAY-COMPUTER REMOVED (SLAT SFCC 2)	90VU	122		
93CV	RELAY-COMPUTER REMOVED (FLAP SFCC 2)	90VU	122		

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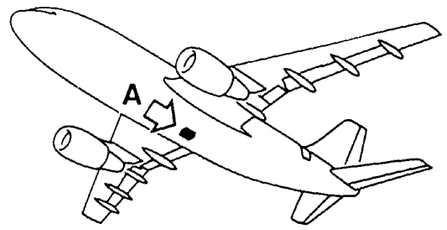

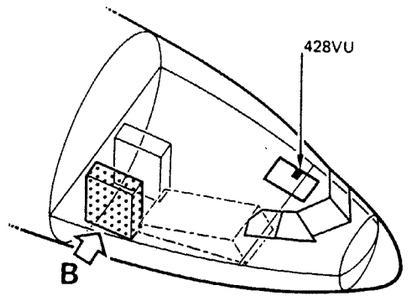

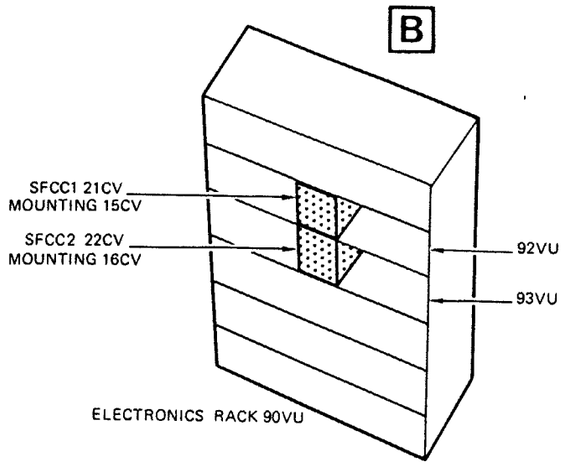

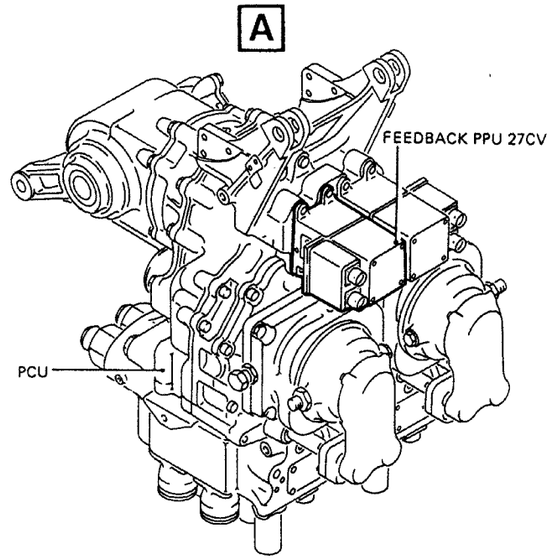

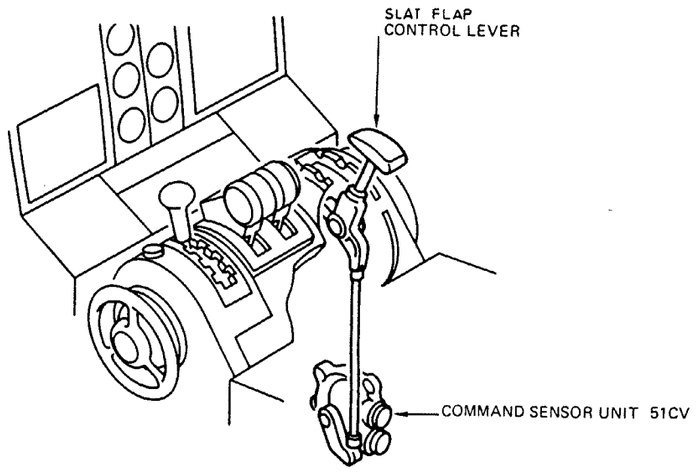

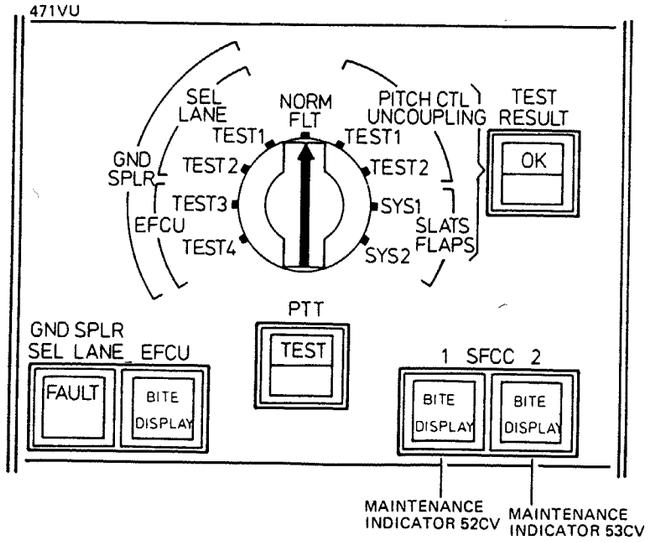

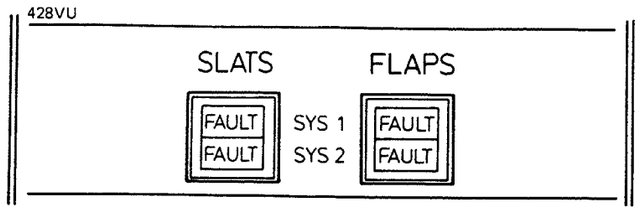

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Component Location
Figure 001

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3. Description

A. Flap positions are selected by the five-position control lever located on the center pedestal.

B. A push-pull rod transmits commands from the control lever to the CSU situated in the electronics bay. Four dual-ganged switches in the CSU transmit command signals to the SFCC.

C. The SFCC generate the appropriate commands for the PCU valve blocks. The commands are computed from signals supplied by the CSU and FPPU.

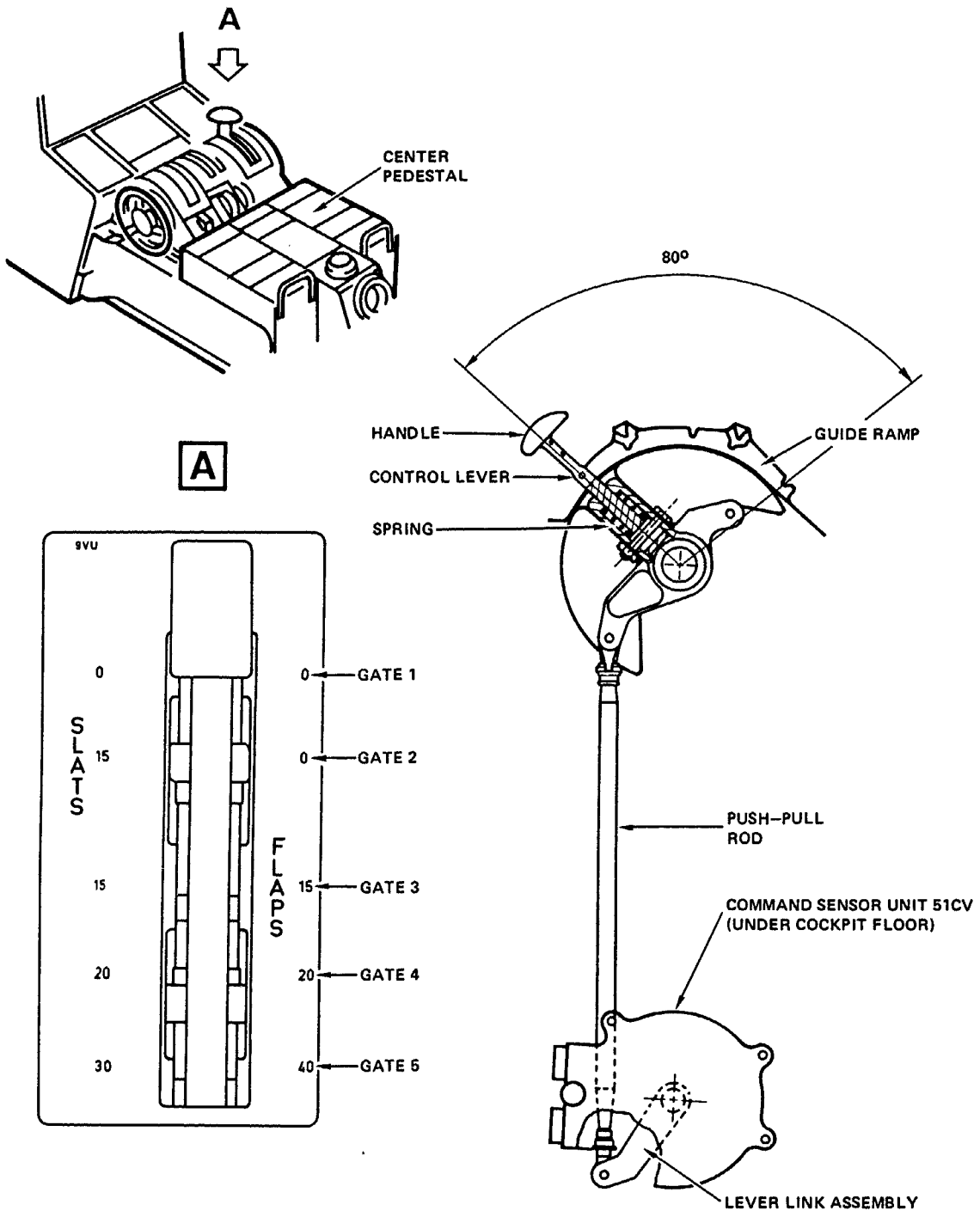
D. A system FAULT annunciator (17CV) provides status of systems 1 and 2.

4. Component Description

A. Slat Flap Control Lever
(Ref. Fig. 002)
(1) The slat flap control lever enables the position of all flap and slat control surfaces to be selected from the flight compartment center pedestal. The control lever is coupled to the CSU through a push-pull rod and lever link assembly and operates within a quadrant arrangement.
(2) A gated guide ramp guides the control lever through the different flap and slat select positions. A detent mechanism in the handle retains the control lever in the selected position.
(3) Two baulks on the guide ramp, at gate 2 (FLAPS 0, SLATS 15) and at gate 4 (FLAPS 20, SLATS 20) prevent the control lever from being moved through the full range in one movement. The five flap select positions are:

CONTROL LEVER		OUTER FLAP			INNER FLAP	
GATE	LEGEND	IN FLIGHT (deg)	ON GROUND (deg)		IN FLIGHT (deg)	ON GROUND (deg)
1	0	0	0	retracted	0	0
2	0	0	0	extended	0	0
3	15	8	8	extended	15	15
4	20	15,5	16	extended	21,6	22,1
5	40	30,5	31,5	extended	40	41

B. Command Sensor Unit (51CV)
(Ref. Fig. 003)
(1) The CSU comprises a cast housing, an input shaft which carries a drive gear and friction brake, and four dual-ganged rotary switches. The switches convert mechanical demands from the control lever into electrical signals for the SFCC.
(2) The friction brake prevents any movement of the input shaft in the event of a failure of the mechanical input. The brake holds the input shaft in the last commanded position.
(3) A hole in the housing and drive gear enables the input shaft to be locked in the FLAPS 0, SLATS 0 position by insertion of a rigging pin, thus



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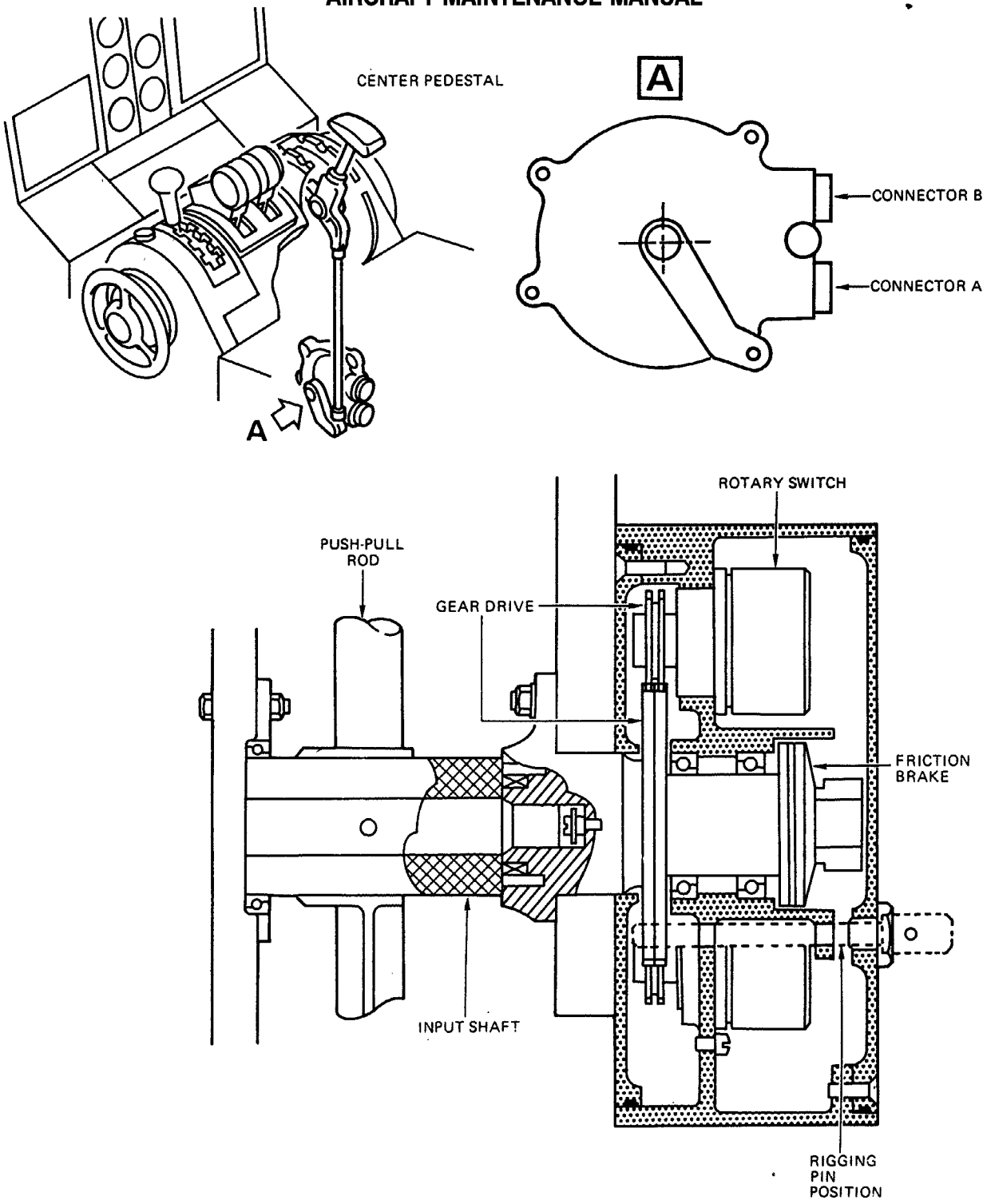
Slat Flap Control Lever
Figure 002



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Command Sensor Unit
Figure 003

providing a facility for checking and adjusting the mechanical input.

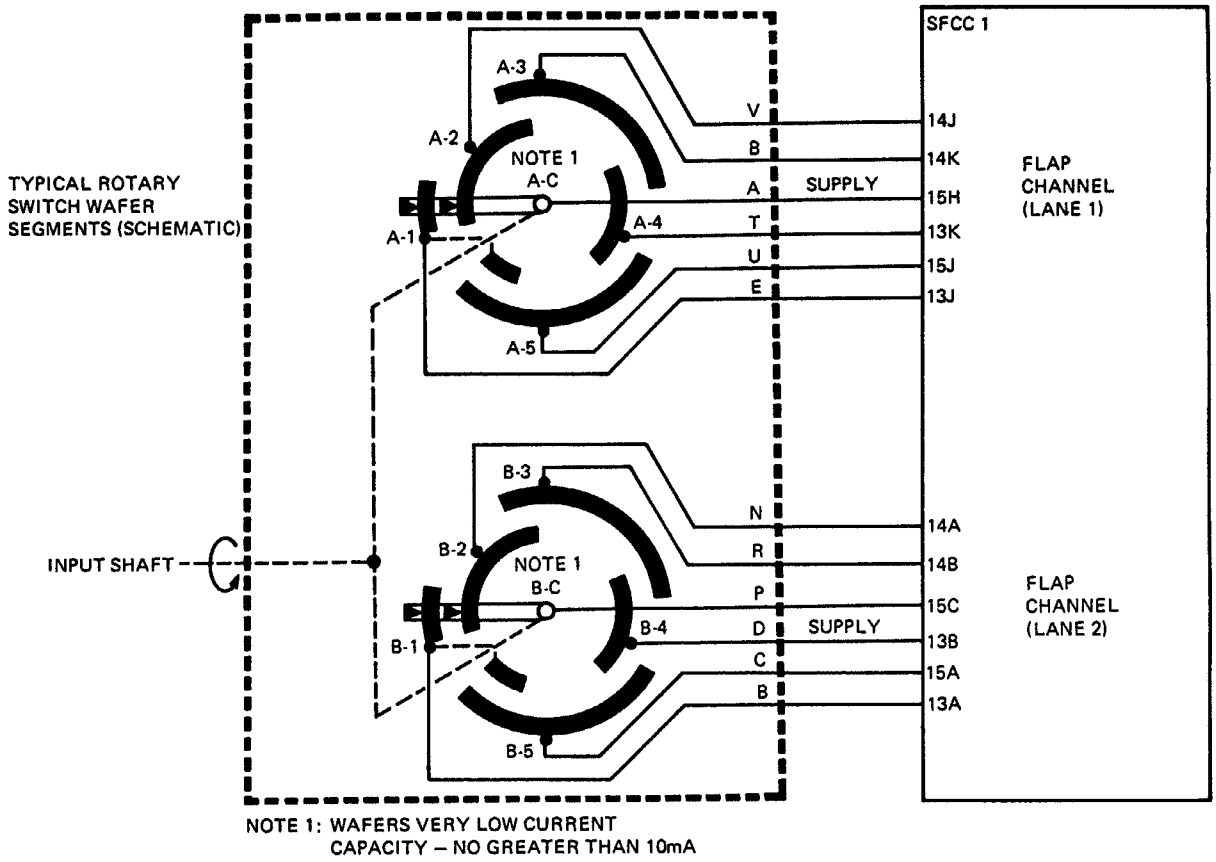
C. Control Lever Command Translation
(Ref. Fig. 004)
Moving the SLAT/FLAP control lever on the center pedestal rotates the CSU input shaft. The shaft drives the gear, rotating the four dual-ganged switches to a new position. When the control lever has reached the new position, the switches produce the new command signal, using a 2 out of 5 code. There are eight command outputs, four are used for flap command and four are used for slat command.

CONTROL LEVER		SWITCH WAFER SEGMENT CODING				
GATE	LEGEND	1	2	3	4	5
1	0	1	1	0	0	0
2	0	0	1	1	0	0
3	15	0	0	1	1	0
4	20	0	0	0	1	1
5	40	1	0	0	0	1

(1)Switching
Each dual-ganged switch provides a dedicated slat/flap command output.

	CSU SWITCH	SFCC LANE	SFCC CHANNEL
SYSTEM 1 (Connector A)	1	SLAT	1
		FLAP	2
	2	SLAT	2
		FLAP	1
SYSTEM 2 (Connector B)	3	SLAT	1
		FLAP	2
	4	SLAT	2
		FLAP	1

(2)Switch pattern
The CSU switching pattern is such that when the control lever is



LEVER GATE	1	2	3	4	5
TRACK 1					
TRACK 2					
TRACK 3					
TRACK 4					
TRACK 5					
FLAP	0	0	15	20	40

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CSU Switching Scheme
Figure 004

being moved from one position to another, the output to the SFCC will not change to the new command until the lever is in the new position. To ensure that the switching pattern is correct, a minimum and maximum CSU position output range is established for each position.

D. Slat/Flap Control Computers (21CV, 22CV)
(Ref. Fig. 005)

(1) Each SFCC comprises an ARINC 600-6MCU case, housing CMOS based circuits. The circuits comprise the flap and slat control channels.

(2) A protrusion at the front face of each unit carries the following controls and indicators:

(a) LEFT WING and RIGHT WING pushbuttons:
The pushbuttons provide a facility for testing the wing-tip brakes without inhibiting system operation (Ref. 27-56-00).
NOTE : Separate pushbuttons are provided for testing flap and slat wing-tip brakes.

(b) BITE test button:
The button initiates the SFCC self test mode (flap and slat channels) when the aircraft is on the ground.

(c) FLAP PASS and SLAT PASS annunciator lights:
The annunciators indicate the successful completion of flap and slat channel self test.

(d) Slat and flap fail indicators:
The indicators provide a binary coded display of flap and/or slat system failures. A failure-code chart located on the front panel provides a reference for decoding given indications.

(e) RESET button:
The button enables the flap or slat fail indicators to be reset to normal after fault rectification. When the RESET button is pressed, all fail indicators come on briefly to prove serviceability.

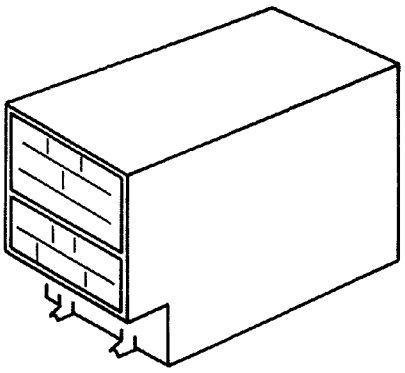
(3) The rear panel carries a size 3 shell ARINC 600 connector to provide electrical connection to the aircraft wiring, via a vibration-damped mounting (15CV-SFCC 1, 16CV-SFCC 2). Contact grouping is as follows:
- RH top and center contacts: slat system connections
- LH top and center contacts: flap system connections
- RH bottom contacts : slat channel power supplies and bonding
- LH bottom contacts : flap channel power supplies and bonding

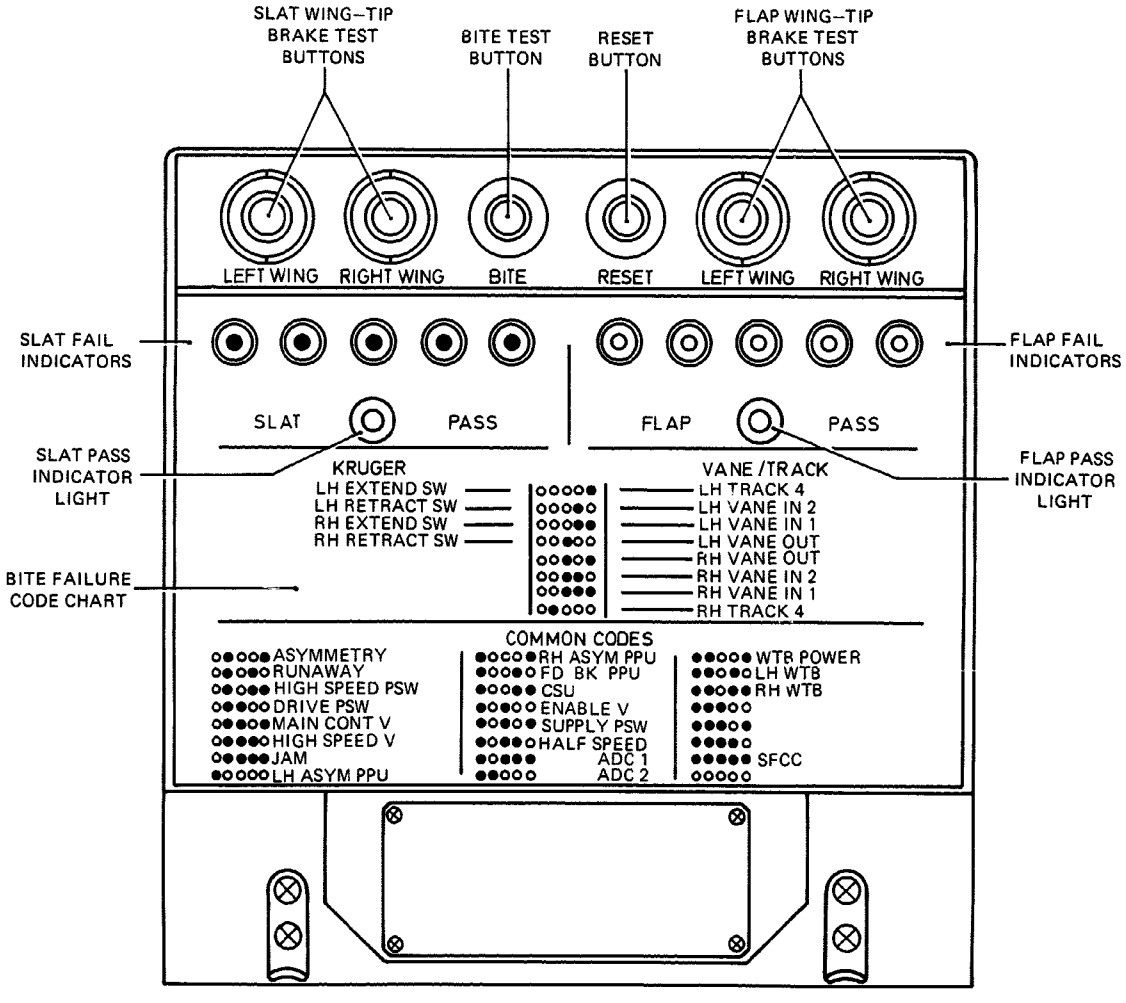
(4) The flap and slat channel circuits within each SFCC comprise lane processors 1 and 2 (which provide the computing functions), common services (which provide interfacing circuits and lane processor output consolidation), and a power supply.

(5) Lane processors 1 and 2 use dissimilar microprocessors to reduce the possibility of a common failure which would render the slat flap control system inoperative.

E. Valve Blocks (23CV, 24CV)
(Ref. Fig. 006)

(1) Two valve blocks are mounted on the underside of the PCU. Each valve block is provided with four solenoid valves, three pressure switches, enable valve, two directional valves (extend and retract) and a high speed valve. The enable valve when energized directs incoming hydraulic





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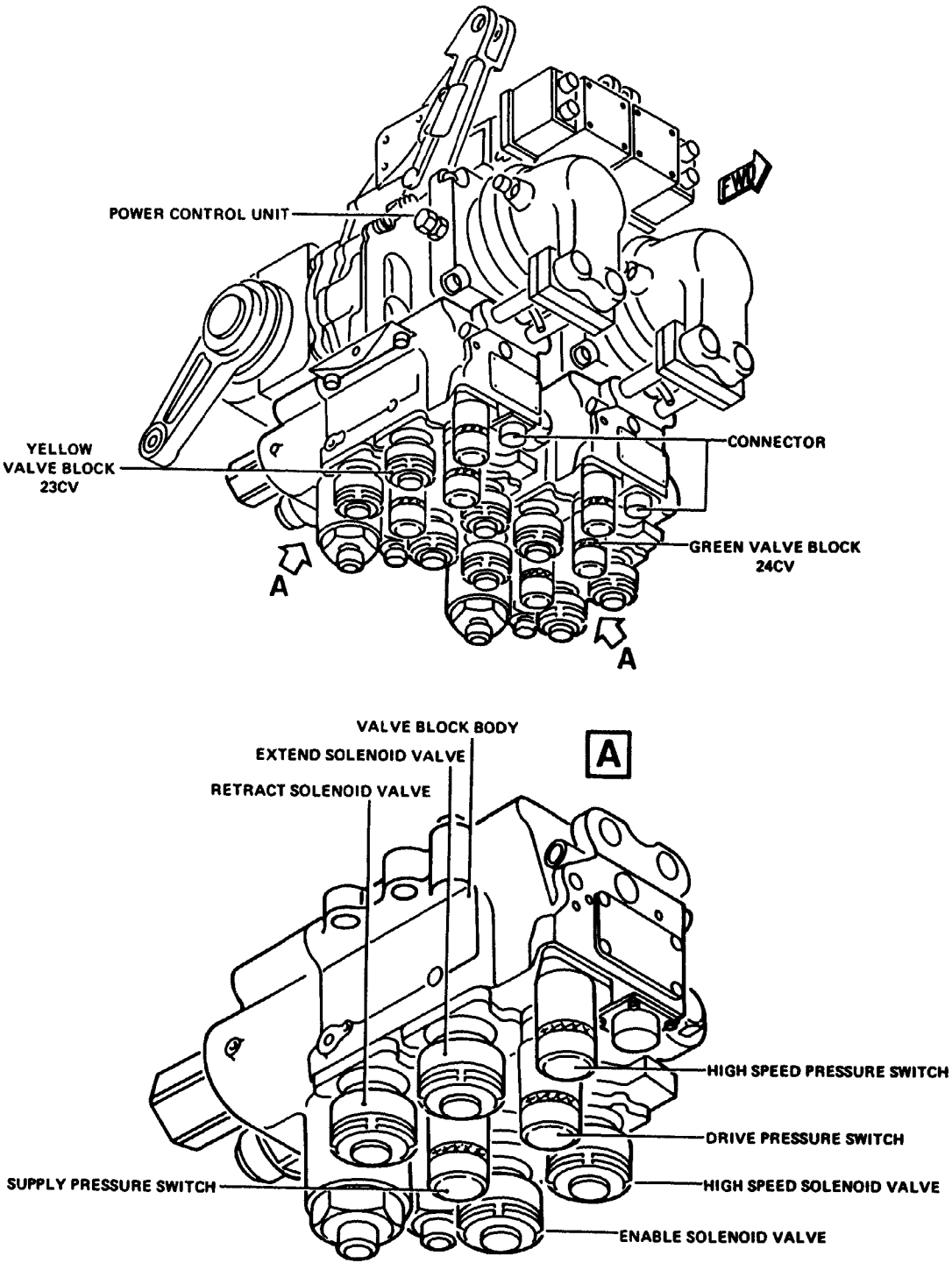
Slat/Flap Control Computer
Figure 005



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Valve Block
Figure 006

pressure to the two directional valves. The directional valves control the position of the main control valve and the high speed valve controls the position of the speed change valve. Three pressure switches ("supply", "high speed" and "drive") monitor the system and interface directly with the SFCC. These components control and monitor YELLOW and GREEN hydraulic system activity within the PCU.

(2)Each pressure switch comprises a pressure sensing element, which operates a microswitch. Electrical and hydraulic supplies to a pressure switch are automatically disconnected and connected within the valve block during switch replacement.
The pressure switches operate at the following pressures:

High speed and drive pressure switches	: 85 bar (1232.8 psi) increasing pressure 65 ±7.5 bar (942.8 ±108.8 psi) decreasing pressure
Supply pressure switch	: 160 ±12 bar (2320.6 ±174 psi) increasing 140 ± 4 bar (2030.5 ±58 psi) decreasing

(3)The solenoid valves are described in 27-54-00.

F. Feedback Position Pick-off Unit (27CV)
(Ref. Fig. 007)

(1)The FPPU, mounted at the front of the PCU, contains two size 11, brushless, transformer-coupled synchro transmitters which connect electrically to SFCC 1 and 2. The synchros are driven by the PCU intermediate gearbox (Ref. 27-54-00). Synchro rotation is less than 360 degrees at full flap travel.

(2)The FPPU input shaft is provided with a self engaging locking device which allows removal and installation without disturbing synchro rotor/stator alignment.

(3)Electrical connections are made via two multiway connectors.

G. System Fault Annunciator (17CV)
(Ref. Fig. 008)

System FAULT annunciator (17CV) is a dual annunciator. The upper FAULT annunciator indicates a fault in Flap system 1, the lower indicates a fault in Flap system 2.

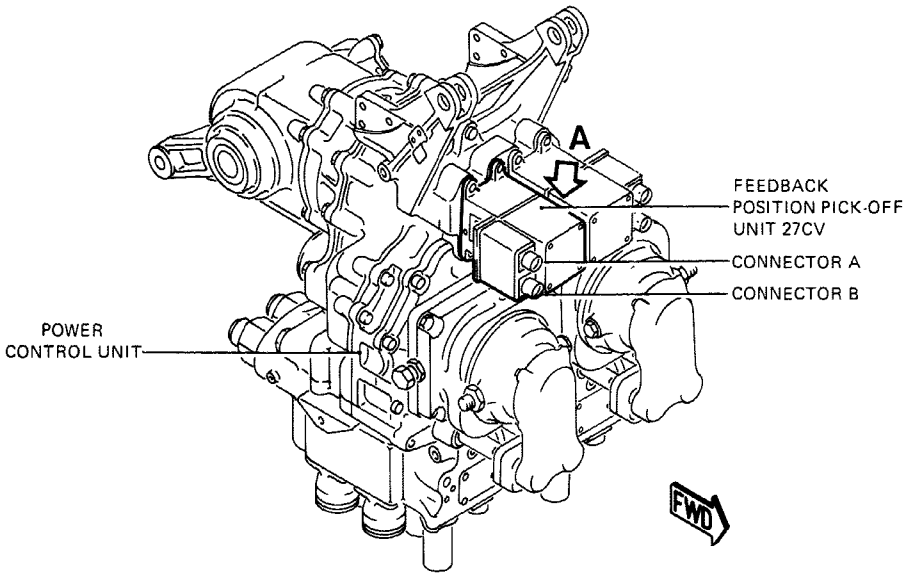
H. BITE DISPLAY Maintenance Indicators (52CV, 53CV)

(1)The maintenance indicators provide cockpit indication that a flap or slat drive fault has been detected and isolated and is indicated on the associated computer, SFCC1 or SFCC2. Maintenance indicator 52CV labelled SFCC1 BITE DISPLAY comes on to indicate a SFCC1 detected fault, and maintenance indicator 53CV labelled SFCC 2 BITE DISPLAY comes on to indicate a SFCC 2 detected fault.

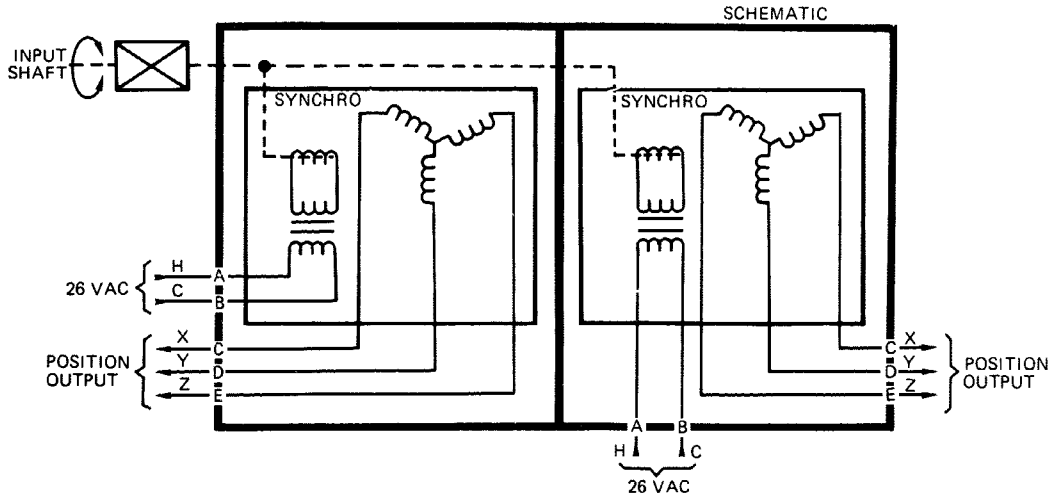
(2)Each indicator contains "set" and "reset" coils which control contact sets. For detailed description of the "set" and "reset" functions, refer to 33-17-00.

5. Operation

A. Generation of Electrical Drive Commands
(Ref. Fig. 009)



A



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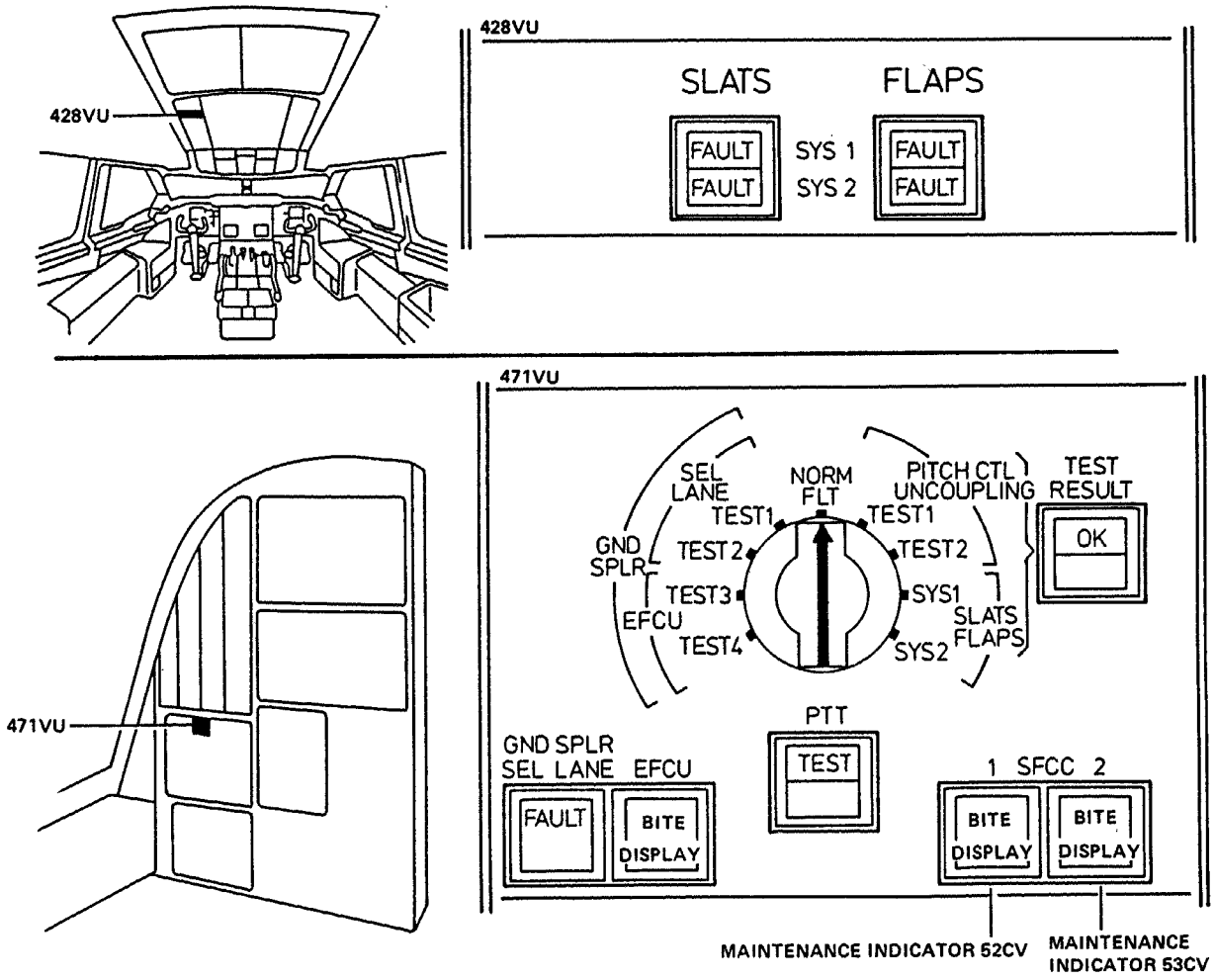
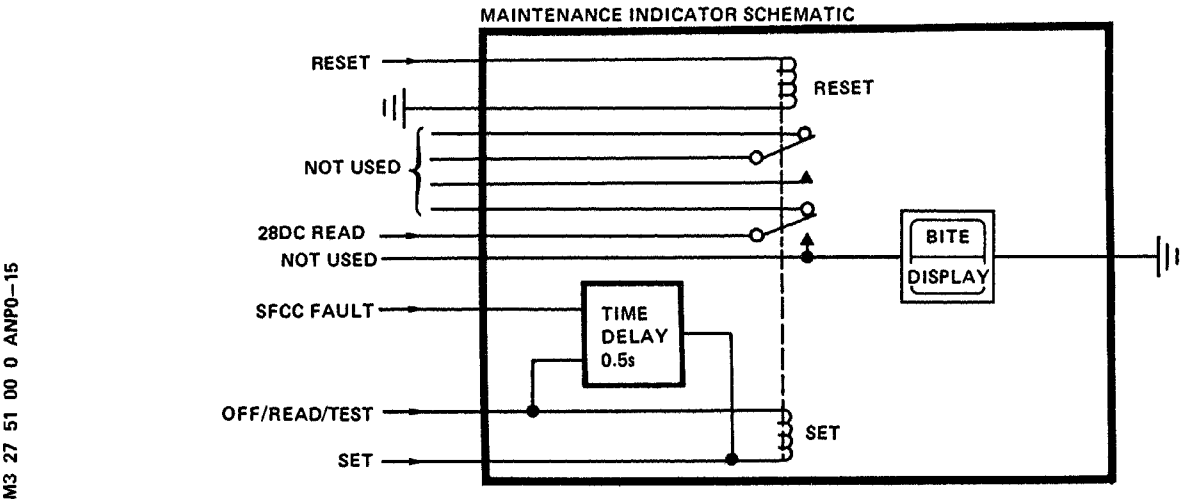
Feedback Position Pick-off Unit
Figure 007





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BITE DISPLAY Maintenance Indicators
Figure 008

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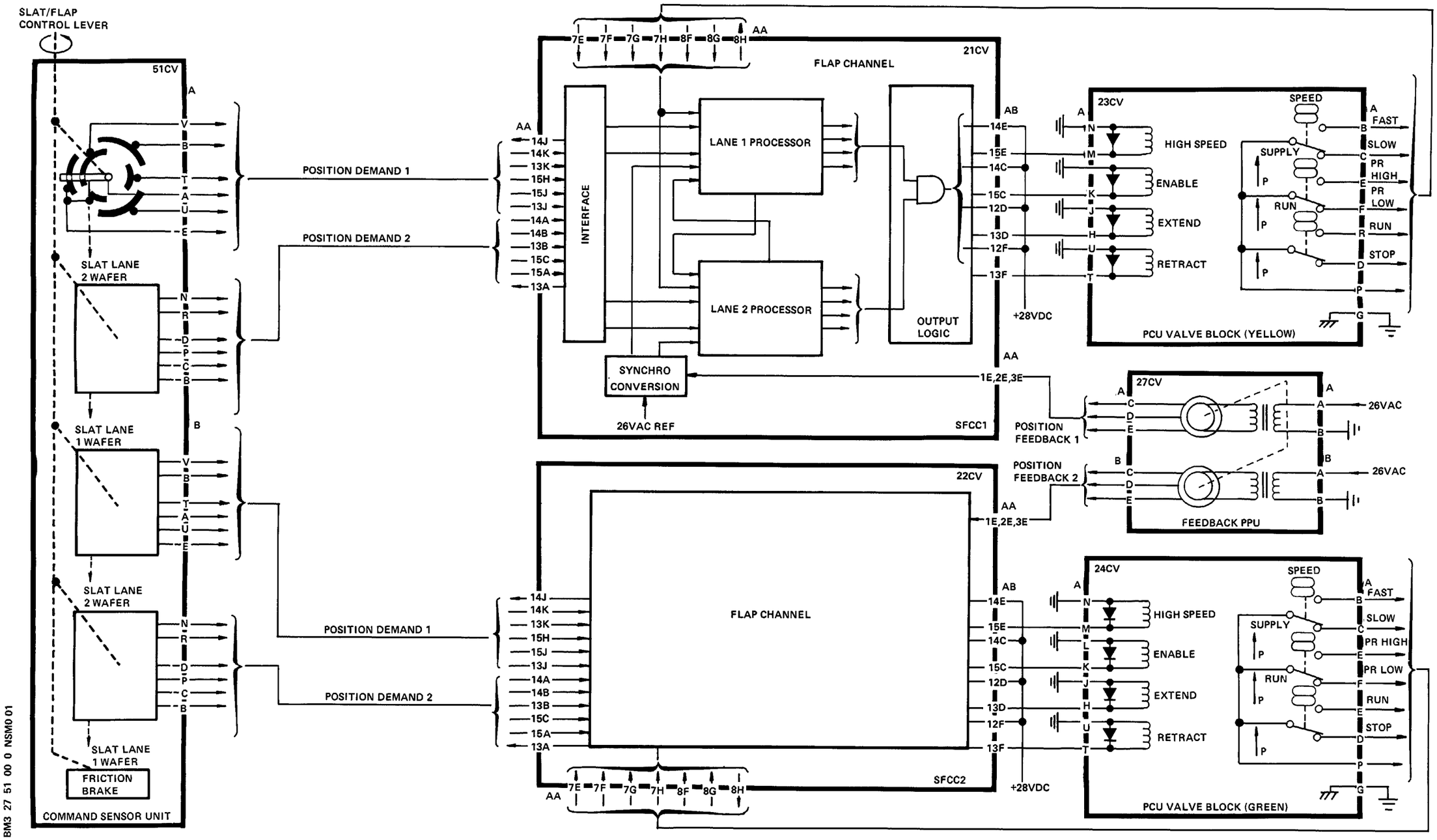


Electrical Control - Schematic Diagram
Figure 009

(1)In each SFCC flap channel, the position input demands from two separate switch wafers are applied to lane processors 1 and 2. The lane processors compare the position demands to ensure the integrity of the demand. If the demand signals are valid, they are compared with actual flap position signal provided by the FPPU located on the flap PCU. If there is a difference between the demanded position and the actual flap position, and no fault exists, each lane processor generates drive commands.

(2)Drive commands from lane processors 1 and 2 are combined using AND logic to ensure that drive commands are only transmitted if both lane processors generate identical commands.

B. Valve Block Electrical Control

(Ref. Fig. 010)

(Ref. Fig. 011)

(1)Drive commands from SFCC 1 are applied to the high-speed, enable, and extend or retract solenoid valves on the YELLOW system PCU valve block and from SFCC 2 to the corresponding solenoid valves on the GREEN system PCU valve block.

(2)The SFCC drive command energizes the enable valve and one of the directional valves (extend or retract). The pressure-off brakes in the flap PCU are released and the hydraulic motors drive the transmission system in the low speed mode (Ref. 27-54-00). After 200 msec the high speed solenoid valve is energized opening the speed-change valve and the motors run at high speed.

NOTE : The 200 msec time delay makes certain that the pressure-off brakes are fully released. This reduces brake wear.

The flaps continue to move at high speed until the low speed threshold is met. This point is defined as "the point at which to close the high speed valve". When this point is reached, the high speed solenoid valve is de-energized and the system moves into the low speed mode (approximately 10% of high speed). The flaps continue to move in low speed until the target position threshold is met. This point is defined as "the point before the target point at which to close the directional valve". When this point is reached, the directional and enable solenoid valves are de-energized. The pressure-off brakes in the flap PCU are applied and the system is stopped.

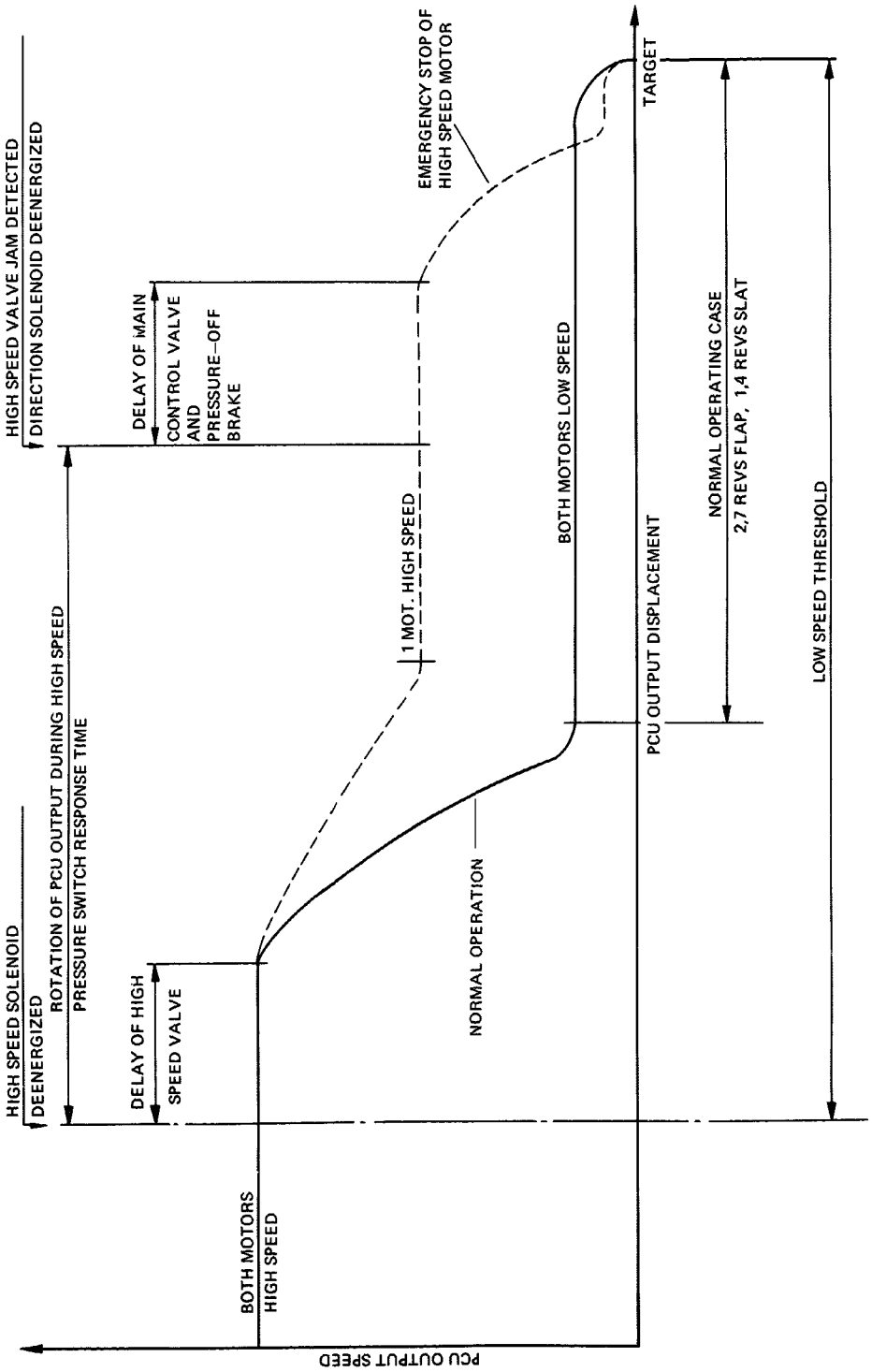
The movement that takes place between the target position threshold and the target point is that movement due to system inertial lag, i.e. the time taken from initiating the command to stop and the time it takes to de-energize the enable and directional solenoid valves and for the pressure-off brakes to bring the system to a complete stop.

C. Valve Block Monitoring

(1)The valve block operation is monitored by three pressure switches:

- the supply pressure switch monitors the enable valve position,
- the drive pressure switch monitors the main control valve position,
- the high speed pressure switch monitors the speed change valve position.

The SFCC compares the input from the pressure switches with the valve position command discrete and initiates fault action



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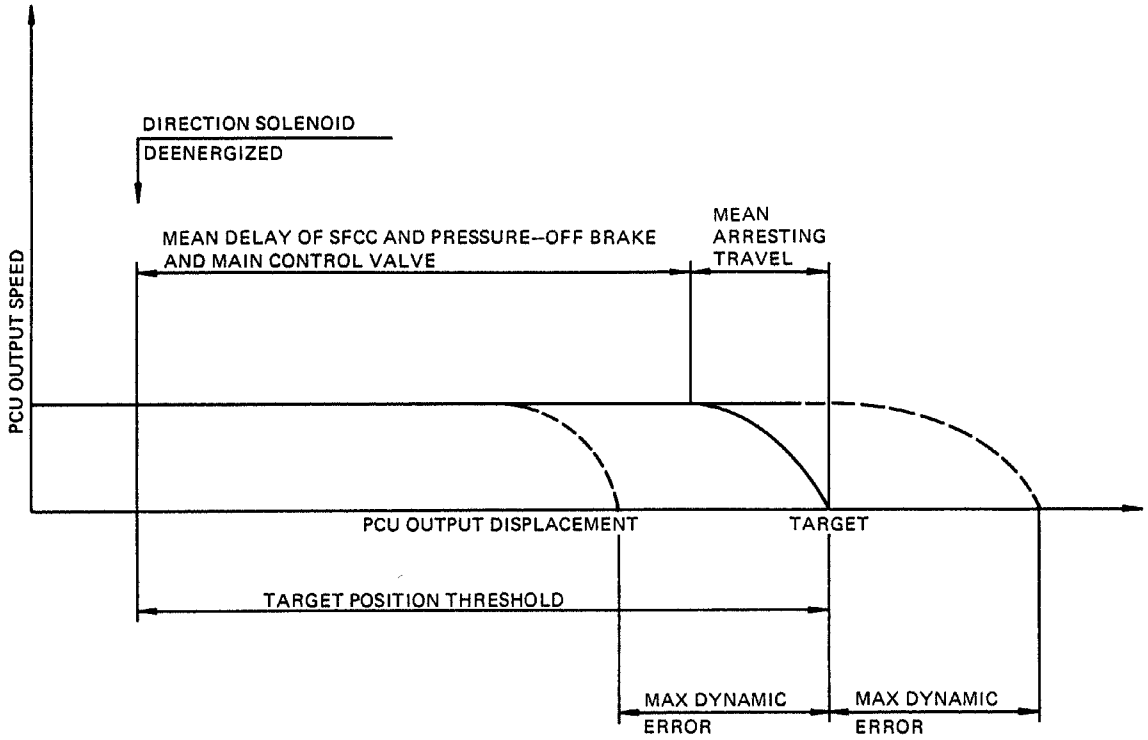
Low Speed Threshold - Graph
Figure 010



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Target Position Threshold - Graph
Figure 011

(Ref. Fault Action Table) if:
- low pressure is indicated when a valve is commanded open
- high pressure is indicated when a valve is commanded close.

R D. Monitoring and Fault Warning

Control functions are monitored by comparison and credibility checks to ensure correct operation of the system. Detection of any failure that cannot be corrected de-energizes all control valve solenoids on the associated PCU.

The SFCC monitors the following functions:
- SFCC internal power
- SFCC synchro excitation
- SFCC lane cross
- Enable valve position and system pressure
- Main control valve position
- High speed valve position
- Command sensor unit
- System jam detection
- Half speed detection
- Asymmetry
- Runaway

R - Krueger flap position (27-89-00)
- ARINC 429 input

R The fault action comprises

R - Motor stop

R - FAULT indication (17CV on overhead panel) comes on (but does not latch)

R - BITE DISPLAY (maintenance panel) latches on

R - FLT CTL plus message comes on on left ECAM display

R - SFCC failure code, latches on.

(Ref. Fig. 012)

FAULT ACTION TABLE

MONITOR/FAULT	ASSOCIATED MOTOR	FAULT 17CV	BITE DISPLAY	FLT CTL	SFCC CODE	SYSTEM STATUS
1. CSU (FAIL) (PATTERN)	STOP	ON	ON	ON	ON	1/2 speed
2. SYNCHRO VOLTS (low with 28V valid)	STOP	ON	-	ON	ON	1/2 speed
3. LANE CROSS MONITOR (any detected fault)	STOP	ON	ON	ON	ON	1/2 speed
4. ENABLE VALVE						
a. (high pressure with 'low'	STOP	ON	ON	ON	ON	1/2 speed

MONITOR/FAULT	ASSOCIATED MOTOR	FAULT 17CV	BITE DISPLAY	FLT CTL	SFCC CODE	SYSTEM STATUS
command)						
b. (low pressure with 'high commanded)	STOP	ON	-	ON	-	1/2 speed
5. MAIN CONTROL VALVE (not in commanded position)	STOP	ON	ON	ON	ON	1/2 speed
6. HIGH SPEED VALVE						
a. (Valve closed with 'open' command)	-	-	ON	-	ON	Approx. 60% high speed.
b. (Valve open with 'close command)	STOP	ON	ON	ON	ON	1/2 speed
7. HALF SPEED (when both motors high speed commanded)	-	-	ON	-	ON	1/2 speed
8. SYSTEM JAM	STOP (Both motors)	ON/ON	ON/ON	ON	ON	STOPPED
9. ASYMMETRY OR RUNAWAY	STOP (Both motors)	ON/ON	ON/ON	ON	ON	STOPPED
10. ARINC429 INPUT (Data invalid - no data)	-	-	ON	-	ON	-

NOTES
Fault 1 - 10-second delay before pattern warning
- If pattern becomes valid, system reverts to normal
Fault 2 - System monitor inoperative
- If fault clears, system reverts to normal

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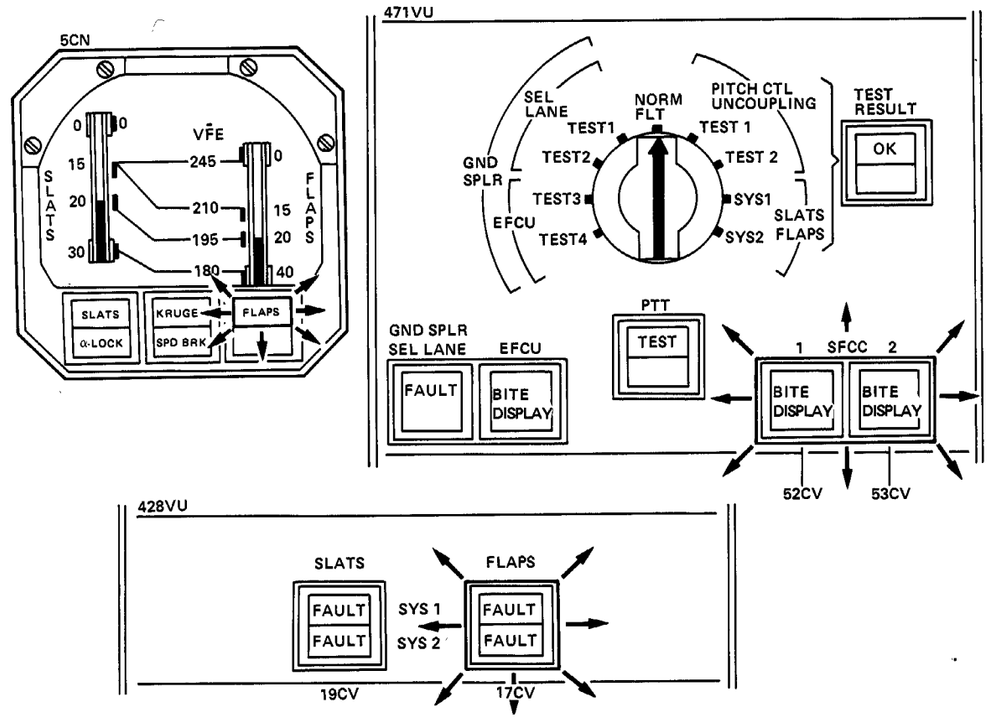

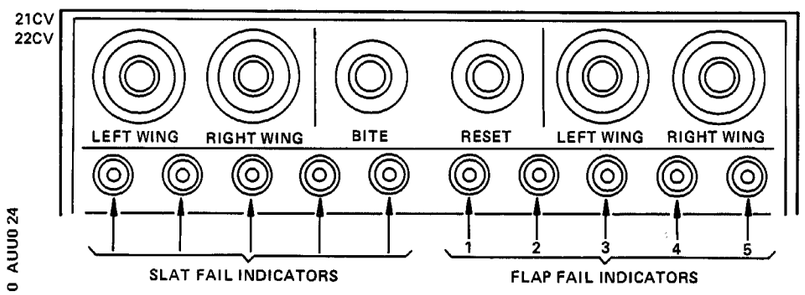

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FAULT CONDITION	FAILURE INDICATIONS									REMARKS
	SFCC FAIL INDICATORS (21CV/22CV)					FAULT ANNUN-CIATOR (17CV)	MAINTENANCE INDICATOR (52CV/53CV)	ECAM	SLAT/FLAP POSITION INDICATOR (5CN)	
	1	2	3	4	5					
–	0	0	0	0	1	–	–	–	–	SFCC FAILURE CODE NOT ALLOCATED
LH VANE IN JAM 2	0	0	0	1	0	FAULT	BITE DISPLAY	FLT CTL	–	REFER TO 27–56–00
LH VANE IN JAM 1	0	0	0	1	1	FAULT	BITE DISPLAY	FLT CTL	–	
LH VANE OUT JAM	0	0	1	0	0	FAULT	BITE DISPLAY	FLT CTL	–	
RH VANE OUT JAM	0	0	1	0	1	FAULT	BITE DISPLAY	FLT CTL	–	
RH VANE IN JAM 2	0	0	1	1	0	FAULT	BITE DISPLAY	FLT CTL	–	
RH VANE IN JAM 1	0	0	1	1	1	FAULT	BITE DISPLAY	FLT CTL	–	
–	0	1	0	0	0	–	–	–	–	SFCC FAILURE CODE NOT ALLOCATED
FLAP ASYMMETRY	0	1	0	0	1	FAULT	BITE DISPLAY	FLT CTL	FLAPS	REFER TO 27–56–00
RUNAWAY	0	1	0	1	0	FAULT	BITE DISPLAY	FLT CTL	FLAPS	
HIGH SPEED PRESSURE SWITCH CONTACT FAULT	0	1	0	1	1	*	BITE DISPLAY	*	–	* "FAULT" AND "FLT CTL" INDICATIONS PRESENT IF SWITCH FAILURE PREVENTS PCU MOTOR OPERATION
DRIVE PRESSURE SWITCH CONTACT FAULT	0	1	1	0	0	*	BITE DISPLAY	*	–	
MAIN CONTROL VALVE FAILURE	0	1	1	0	1	FAULT	BITE DISPLAY	FLT CTL		REFER TO 27–54–00
HIGH SPEED VALVE FAILURE	0	1	1	1	0	*	BITE DISPLAY	*	–	* "FAULT" AND "FLT CTL" INDICATIONS PRESENT IF VALVE IN HIGH SPEED POSITION WITH LOW SPEED SELECTED
SYSTEM JAM (NO FLAP MOVEMENT)	0	1	1	1	1	FAULT	BITE DISPLAY	FLT CTL	–	* FLAPS IF WTB ARM FROM OTHER CHANNEL IS PRESENT
LH ASYMMETRY PPU	1	0	0	0	0	FAULT	BITE DISPLAY	FLT CTL	*	
RH ASYMMETRY PPU	1	0	0	0	1	FAULT	BITE DISPLAY	FLT CTL	*	
FEEDBACK PPU	1	0	0	1	0	FAULT	BITE DISPLAY	FLT CTL	*	
CSU SWITCH PATTERN	1	0	0	1	1	FAULT	BITE DISPLAY	FLT CTL	–	10 SECOND DELAY BEFORE WARNINGS GENERATED
ENABLE VALVE JAMMED OPEN	1	0	1	0	0	FAULT	BITE DISPLAY	FLT CTL	–	–
SUPPLY PRESSURE SWITCH CONTACT FAULT	1	0	1	0	1	*	BITE DISPLAY	*	–	* "FAULT" AND "FLT CTL" INDICATIONS PRESENT IF SWITCH FAILURE PREVENTS PCU MOTOR OPERATION
HALF SPEED OPERATION (MOTOR JAM)	1	0	1	1	0	–	BITE DISPLAY	–	–	REFER TO 27–54–00
LOSS OF DATA FROM ADC1	1	0	1	1	1	–	BITE DISPLAY	–	–	NO ARINC DATA (LABEL 271+206) RECEIVED FOR MORE THAN 10 SEC. DURING FLIGHT
LOSS OF DATA FROM ADC2	1	1	0	0	0	–	BITE DISPLAY	–	–	
LOSS OF WING–TIP BRAKE POWER	1	1	0	0	1	–	BITE DISPLAY	–	–	REFER TO 27–56–00
LOSS OF LH WING–TIP BRAKE	1	1	0	1	0	–	BITE DISPLAY	–	–	
LOSS OF RH WING–TIP BRAKE	1	1	0	1	1	–	BITE DISPLAY	–	–	
–	1	1	1	0	0	–	–	–	–	SFCC FAILURE CODES NOT ALLOCATED
–	1	1	1	0	1	–	–	–	–	
–	1	1	1	1	0	–	–	–	–	
SFCC FAILURE	1	1	1	1	1	FAULT	BITE DISPLAY	FLT CTL	–	–
LOW HYDRAULIC PRESSURE (SUPPLY PRESSURE SWITCH IN LOW POSITION WHEN ENABLE VALVE COMMANDED OPEN)	0	0	0	0	0	FAULT	–	FLT CTL	–	NO SFCC FAILURE CODE MOTOR INHIBITED BUT ENABLE VALVE REMAINS OPEN (REFER 27–54–00)
26VAC OR 28VDC POWER SUPPLY FAILURE	0	0	0	0	0	FAULT	–	FLT CTL	–	NO SFCC FAILURE CODE

NOTE: FOR WARNING CRT PAGE DISPLAYS, REFER 31–51–00 (OR ECAM DATA BOOK 31–52–00)

Continuous Monitoring-
Failure Modes and Fault Indications
Figure 012

Fault 3 - System inhibited for rest of flight.
Fault 4a - Will reset on receipt of new CSU command.
b - If low pressure fault clears, system reverts to normal
Fault 5 - Will reset on 'power up'.
Fault 6a - None
b - 60% of high speed if one motor operating normally.
- Will reset on 'power up'.
Fault 7 - Only monitored in flight.
- System continues to operate unless fault detected by another monitor
- Half speed monitor only when both motors high speed commanded
Fault 8 - Motors stop after 4 seconds
- If opposite selection is made on the lever, system will attempt to drive. Refer to text.
Fault 9 - System inhibited for the rest of the flight
- System torque limiter lockout indicator will require check

R (1)SFCC Internal Power Monitor
If the internal power is low when the 28 V DC is valid, fault action is taken.

R (2)SFCC Synchro Excitation Monitor
Fault action is initiated if the 26 V AC synchro power is low when the 28 V DC is valid.

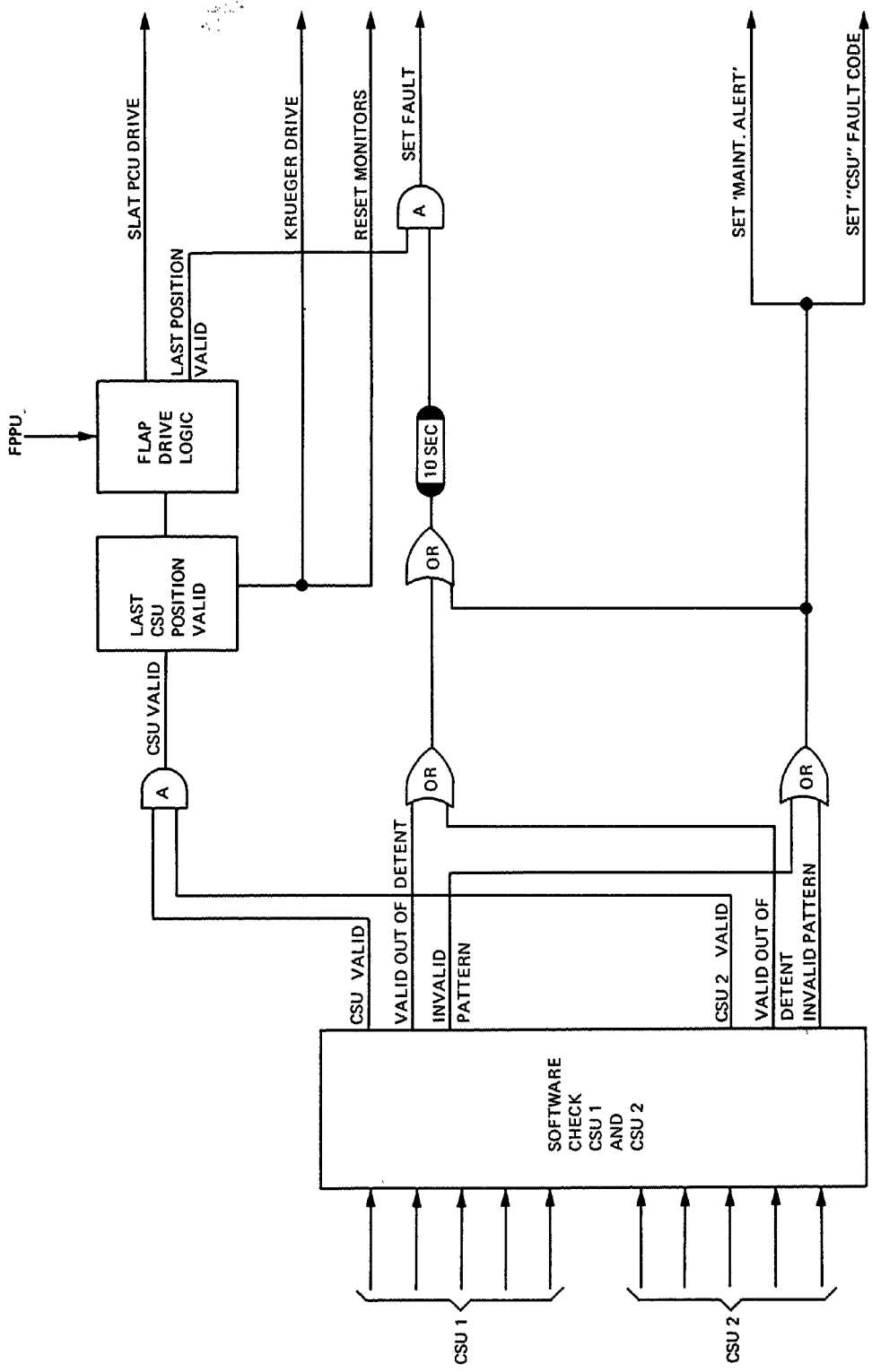
R (3)SFCC Lane Cross Monitor
The lane cross monitor receives four solenoid valve control discretes from the other lane and compares them with those generated within its own lane. If there is a discrepancy it is interpreted as a SFCC failure and fault action is initiated.
NOTE : In the slat channel the two Krueger flap position discretes are also monitored (Ref. 27-81-00).
The lane monitor also compares the CSU input to both lanes. If a discrepancy exists, CSU failure is interpreted and fault action is initiated.
NOTE : The lane cross monitor does not monitor the CSU pattern.

R (4)Enable Valve Position and System Pressure Monitor
The monitor is fed a pressure discrete from the supply pressure switch. Fault action is initiated if:
- Low pressure is indicated when the enable valve is commanded open
R - High pressure is indicated when the enable valve is commanded closed.
If the monitor detects low pressure, the system jam detection monitor is inhibited.

R (5)Main Control Valve Position Monitoring
The drive pressure switch provides a main control valve position discrete. Fault action is initiated if the main control valve is not in the commanded position or if the pressure switch is faulty.

R (6)High Speed Valve Position Monitoring
The high speed pressure switch provides a high speed valve position discrete. Fault action is initiated if the high speed valve is not in the commanded position or if the pressure switch is faulty.

R (7)CSU Pattern Validity Monitor
(Ref. Fig. 013)
The CSU pattern is monitored in both lanes. If the CSU pattern is



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CSU Monitor
Figure 013

invalid after a 10 second period all drive commands to the flap, slat and Krueger control valves are inhibited, the valves are inhibited, fault indications are generated and the last commanded position is maintained. The uncommanded movement monitor is disabled. If a new valid command is received, the system returns to normal and the following monitors are reset:

- CSU pattern
- System jam detect
- Position pick-off monitor
- Krueger.

R (8) System Jam Detect Monitor
(Ref. Fig. 014)

R A system jam is defined as: "A system speed less than between
R 1.5 ± 0.5% of nominal speed for a period longer than 4 seconds, when a valid command has been made".

If a system jam is detected, fault action is initiated. If a new
R position is selected on the slat/flap control lever, the system attemps to drive again. If the detected jam is cleared by selecting to a new position, the FAULT annunciator (17CV) goes off. The BITE DISPLAY annunciator on the FLIGHT CONTROLS section of maintenance panel 471VU and the failure code on the SFCC remain set, but can be cleared by pressing the RESET pushbutton switch on the maintenance panel.

R (9) Half Speed Detection Monitor
(Ref. Fig. 015)

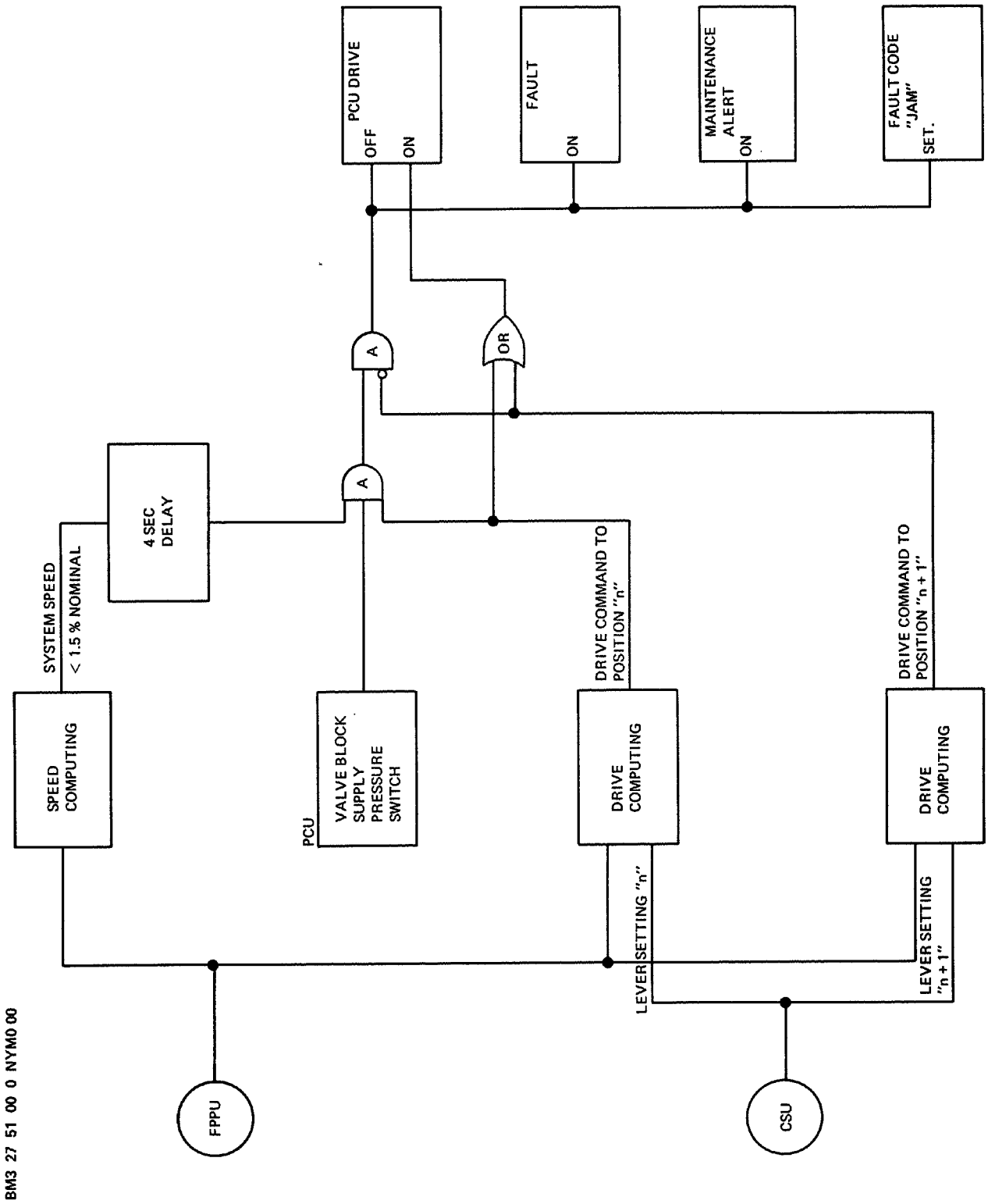
Half speed is defined as "slower movement of the surfaces than the probable minimum combined speed of two motors".

The monitor only functions when high speed has been commanded.

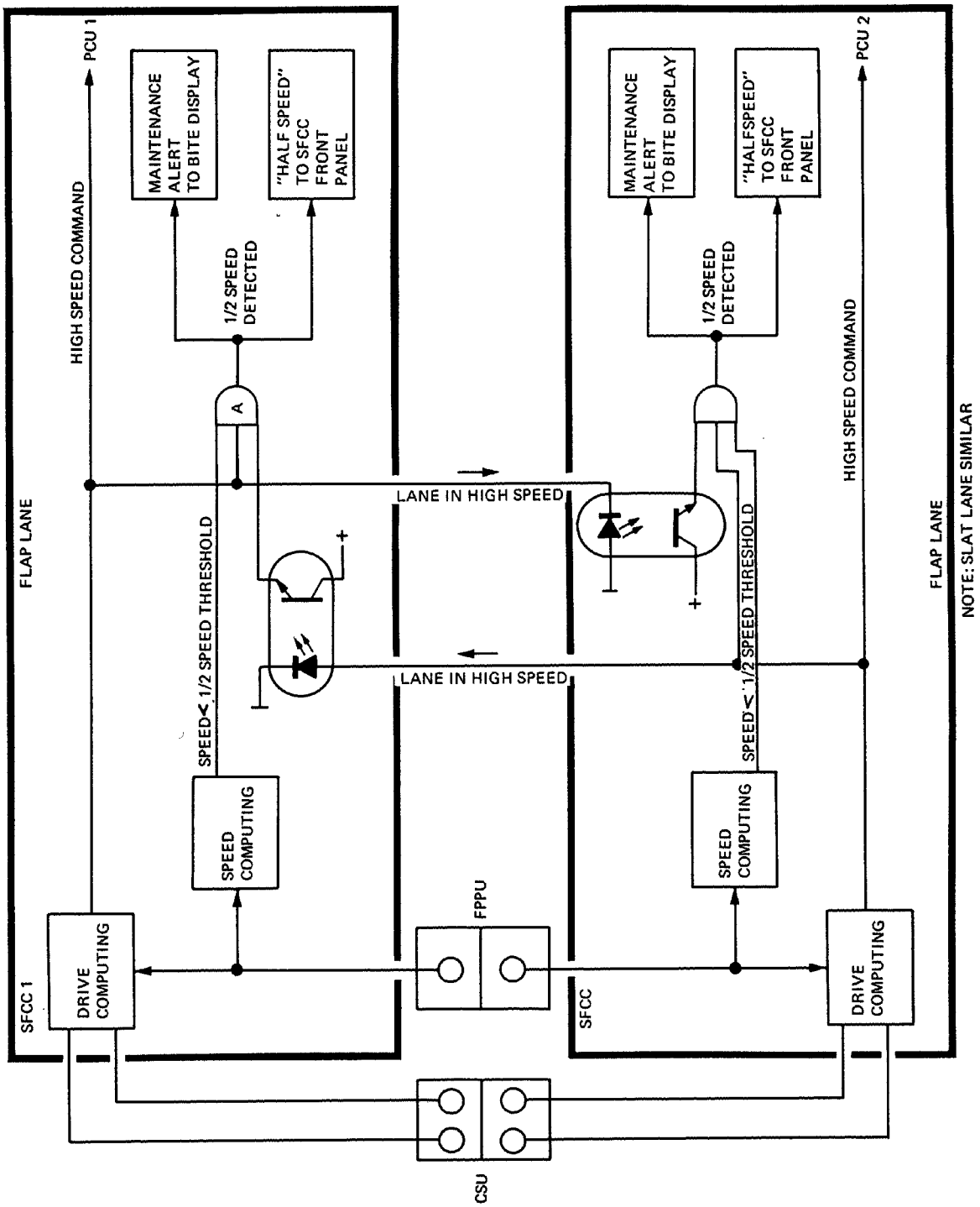
If a half speed fault is detected, the BITE DISPLAY annunciator, on the FLIGHT CONTROLS section of maintenance panel (471VU) comes on and a half-speed fault code is stored in the SFCC. The half speed monitor is inhibited if the other system has been shut down.

R (10) Asymmetry Monitoring
(Ref. Fig. 016)

R Asymmetry is defined as:
R - a position difference between only one APPU and the FPPU synchro
R ≥2.007° synchro angle (1.996 torque shaft revs. approx.) at
R APPU together with a position difference between both APPU synchros
R of ≥0.879° synchro angle (0.874 torque shaft revs. approx.).
R Asymmetry is monitored by the PPU monitor in each flap channel. If
R asymmetry is detected in both channels, an "arm" signal is exchanged
R between channels. On receipt of the arm signal, fault action is
R initiated and the flap channel in each SFCC is inhibited for the rest of
R the flight.
R If a monitor detects asymmetry but does not receive an arm signal from
R the other channel, a PPU failure is assumed.



System Jam Detect Monitor
Figure 014



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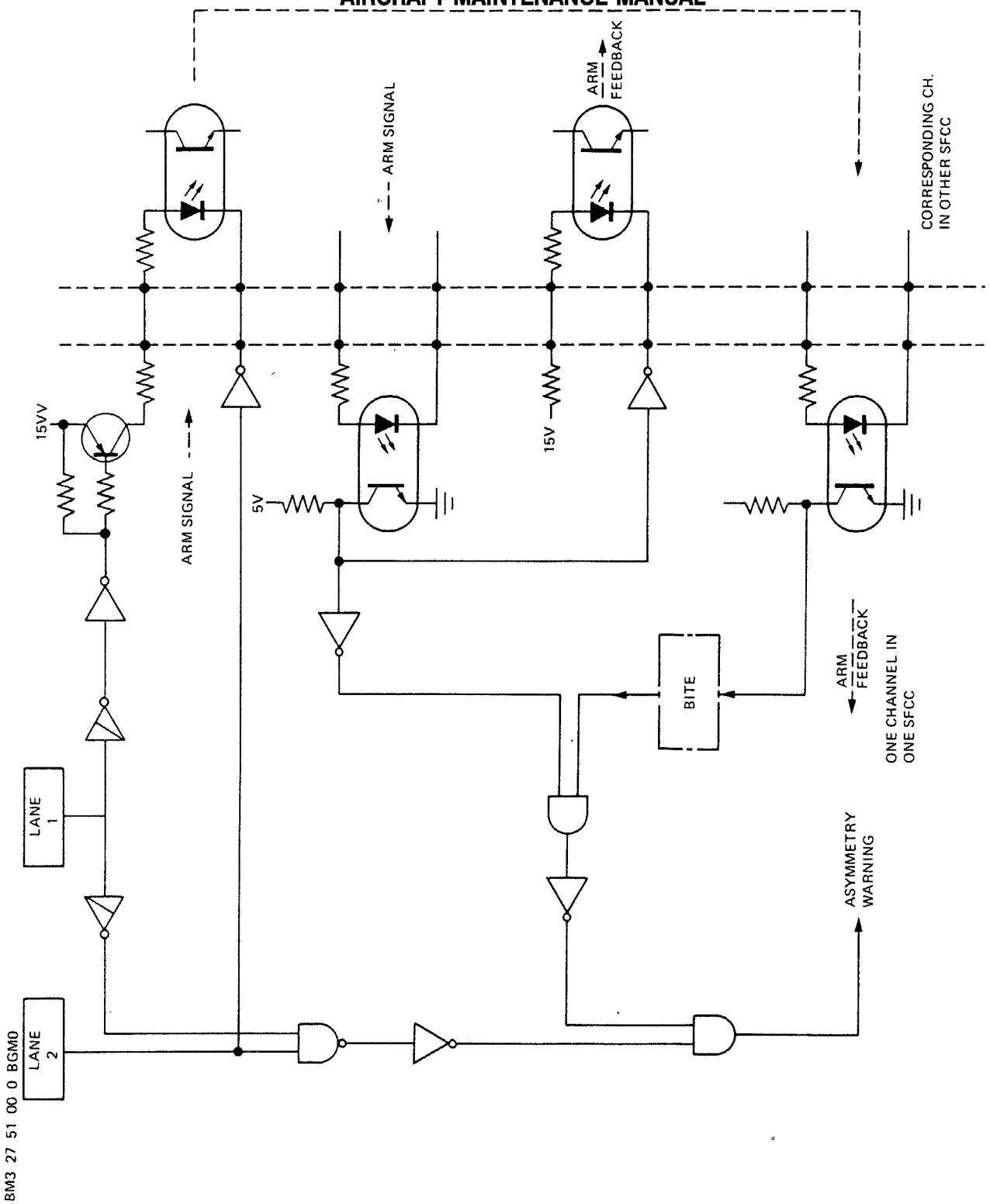
Half Speed Detection Monitor
Figure 015

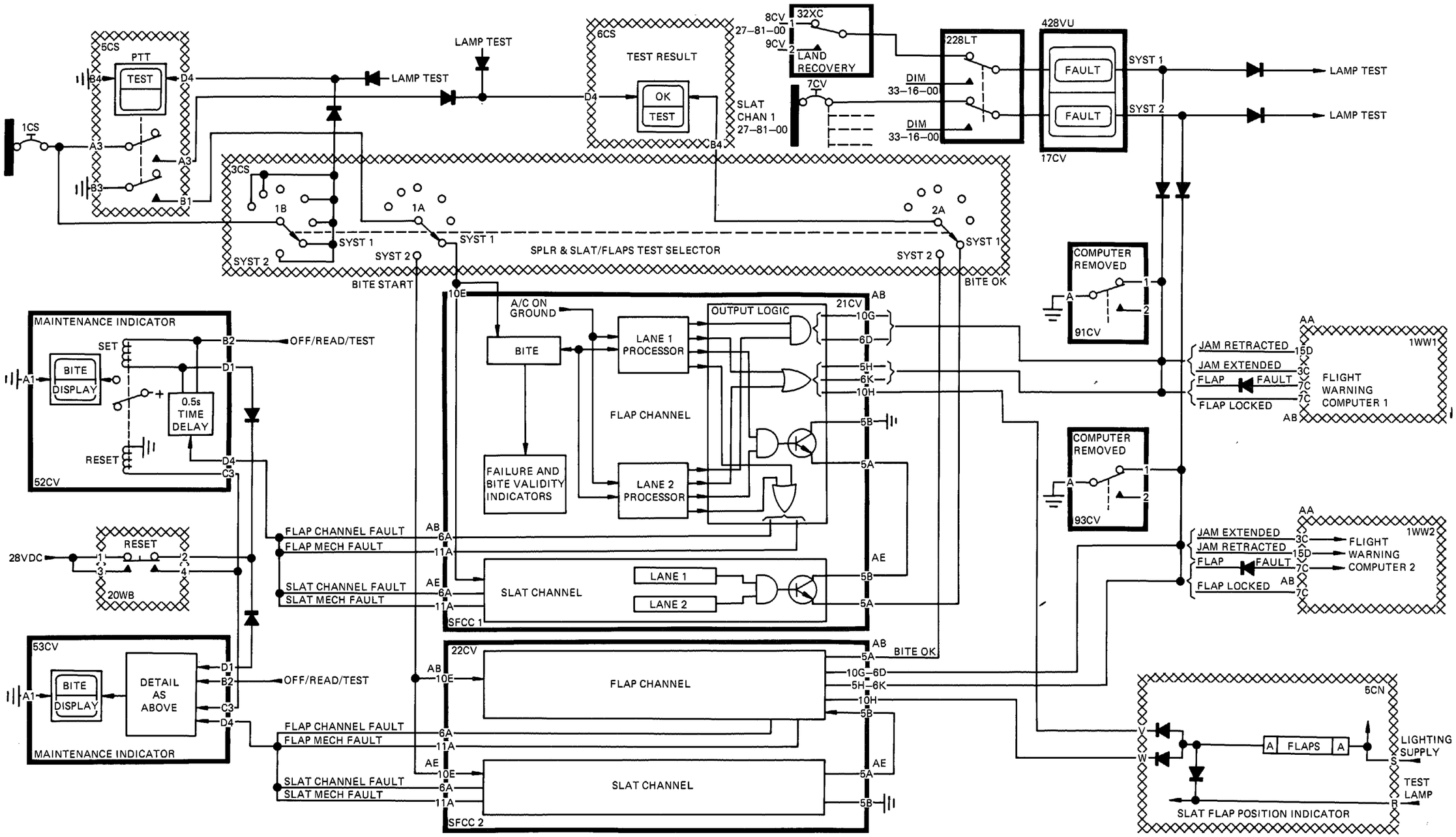


Asymmetry Monitor
Figure 016

R (11)Runaway Monitoring
R Runaway is interpreted if:
R - there exists a position difference between only one APPU synchro and
R the FPPU synchro of ≥2.007° synchro angle (1.996 torque shaft
R revs. approx.) at APPU together with a position difference
R between both APPU synchros of <0.879° synchro angle (0.874
R torque shaft revs. approx.) or
R - a position difference at both APPU relative to the FPPU synchro
R of ≥2.007° synchro angle (1.996 torque shaft revs. approx.)
R at APPU exists.
R The uncommanded movement monitor detects the following faults:
R - overtravel of the FPPU synchro with respect to the CSU command
R position if ≥1.6° (1.59 FPPU input shaft revs.)
R - movement in the wrong direction at the FPPU when a drive command is
R present
R - movement away from the stopped position at the FPPU when there is no
R drive command present.
R If flap runaway is detected in either flap channel, fault action is
R initiated and an arm signal is sent to the other channel. If an arm
R signal is received from the other channel, both channels are inhibited
R for the rest of the flight, fault action is taken and indicated on the
R SFCC front face.
R NOTE : Once inhibited the SFCC can only be reset on the ground.
R If a monitor detects slat runaway but does not receive an arm
R signal from the other channel, a PPU failure is assumed.
R (12)Position pick-off monitoring
If only one channel detects asymmetry or runaway, a PPU failure is assumed. When this occurs, the associated motor is stopped, fault action is initiated, and the appropriate PPU fault code is displayed on the SFCC front panel. A WTB "arm" discrete is transmitted to the other channel and the system operates at half speed.
R (13)Kruger monitoring
R The Kruger is monitored by the slat channel and compares command with
R position as indicated by position switches. A fault warning is generated
R if the position and command differ. After a new command a 10 second
R delay is introduced before the warning is given (Ref. 27-89-00).
R (14)ARINC 429 input monitoring
Each channel of the SFCC receives two ARINC 429 inputs from the air data computers (ADC)
- computed airspeed (CAS) Label 206 Octal
- corrected angle of attack (CAOA) Label 241 Octal.
Each channel receives data from both ADC 1 and ADC 2. The monitor checks parity of the data. If only one set of data is valid, this data is used by both channels. If the data from both ADC 1 and ADC 2 is invalid, fault action is initiated.
If during flight no data is received for a period exceeding 10 seconds, fault action is initiated.
R Data from the two ARINC 429 sources is used in the slat channel
R computing to inhibit retraction of slat surfaces below seventeen
R degrees if a high angle of attack is detected. This function is
R provided as long as valid air data information is available from

R one ARINC 429 source.
R (15)Fault Action
R (a)If a fault condition is detected which prevents motor operation, lane
R processors 1 and 2 take appropriate action to arrest flap movement and
R inhibit subsequent operation. If a fault condition is detected which
R does not prevent motor operation, flap operation is not inhibited.
R (b)Two relays in each computer system, 90CV and 91CV (SFCC1), 92CV and
R 93CV (SFCC2) provide slat and flap FAULT warnings if a computer is
R removed.
R (c)The SFCC also generate fault and warning discretes for the Electronic
R Centralized Aircraft Monitoring (ECAM) system, slat/flap position
R indicator and FLAP SYS control switches. Detected faults attributed
R to the flap drive system are defined by the fail indicators on SFCC 1
R and 2 front panels. When these indicators are set, fault indication
R discretes are fed to the appropriate BITE DISPLAY maintenance indicator
R (52CV - SFCC 1, 53CV - SFCC 2) on panel 471VU.
R (d)Fault discretes fed to the ECAM system define the nature of the fault
R and display the appropriate text page on the warning CRT.
(Ref. Fig. 017)

E. Test
(1)Test
(a)General
Self test facilities are provided to
- detect and indicate failures in redundant and dormant circuits
- identify failed electrical Line Replaceable Units (LRU).
Self test can be initiated from the flight deck or from the front panel of the SFCC.
The ANN LT switch on maintenance panel 472VU provides a fault read facility.
(b)ANN LT Switch
The ANN LT switch is a three position switch placarded TEST/READ/OFF. When the switch is selected to the READ position and a fault warning is stored in a SFCC (combined with fault code indication on the SFCC front panel), the SFCC 1 BITE DISPLAY or SFCC 2 BITE DISPLAY will come on. To reset, the SFCC fault codes must first be cleared (by pressing RESET button on SFCC front face) and then the MFA reset pushbutton on maintenance panel 471VU must be pressed.
(c)Self Test (from flight deck)
To enable the self test, the rotary selector on the FLIGHT CONTROLS section of maintenance panel 471VU must be set to the correct position (SYS1 or SYS2) for the system to be tested. When this has been accomplished, the PTT pushbutton switch TEST legend comes on to indicate that self test is possible. To initiate the test the PTT pushbutton switch is pressed and held depressed long enough for the system to complete the test cycle (approx. 10 secs.).
(d)The test is satisfactory if the following indications appear
- OK annunciator on FLIGHT CONTROLS section of maintenance panel 471VU comes on
- FAULT legends on flap/slat annunciators (panel 428VU) come on.
- On the slat/flap position indicator 5CN, the FLAP SLAT and KRUGER



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BITE and Fault Indication - Schematic Diagram
Figure 017

annunciators come on and the ALPHA LOCK annunciator flashes at 2Hz.
- The appropriate messages appear on the ECAM display CRT.

(e)If the OK annunciator does not come on, either the computer under test is at fault or there is a faulty (high resistance) solenoid in a Wing Tip Brake (WTB). In the latter case the appropriate fault indication will appear on the SFCC front panel.

(f)The OK annunciator will come on flashing for any of the following reasons:
- Wing Tip Brake (WTB) 28 V DC supply low
- WTB "Arm" opto-isolator feedback not present (other SFCC not powered or not installed)
- WTB solenoid open circuit
- Synchro excitation and SFCC reference 26 V/400 Hz supply low.

(2)Self Test (from SFCC front panel)

Self test may be performed directly from the SFCC provided only that the aircraft is on the ground and both channels of the SFCC are powered. When the BITE pushbutton on the computer is pressed and held. the test sequence is initiated. If there are no faults, the two green PASS annunciators come on.

If one or both PASS annunciators come on flashing, one of the following is indicated:
- Wing Tip Brake (WTB) 28 V DC supply low
- WTB "Arm" opto-isolator feedback not present (other SFCC not powered or not installed)
- WTB solenoid open circuit
- Synchro excitation and SFCC reference 26 V/400 Hz supply low.

If any PASS annunciator fails to come on, either a fault has been detected in that channel or a high resistance WTB solenoid has been detected in which case the appropriate fault code indications will appear.

(3)Computer Removed Warning.

When SFCC1 and SFCC2 are in position, four relays 90CV, 91CV (SFCC1) and 92CV and 93CV (SFCC2) are energized. If a computer is removed, the two associated relays are de-energized and the SLAT and FLAP FAULT annunciators come on.

F. Power Supplies

(Ref. Fig. 018)

(1)During normal operation, electrical power is derived from the following busbars:
- 28 V DC bus 106PP (SFCC 1, PCU valve block, YELLOW)
- 28 V DC bus 104PP (SFCC 2, PCU valve block, GREEN)
- 26 V AC bus 331XP (SFCC 1, feedback PPU)
- 26 V AC bus 231XP (SFCC 2, feedback PPU)

(2)Bus 106PP and 331PP consumers are "shed" if smoke is detected in the flight compartment or main electronic bay (smoke emergency configuration). To allow the flaps and slats to be extended for landing, the AC and DC supplies for SFCC 1 and FPPU are routed through contacts on power transfer relay, 31XC. This relay is energized when the LAND RECOVERY pushbutton on panel 424VU is pressed (ON selected). The normally open contacts provide alternative power supplies from

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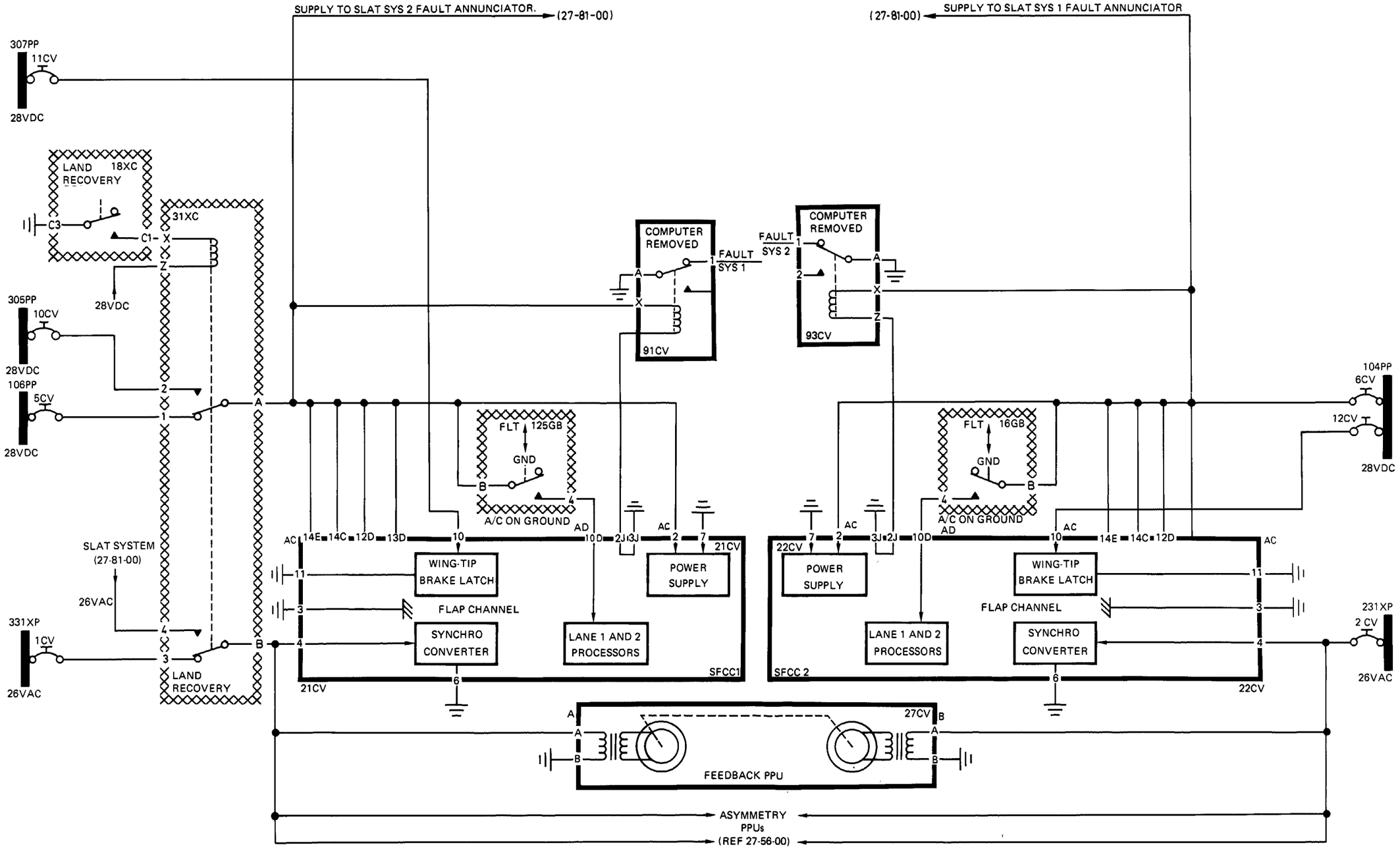

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Power Supply Distribution - Schematic Diagram
Figure 018

buses 305PP (28 V DC) and 431XP (26 V AC). Buses 104PP and 231XP are also "shed" in the smoke emergency configuration but no alternative supplies are provided for recovery. Thus when the LAND RECOVERY push-button is pressed, the flap system operates through SFCC 1 only, providing flap drive at half speed.

(3) Power for the wing-tip brake latches in SFCC 1 and 2 is derived from the primary 28 V DC inputs to the system. The 26 V AC supplies for the APPU (Ref. 27-56-00) are derived from the primary 26 V AC inputs to ensure correct co-phasing of the position synchro signals.

1. Operational Test

A. Flap/Slat Wing Tip Brake Solenoid Test and Flap/Slat Bite Test
(1)Reason for the Job
(a)Test of wing tip brake solenoid electrical integrity.
(b)Test of flap/slat bite system to make certain that there are no dormant faults in the asymmetry and power transmission monitoring circuits.
(2)Referenced Procedure
- 24-41-00, P. Block 301 AC External Power Control
(3)Procedure
(a)Job Set-Up
1 Open access door 121BL or 211PZ.
2 Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
3 Make certain that electronics racks ventilation is correct.
4 Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM/FLT WARN MONITOR	24WW	108/B7
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS & SLATS/POS/ECAM	2CN	334/S65
133VU	FLT CTL/FLAPS & SLATS/POS/IND	1CN	334/S66
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/SLATS/WTB 2	14CV	336/Q64
133VU	FLT CTL/SLATS/WTB 1	13CV	336/Q65
133VU	FLT CTL/FLAPS/WTB 1	11CV	336/Q66
133VU	FLT CTL/FLAPS/WTB 2	12CV	336/Q67

5 Make certain that circuit breakers associated with ECAM system are closed.
6 On ECAM control panel 11VU, switch on left ECAM display unit.

7 Make certain that aircraft is in ground condition.

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(b)Test of Flap and Slat Wing Tip Brake Solenoid Valves
- Following table shows which wing tip brake (WTB) solenoid is controlled by slat flap control computers (SFCC) 1 and 2.

SFCC1/SFCC2 PUSHBUTTONS	SFCC	FLAP/ SLAT	WTB-SOLENOID	HYDRAULIC SYSTEM
LEFT WING	1	FLAP	33CV-A	YELLOW
RIGHT WING	1	FLAP	34CV-A	YELLOW
LEFT WING	1	SLAT	35CV-A	BLUE
RIGHT WING	1	SLAT	36CV-A	BLUE
LEFT WING	2	FLAP	33CV-B	BLUE
RIGHT WING	2	FLAP	34CV-B	BLUE
LEFT WING	2	SLAT	35CV-B	YELLOW
RIGHT WING	2	SLAT	36CV-B	YELLOW

ACTION	RESULT
1. On electronic rack 90VU on SFCC 1 and SFCC 2 front panel - Press and release RESET pushbutton (Record any fault codes).	On electronic rack 90VU on SFCC 1 and SFCC 2 front panel - Fault code indicators are black.
2. On SFCC 1 front panel - Press LEFT WING pushbutton on flap section until LH WTB fault code appears.	On SFCC 1 front panel - Fault code LH WTB appears after approx. 8 s.
3. On SFCC 1 front panel - Press and release RESET pushbutton.	On SFCC 1 front panel - LH WTB fault code disappears (the appropriate WTB solenoid valve is unserviceable if LH WTB fault code appears again after approx. 8 s).
4. On SFCC 1 front panel - Press RIGHT WING pushbutton on flap section until RH WTB fault code appears.	On SFCC 1 front panel - Fault code RH WTB appears after approx. 8 s.
5. ON SFCC 1 front panel - Press and release RESET pushbutton.	On SFCC 1 front panel - RH WTB fault code disappears (the appropriate WTB solenoid valve is unserviceable if RH WTB fault code appears again after approx. 8 s).

ACTION	RESULT
6. Repeat steps 2. to 5. on slat section of SFCC 1.	Same as steps 2. to 5. but on slat section of SFCC 1.
7. Repeat steps 2. to 6. on flap and slat section of SFCC 2.	Same as steps 2. to 6. but on flap and slat sections of SFCC 2.
8. On SFCC 1 front panel - Press and hold BITE pushbutton.	On SFCC 1 front panel - SLAT PASS and FLAP PASS lights come on steady (Flashing or no illumination of lights in conjunction with appearance of WTB fault code shows a WTB solenoid failure).
9. On SFCC 1 front panel - Release BITE pushbutton.	On SFCC 1 front panel - SLAT PASS and FLAP PASS lights go off.
10. Repeat steps 8. and 9. for SFCC 2	Same as steps 8. and 9. for SFCC 2
11. On maintenance panel 472VU - Set ANN LT switch to READ position.	On maintenance panel 471VU section FLIGHT CONTROLS - SFCC 1 and SFCC 2/BITE DISPLAY annunciators come on.
12. On maintenance panel 471VU - Press and release MFA RESET push-button.	On maintenance panel 471VU section FLIGHT CONTROLS - SFCC 1 and SFCC 2/BITE DISPLAY annunciators go off.
13. On maintenance panel 472VU - Set ANN LT switch to OFF.	

(c)Flap/Slat Bite Test

ACTION	RESULT
1. On electronic rack 90VU on SFCC 1 and SFCC 2 front panel - Press and release **RESET** pushbutton (Record any fault codes).	On electronic rack 90VU on SFCC 1 and SFCC 2 front panel - Fault code indicators are black.
2. On maintenance panel 472VU - Set **ANN LT** switch to **READ** position.	On maintenance panel 471VU, section **FLIGHT CONTROLS** - Maintenance indicators associated with slats/flaps are off.
3. On maintenance panel 471VU, section **FLIGHT CONTROLS** - Set rotary switch to **SLATS/FLAPS SYS1**.	On maintenance panel 471VU, section **FLIGHT CONTROLS** - **PTT/TEST** pushbutton switch integral light comes on.
4. On maintenance panel 471VU, section **FLIGHT CONTROLS** - Press and hold **PTT/TEST** pushbutton switch until all indications in **RESULT** column have been checked.	On maintenance panel 471VU, section **FLIGHT CONTROLS** - **TEST RESULT/OK** annunciator comes on. On overhead panel 428VU - **SLATS/SYS1/FAULT** light comes on - **FLAPS/SYS1/FAULT** light comes on. On center instrument panel 4VU - On slat/flap position indicator **SLAT, FLAP** and **KRUGER** annunciator lights come on and **ALPHA-LOCK** annunciator light flashes. On electronic rack 90VU on SFCC 1 front panel - **SLAT PASS** and **FLAP PASS** lights come on. Single chime sounds.

ACTION	RESULT
	On left ECAM display unit the following message appears: FLT CTL FLAPS VANE JAM FLAPS EXTENSION LIMITED FLAPS VANE JAM FLAPS RETRACTION LIMITED NOTE : If the Green hydraulic system is pressurized, the following message will appear after 30s: FLT CTL KRUGER NOT EXTENDED (If Kruger flaps are out) KRUGER NOT RETRACTED (If Kruger flaps are in).
5. On maintenance panel 471VU, section FLIGHT CONTROLS - Release PTT/TEST pushbutton switch.	Lights and annunciators as detailed in step 4 go off. ECAM message disappears.

6. Carry out steps 3, 4 and 5 for SYS2.

NOTE : If test has not been successful (TEST RESULT/OK, SLAT PASS AND FLAP PASS do not come on) and the maintenance indicator SFCC 1/ BITE DISPLAY comes on, check if fault codes LH WTB or RH WTB appears on SFCC 1. Setting of fault codes LH WTB or RH WTB indicates a failure of wing tip brake solenoid.

ACTION	RESULT
7. On electronic rack 90VU on SFCC 1 front panel - Press and hold **BITE** pushbutton.	On electronic rack 90VU on SFCC 1 front panel - **SLAT PASS** and **FLAP PASS** lights come on. Lights and annunciators as detailed in step 4. come on, except **TEST RESULT/OK** annunciator. **ECAM** message as detailed in step 4. appears.
8. On electronic rack 90VU on SFCC 1 front panel - Release **BITE** pushbutton.	On electronic rack 90VU on SFCC 1 front panel - **SLAT PASS** and **FLAP PASS** lights go off. Lights and annunciators as detailed in step 4. go off. **ECAM** message disappears.
9. Repeat steps 7 and 8 for SFCC 2.	Analog results as steps 7 and 8 but on SFCC 2.
10. On maintenance panel 471 VU, section **FLIGHT CONTROLS** - Set rotary switch to **NORM FLT**.	On maintenance panel 471VU, section **FLIGHT CONTROLS** - **PTT/TEST** pushbutton switch integral light goes off.
11. On maintenance panel 472VU - Set **ANN LT** switch to **OFF**.	

(d) Close-Up

1 De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

2 Close access door 121BL or 211PZ.

B. T.O CONFIG Warning Test (Refer to 27-00-00, P. Block 501)

MECHANICAL AND ELECTRICAL CONTROL (FLAPS) - DEACTIVATION/REACTIVATION

Ref. MMEL Sect. 1-27, Item 18
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MMEL.

1. Deactivation

A. Reason for the Job
(1)Test of slat wing tip brake solenoids associated with blue hydraulic system and flap wing tip brake solenoids associated with yellow hydraulic system in case slat/flap control computer (SFCC) 2 is inoperative.

B. Referenced Procedure
- 24-41-00, P. Block 301 AC External Power Control

C. Procedure
(1)Job Set-Up
(a)Open access door 121BL or 211PZ.
(b)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Make certain that electronics racks ventilation is correct.
(d)Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/SLATS/WTB 1	13CV	336/Q65
133VU	FLT CTL/FLAPS/WTB 1	11CV	336/Q66

(2)Deactivation
No action.
(3)Test
- The following table shows which wing tip brake (WTB) solenoid is controlled by SFCC 1.

SFCC 1/SFCC 2 PUSHBUTTONS	SFCC	FLAP/ SLAT	WTB- SOLENOID	HYDRAULIC SYSTEM
LEFT WING	1	FLAP	33CV-A	YELLOW
RIGHT WING	1	FLAP	34CV-A	YELLOW
LEFT WING	1	SLAT	35CV-A	BLUE
RIGHT WING	1	SLAT	36CV-A	BLUE

ACTION	RESULT
1. On electronic rack 90VU on SFCC 1 front panel - Press and release **RESET** pushbutton (record any fault codes).	On electronic rack 90VU on SFCC 1 front panel - Fault code indicators are black.
2. On SFCC 1 front panel - Press **LEFT WING** pushbutton on flap section until **LH WTB** fault code appears.	On SFCC 1 front panel - Fault code **LH WTB** appears after approx. 8 s.
3. On SFCC 1 front panel - Press and release **RESET** pushbutton.	On SFCC 1 front panel - Fault code **LH WTB** disappears (the appropriate **WTB** solenoid valve is unserviceable if fault code **LH WTB** appears again after approx. 8 s.).
4. On SFCC 1 front panel - Press **RIGHT WING** pushbutton on flap section until **RH WTB** fault code appears.	On SFCC 1 front panel - Fault code **RH WTB** appears after approx. 8 s.
5. On SFCC 1 front panel - Press and release **RESET** pushbutton.	On SFCC 1 front panel - Fault code **RH WTB** disappears (the appropriate **WTB** solenoid valve is unserviceable if fault code **RH WTB** appears again after approx. 8 s.).
6. Repeat steps 2 to 5 on slat section of **SFCC 1**.	Same as steps 2 to 5 but on slat section of **SFCC 1**.
7. On SFCC 1 front panel - Press and hold **BITE** pushbutton.	On SFCC 1 front panel - **SLAT PASS** and **FLAP PASS** lights come on steady (Flashing or no illumination of lights in conjunction with appearance of a **WTB** fault code shows a **WTB** solenoid failure).
8. On SFCC 1 front panel - Release **BITE** pushbutton.	On SFCC 1 front panel - **SLAT PASS** and **FLAP PASS** lights go off.
9. On maintenance panel 472VU - Set **ANN LT** switch to **READ** position.	On maintenance panel 471VU section **FLIGHT CONTROLS** - **SFCC 1/BITE DISPLAY** annunciator comes on.

ACTION	RESULT
10. On maintenance panel 471VU - Press and release MFA RESET push-button.	On maintenance panel 471VU section FLIGHT CONTROLS - SFCC 1/BITE DISPLAY annunciator goes off.
11. On maintenance panel 472VU - Set ANN LT switch to OFF.	

(4) Close-Up
  (a) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
  (b) Close access door 121BL or 211PZ.

2. Reactivation

A. Refer to TSM 27-50-10.

FLAP AND SLAT CONTROL LEVER - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A27508034000	Rigging Pin - Command Sensor Unit
B. 98A27603005000	Wrench - Rack
C.	Circuit Breaker Safety Clips and Tags
D.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
E.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
F.	Warning Notice Prohibiting Operation of Controls on Center Pedestal
G. Material No. 04-004	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 27-41-11, P. Block 401	Pitch Trim Control Mechanism
- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)

2. Procedure

A. Job Set-Up

(1) Open access door 121BL.

(2) Retract flaps (Ref. 27-50-00, P. Block 301) and slats (Ref. 27-80-00, P. Block 301) to 0° position.

(3) Immobilize command sensor unit 51CV using rigging pin PN 98A27508034000.

(4) Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 2	9CV	335/R66
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

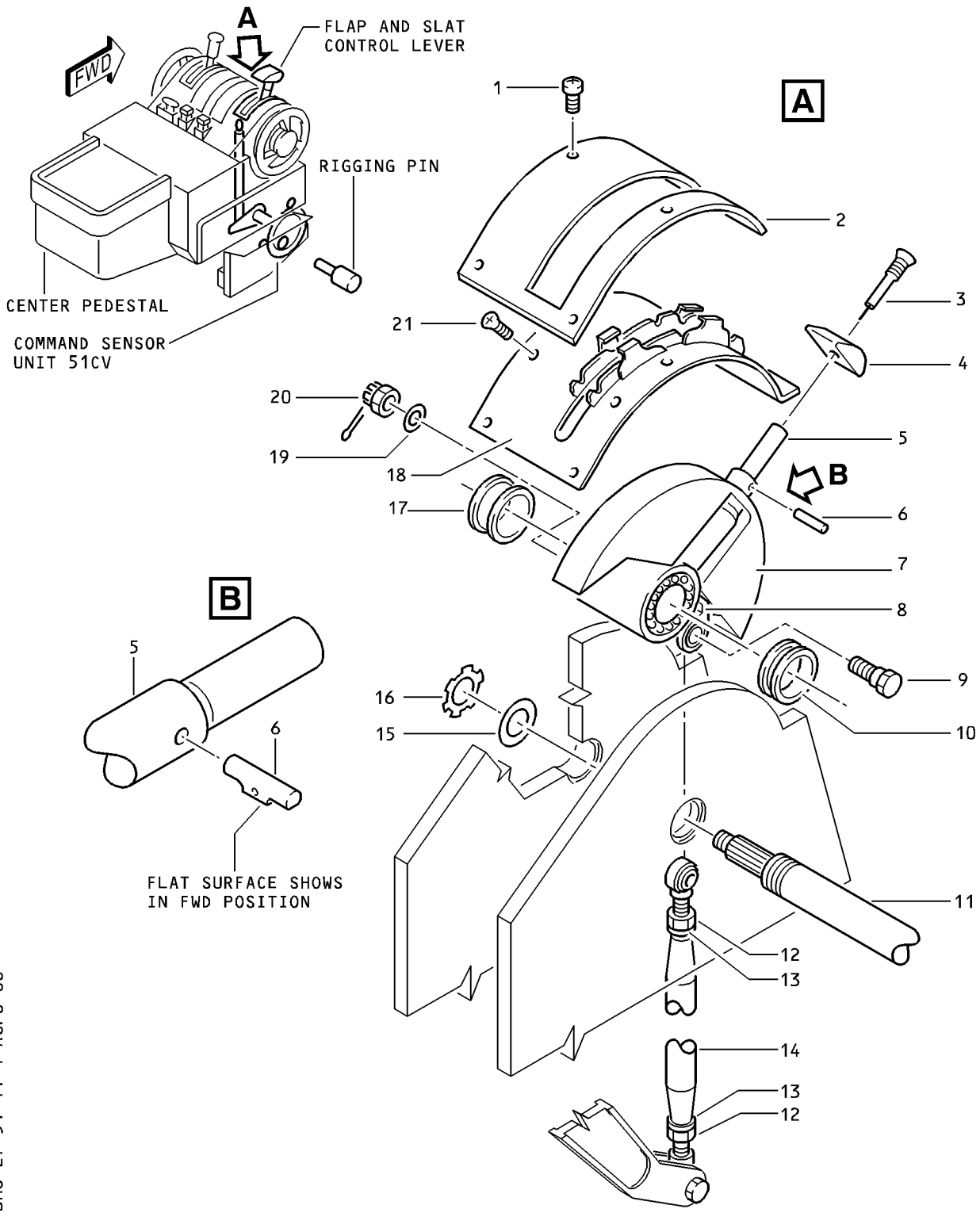
(5)Display a warning notice on HYD PWR panel 427VU prohibiting pressurization of Green, Blue and Yellow hydraulic systems.
(6)Display a warning notice prohibiting operation of controls on the center pedestal.
(7)Remove Captain and First Officer pitch trim control wheels (Ref. 27-41-11, P. Block 401).

B. Removal

R (Ref. Fig. 401)
(1)Remove screw (3) securing handle (4). Remove handle (4). Remove pin (6).
(2)Remove screws (1) securing cover plate (2). Remove plate (2).
(3)Remove screws (21) securing guide ramp assembly (18) and remove ramp assembly (18).
(4)Remove cotter pin, nut (20) and retain washer (19).
(5)Support push-pull rod (14) and remove shoulder bolt (9). Place push-pull rod against center pedestal structure.
(6)Cut lockwire and remove slotted nut (16) using rack wrench PN 98A27603005000.
(7)Retain washer (15).
CAUTION : DURING THIS OPERATION, SHAFT IS TO BE MOVED ONLY TO DISENGAGE THE CONTROL LEVER ASSEMBLY. SHAFT SHALL REMAIN SUPPORTED BY SIDE PLATE.
(8)Support spacers (10),(17) and control lever assembly (7) and withdraw shaft (11) until spacer (17), control lever assembly (7) then spacer (10) are successively released.
(9)Remove control lever assembly (7).

C. Preparation of Replacement Component
(1)Make certain that bellcrank (8) is equipped with bushes.
(2)Remove screw (3) securing handle (4).
(3)Remove handle (4).

D. Installation
NOTE : Apply grease (Material No. 04-004) to threads of screws, nuts and parts, and interfaces prior to assembly.
(1)Position control lever assembly (7) and spacers (10),(17) on either side of lever. Push shaft (11) into position. Engage washer (15).
(2)Tighten slotted nut (16) using rack wrench PN 98A27603005000. TORQUE to 2 m.daN (14.75 lbf.ft). Safety nut (16) with lockwire.



Flap and Slat Control Lever
Figure 401

R

(3)Position guide ramp assembly (18) and secure on side plates using screws (21). Tighten screws (21).
(4)Position cover plate (2) and secure with screws (1). Tighten screws (1). Engage pin (6).
(5)Secure handle (4) on lever (5) with screw (3).
(6)Place handle/lever (5) in first notch position.
(7)Connect push-pull rod (14) to bellcrank (8). Engage shoulder bolt (9).
(8)If required, cut lockwire and unscrew nuts (12), disengage lockwashers (13) and adjust length of rod (14) until shoulder bolt (9) can be engaged. Engage lockwashers (13), tighten nuts (12) and safety with lockwire.
(9)Install washer (19) on shoulder bolt (9). Tighten nut (20) and safety with cotter pin.
(10)Install Captain and First Officer pitch trim control wheels (Ref. 27-41-11, P. Block 401).

E. Adjustment
(1)With flap and slat control lever in first notch and the command sensor unit immobilized, remove rigging pin PN 98A27508034000 and move control lever throughout complete travel range.
(2)Make certain that control components operate freely, without interfering or chafing against adjacent structure or controls. Make certain that control lever is correctly positioned in each notch.
(3)Return control lever in first notch position and check that rigging pin can be easily inserted in and removed from command sensor unit: if not, repeat adjustment of push-pull rod (14).
(4)Remove rigging pin PN 98A27508034000.

F. Test
(1)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 3CV, 4CV, 5CV, 6CV, 7CV, 8CV, 9CV and 10CV.
(2)Remove warning notices.
(3)Carry out operational test of flaps system (Ref. 27-54-00, P. Block 501).

G. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.
(3)Remove access platform.

COMMAND SENSOR UNIT 51CV - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
R	A. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	B. 98A27508034000	Rigging Pin - Command Sensor Unit
	C.	Circuit Breaker Safety Clips and Tags
	D.	Electrical Connector Blanking Caps
	E.	Warning Notice Prohibiting Pressurization of Green, Blue and Yellow Hydraulic Systems
	F.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	G. Material No. 04-004	Common Greases (Ref. 20-31-00)

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)

2. Procedure

A. Job Set-Up

(1) Open access door 121BL.

(2) Retract flaps (Ref. 27-50-00, P. Block 301) and slats (Ref. 27-80-00, P. Block 301) to 0° position.

(3) Immobilize command sensor unit 51CV using rigging pin PN 98A27508034000.

R (4) Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(5) Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY FLAPS/SYS 1	10CV	335/R67

(6)Display a warning notice on HYD PWR panel 427VU prohibiting pressurization of Green, Blue and Yellow hydraulic systems.

B. Removal
(Ref. Fig. 401)
(1)On command sensor unit (8), disconnect connectors 51CV-B (5) and 51CV-A (6).
(2)Place blanking caps on movable connectors (5),(6).
(3)Remove cotter pins and nuts (12) securing command sensor unit (8) on side plate (13).
(4)Retain washers (11).
(5)Support command sensor unit (8).
(6)Remove screws (9).
(7)Remove command sensor unit (8).

R

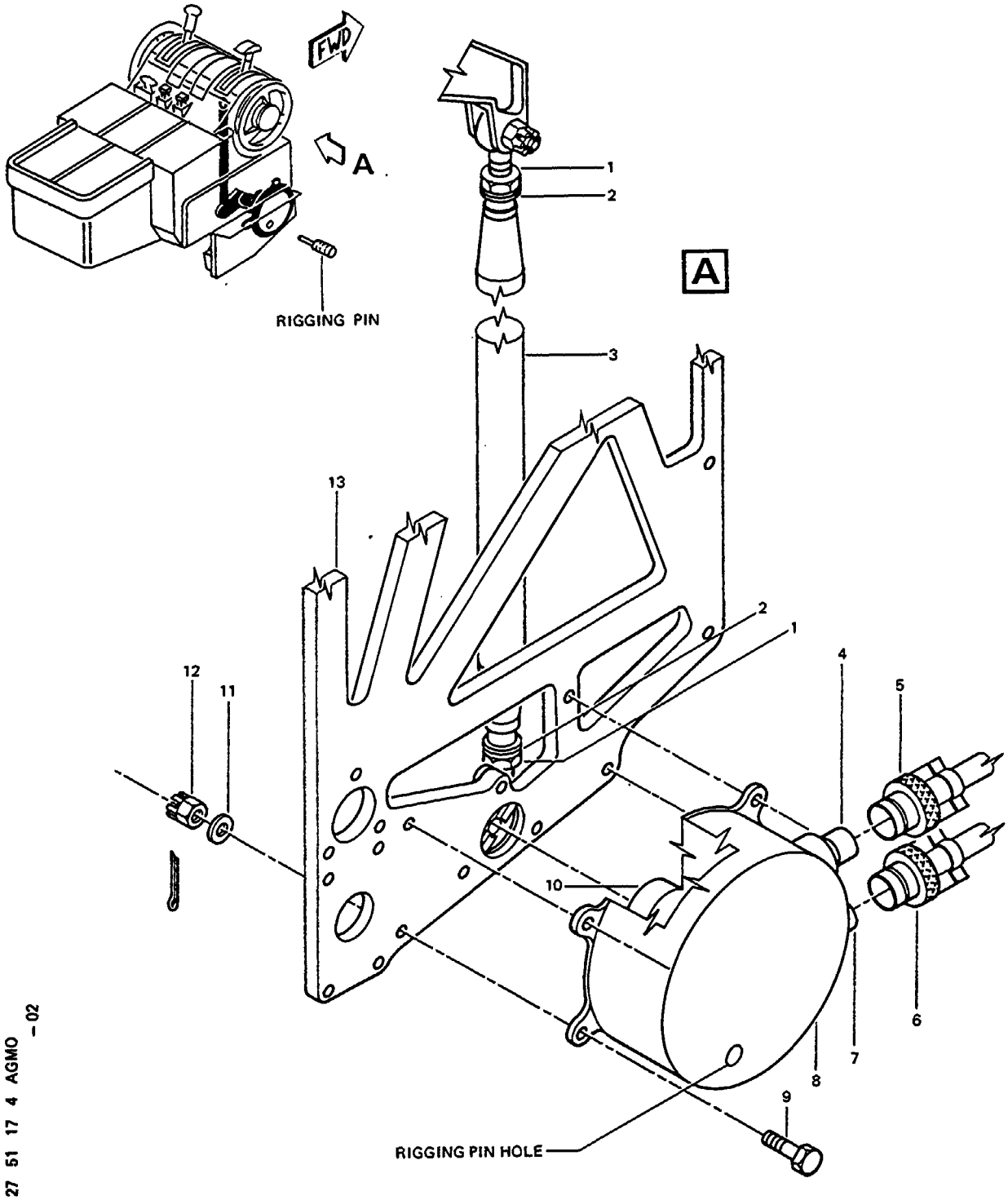
R C. Installation

NOTE : Before installation, apply grease (Material No. 04-004) to threads of nuts, screws, parts and interfaces.

(1)Make certain that flap and slat control lever is in first notch position.
(2)Position command sensor unit (8) on side plate (13).
(3)Engage command sensor unit input shaft (10) in its bore.
(4)Make certain that sensor unit shaft (10) stud is correctly engaged in drive slot.
(5)Install screws (9), washers (11) and nuts (12). Safety nuts (12) with cotter pins.
(6)Remove blanking caps and connect connectors 51CV-B (5) and 51CV-A (6).

WARNING : MAKE CERTAIN THAT CONNECTORS ARE NOT CROSS CONNECTED.

R D. Adjustment
(1)Immobilize command sensor unit (8) with rigging pin PN 98A2750834000.
(2)If required, remove lockwire, loosen nuts (1), disengage lockwashers (2) and adjust length of push pull rod (3) until rigging pin PN 98A27508034000 can be freely inserted and removed.
(3)Engage lockwashers (2), tighten nuts (1) and safety with lockwire.



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Command Sensor Unit
Figure 401

(4)Remove rigging pin from command sensor unit (8).
(5)Remove safety guard from flap/slat control lever quadrant.
(6)In flight compartment, on center pedestal, move flap and slat control lever from the first to the fifth notch. Make certain that command sensor unit (8) input bellcrank operates smoothly.

NOTE : The force required to move the flap and slat control lever is between 2.5 and 3.6 daN (5.6 and 8.1 lbf.)

(7)Return flap and slat control lever to first notch position.

R E. Test
(1)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 3CV, 4CV, 5CV, 6CV, 7CV, 8CV, 9CV and 10CV.
(2)Remove warning notices.
(3)Carry out operational test of flap system (Ref. 27-54-00, P. Block 501).

R F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.

SLAT/FLAP CONTROL COMPUTER 21CV (22CV) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips and Tags
B.	Blanking Plugs

Referenced Procedure
- 27-51-00, P. Block 501 Mechanical and Electrical Control (Flaps)

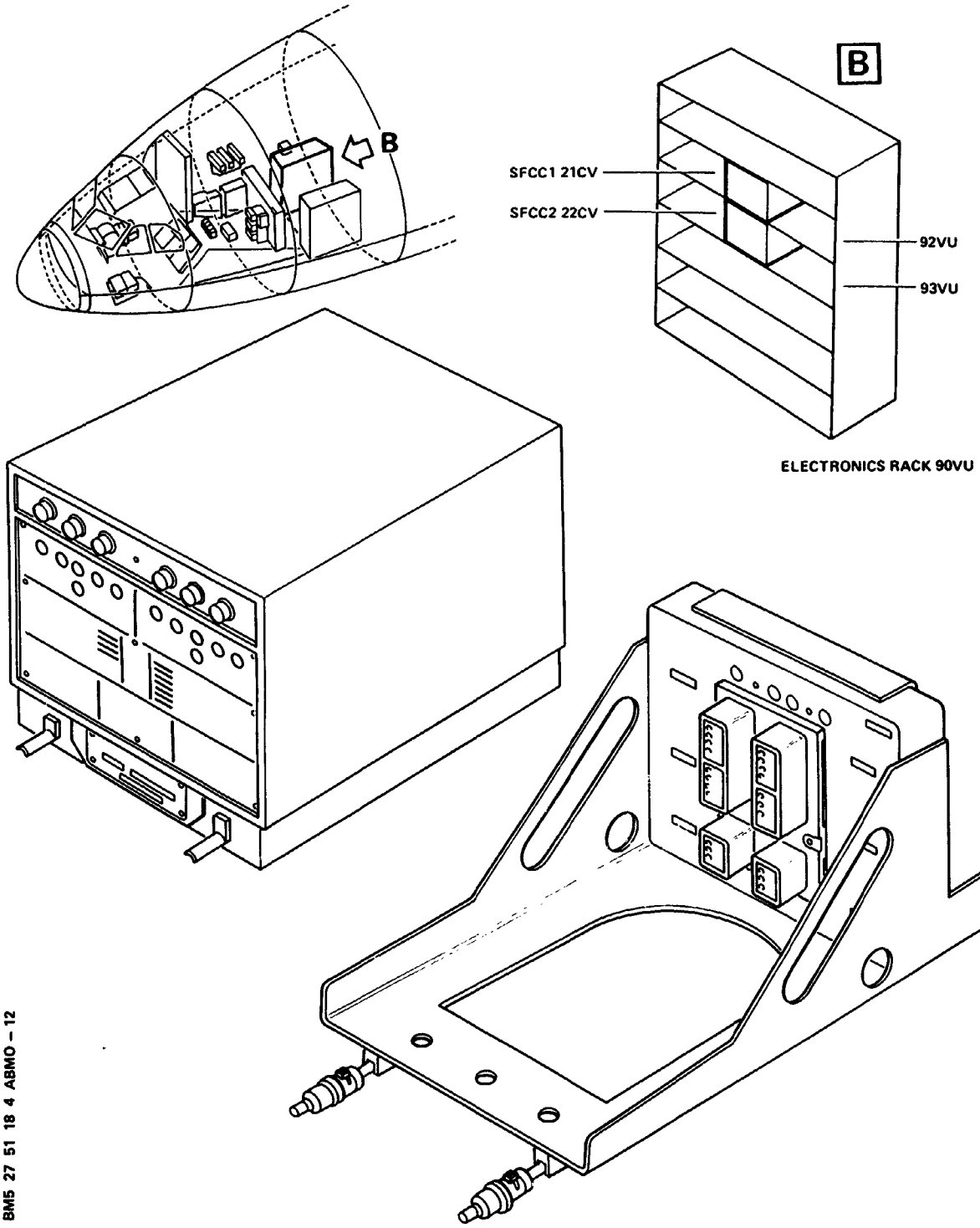
2. Procedure

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 2	9CV	335/R66
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(2)Open access door 121BL.

B. Removal
(Ref. Fig. 401)
(1)Unscrew attachment device retaining nuts.
(2)Disengage locking slider to free the computer studs and move attachment devices downwards.



Slat/Flap Control Computer
Figure 401

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(3)Remove computer by pulling slowly.
(4)Install blanking plugs.

C. Installation
(1)Remove blanking plugs.
(2)Position computer on its mount and slowly push fully home.
(3)Move attachment devices upwards and engage locking slider to secure computer studs.
(4)Tighten attachment device retaining nuts.
(5)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 3CV, 4CV, 5CV, 6CV, 7CV, 8CV, 9CV and 10CV.

D. Test
Carry out flap/slat bite operational test (Ref. 27-51-00, P. Block 501).

E. Close-Up
(1)Close access door 121BL.

FEEDBACK POSITION PICK-OFF UNIT (27CV) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS, OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.6 m (8 ft. 8 in.)
B.	Torque Wrench, 8.7 to 9.57 Nm (6.4 to 7.0 lbf.ft.)
C.	Ohmmeter, 0 to 20 milliohms
D.	Warning Notice - Prohibiting Pressurization of Hydraulic Systems
E.	Safety Barriers
F.	Circuit Breaker Safety Clips and Tags
G. Material No. 05-002	Special Materials (Ref. 20-31-00)
H. Material No. 05-054	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

NOTE : The following procedure describes removal and installation of Feedback Position Pick-off Unit (FPPU) set at mechanical and electrical zero, this being the condition new FPPU are in when delivered. Removal/installation of FPPU is possible with the system at positions other than zero, due to the FPPU self-locking facility, provided that the same FPPU is refitted and no movement of the system transmission has occurred between removal and installation of FPPU.

A. Job Set-Up
(1)Position safety barriers.
(2)Open main landing gear doors (Ref. 32-12-11, P. Block 301).
(3)Position access platform.
(4)Make certain that flaps are in retracted position (Ref. 27-50-00, P. Block 301).
(5)Display a warning notice prohibiting pressurization of the hydraulic systems.
(6)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

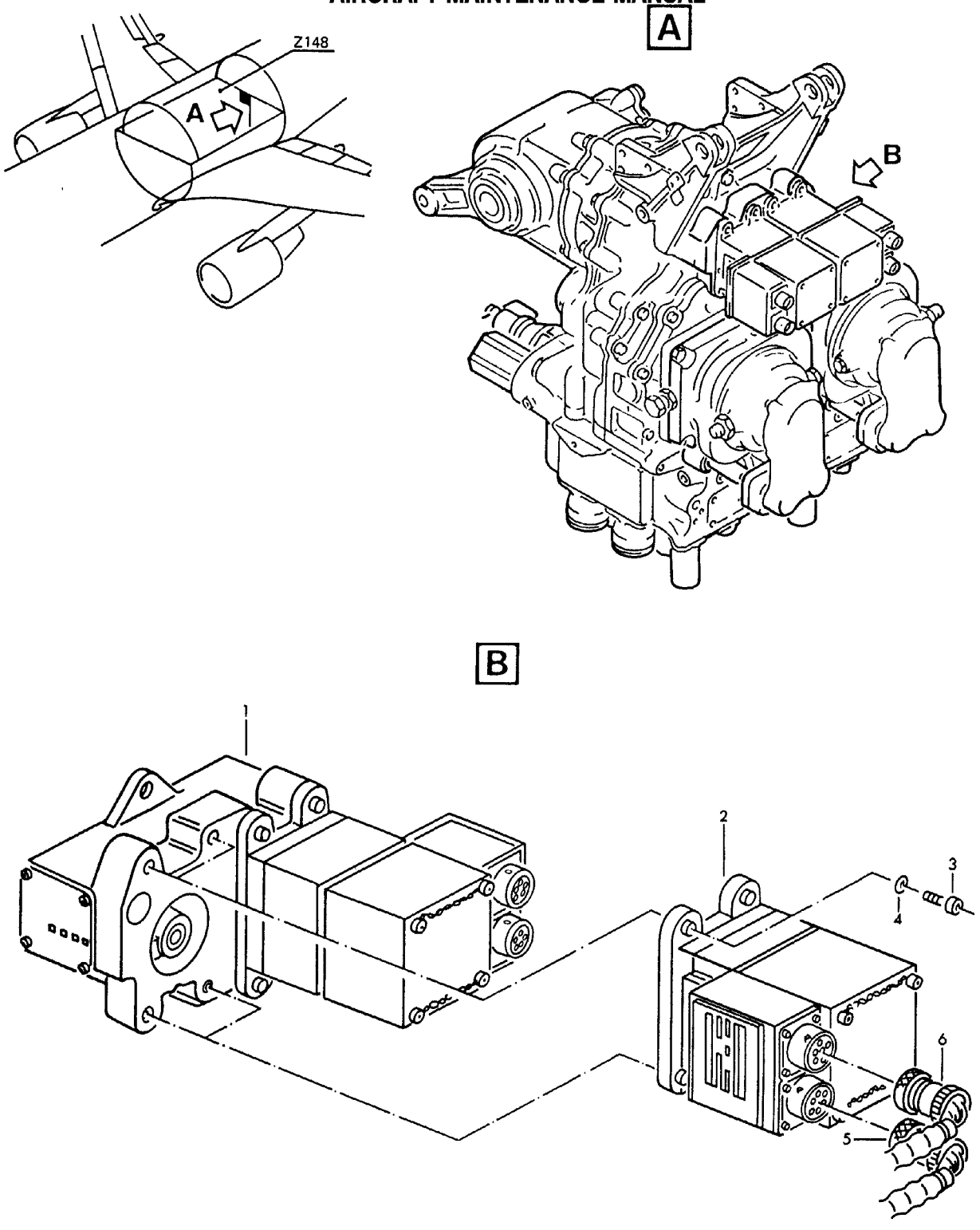
B. Removal

CAUTION : FEEDBACK POSITION PICK-OFF UNIT MUST NOT BE REMOVED IF PRESSURE OFF BRAKES HAVE BEEN REMOVED FROM POWER CONTROL UNIT.

(Ref. Fig. 401)
(1)Disconnect electrical connectors (5),(6).
(2)Remove screws (3) and washers (4).
(3)Carefully remove feedback position pick-off unit (2) from gearbox (1).
(4)Fit blanking caps to electrical plugs, receptacles and exposed holes.
(5)Fit a tie-wrap behind the locking plate to prevent retraction of locking plate.

C. Preparation for Installation
(1)Prepare a small quantity of a mixture comprising 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. 05-054).
NOTE : Proportions quoted are by weight.
(2)Apply a quantity of a mixture prepared above to area free of anodic finish on FPPU and intermediate gearbox mating surfaces.

D. Installation
CAUTION : A NEW FPPU IS DELIVERED, LOCKED IN THE MECHANICAL AND ELECTRICAL ZERO POSITION. THE SYSTEM MUST ALSO BE IN ITS ZERO POSITION BEFORE THE FPPU IS INSTALLED.
(1)Remove blanking caps and tie-wrap.
(2)Position feedback position pick-off unit (2) to intermediate gearbox.
NOTE : Fitting the FPPU requires the simultaneous alignment of the housing keyway, the drive shaft splines, the locating dowel and the securing screw holes, but not more than moderate hand pressure should be required. A slight additional pressure is required to depress the FPPU locking plate and engage the drive fully.
(3)Coat screw threads with anti-corrosion compound (Material No. 05-002).



Feedback Position Pick-off Unit
Figure 401

(4)Install screws (3) and washers (4).
(5)TORQUE screws (3) to between 8.7 and 9.57 Nm (6.4 and 7.0 lbf.ft.).
(6)Measure electrical resistance between FPPU and main bonding point of Power Control Unit. Resistance must not exceed 20 milliohms.
(7)Connect electrical connectors (5, 6).

E. Test
(1)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV and 10CV.
(2)Remove warning notice prohibiting pressurization of the hydraulic systems.
(3)Carry out operational test of flap system (Ref. 27-54-00, P. Block 501).

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(4)Remove safety barriers.

HYDRAULIC ACTUATION AND POWER TRANSMISSION (FLAPS) - DESCRIPTION AND OPERATION

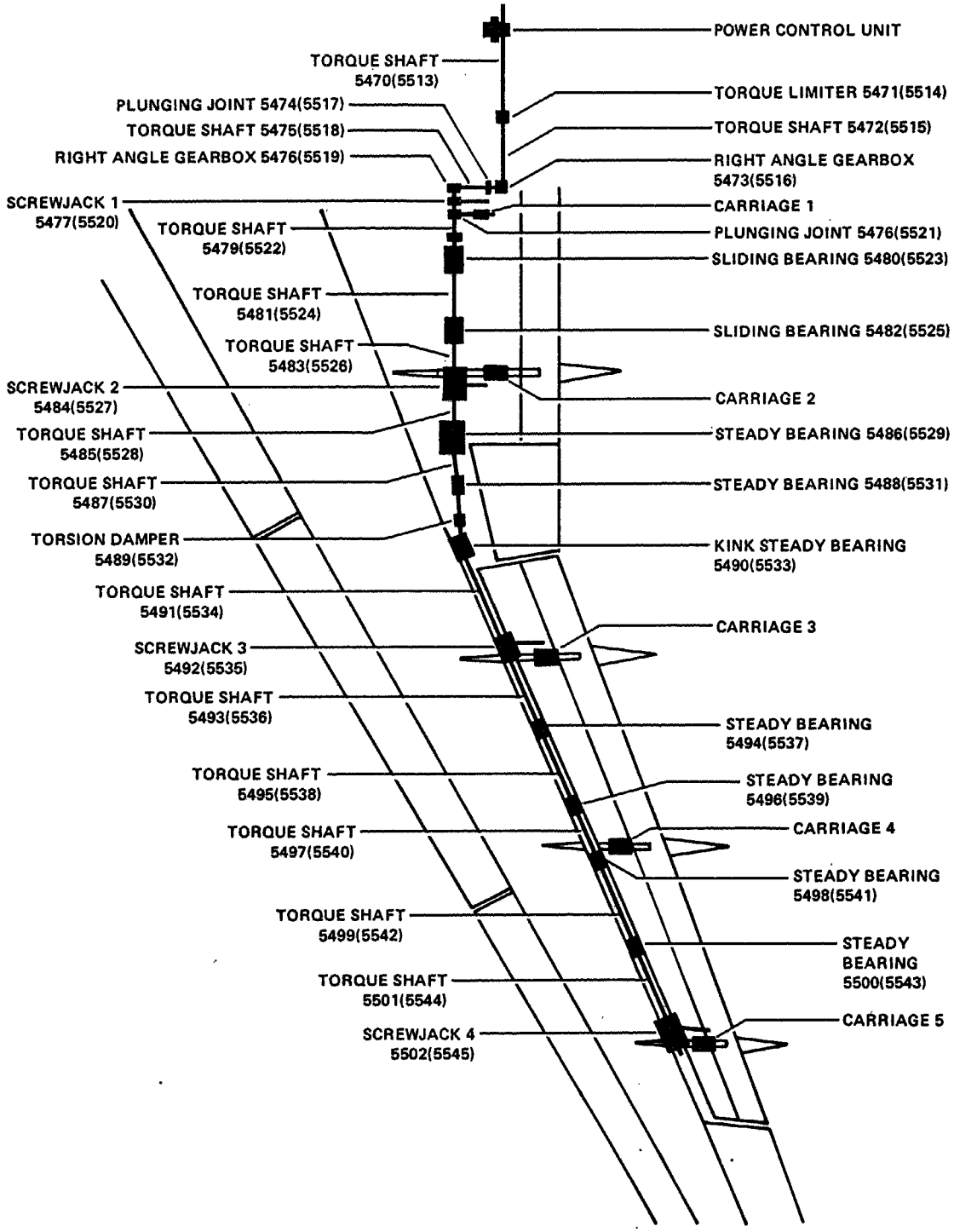
1. General

Two hydraulic motors, supplied by the YELLOW and the GREEN hydraulic systems, power the transmission system. The hydraulic motors are incorporated in a Power Control Unit (PCU) mounted in the fuselage.
Torque shafts and gearboxes transmit power from the PCU to the eight screw jacks mounted in the wings. Two screw jacks drive each flap. Two torque limiters, mounted in the fuselage, protect the transmission system in the wings from overload. A wing-tip brake and an Asymmetry Position Pick-off Unit (APPU) are provided in each wing (Ref. 27-56-00).

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
23CV	VALVE BLOCK-YELLOW		148		27-54-33
	VALVE-MAIN CONTROL		148		27-54-33
	VALVE-SPEED-CHANGE		148		
	VALVE-SOLENOID, EXTEND		148		27-54-33
	VALVE-SOLENOID, RETRACT		148		27-54-33
	VALVE-SOLENOID, ENABLE		148		27-54-33
	VALVE-SOLENOID, HIGH-SPEED		148		27-54-33
	SWITCH-PRESSURE, SUPPLY		148		27-54-33
	SWITCH-PRESSURE, HIGH-SPEED		148		27-54-33
	SWITCH-PRESSURE, DRIVE		148		27-54-33
	FILTER		148		27-54-33



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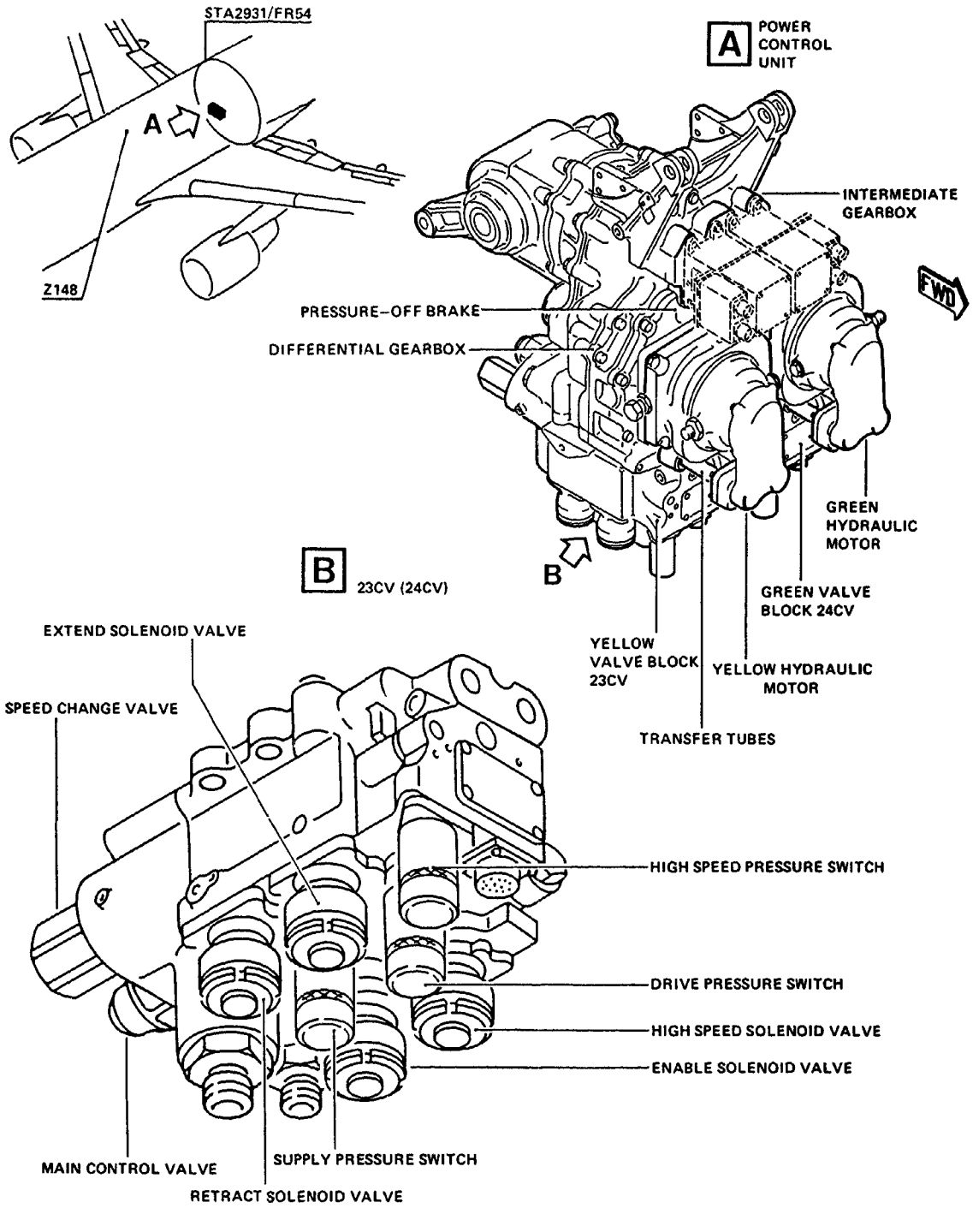
Component Location
Figure 001



Component Location
Figure 002

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
24CV	VALVE BLOCK-GREEN		148		27-54-33
	VALVE-MAIN CONTROL		148		27-54-33
	VALVE-SPEED-CHANGE		148		
	VALVE-SOLENOID, EXTEND		148		27-54-33
	VALVE-SOLENOID, RETRACT		148		27-54-33
	VALVE-SOLENOID, ENABLE		148		27-54-33
	VALVE-SOLENOID, HIGH-SPEED		148		27-54-33
	SWITCH-PRESSURE, SUPPLY		148		27-54-33
	SWITCH-PRESSURE, HIGH-SPEED		148		27-54-33
	SWITCH-PRESSURE, DRIVE		148		27-54-33
	FILTER		148		27-54-33
	GEARBOX-DIFFERENTIAL		148		
	GEARBOX-INTERMEDIATE		148		27-54-31
5469	POWER CONTROL UNIT		148		27-54-11
	MOTOR-HYDRAULIC, YELLOW		148		27-54-34
	MOTOR-HYDRAULIC, GREEN		148		27-54-34
	PRESSURE-OFF BRAKE-YELLOW		148		27-54-32
	PRESSURE-OFF BRAKE-GREEN		148		27-54-32
	TRANSFER TUBES-YELLOW		148		27-54-34
	TRANSFER TUBES-GREEN		148		27-54-34
5470	TRANSMISSION SHAFT-LH		147		27-54-31
5513	TRANSMISSION SHAFT-RH		148		27-54-19
5471	LIMITER-TORQUE, LH		147		27-54-12
5514	LIMITER-TORQUE, RH		148		27-54-12
5472	TRANSMISSION SHAFT-LH		147		27-54-19
5515	TRANSMISSION SHAFT-RH		148		27-54-19
5473	GEARBOX-RIGHT-ANGLE, LH		577		27-54-13
5516	GEARBOX-RIGHT-ANGLE, RH		677		27-54-13
5474	PLUNGING JOINT-LH		577		27-54-14
5517	PLUNGING JOINT-RH		677		27-54-14
5475	TRANSMISSION SHAFT-LH		577		27-54-19
5518	TRANSMISSION SHAFT-RH		677		27-54-19
5476	GEARBOX-RIGHT-ANGLE, LH		577		
5519	GEARBOX-RIGHT-ANGLE, RH		677		
5477	SCREW JACK 1-LH		572		27-54-21
5520	SCREW JACK 1-RH		672		27-54-21
5478	PLUNGING JOINT-LH		572	572BB	27-54-14
5521	PLUNGING JOINT-RH		672	672BB	27-54-14
5479	TRANSMISSION SHAFT-LH		572	572AB 572BB	27-54-19
5522	TRANSMISSION SHAFT-RH		672	672AB 672BB	27-54-19

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
5480	SLIDING BEARING-LH		572	572BB	27-54-15
5523	SLIDING BEARING-RH		672	672BB	27-54-15
5481	TRANSMISSION SHAFT-LH		572	572BB 572CB	27-54-19
5524	TRANSMISSION SHAFT-RH		672	672BB 672CB	27-54-19
5482	SLIDING BEARING-LH		572	572CB	27-54-15
5525	SLIDING BEARING-RH		672	672CB	27-54-15
5483	TRANSMISSION SHAFT-LH		572	572CB	27-54-19
5526	TRANSMISSION SHAFT-RH		672	672CB	27-54-19
5484	SCREW JACK 2-LH		572		27-54-22
5527	SCREW JACK 2-RH		672		27-54-22
5485	TRANSMISSION SHAFT-LH		572	572DB	27-54-19
5528	TRANSMISSION SHAFT-RH		672	672DB	27-54-19
5486	STEADY BEARING-LH		572	572DB	27-54-16
5529	STEADY BEARING-RH		672	672DB	27-54-16
5487	TRANSMISSION SHAFT-LH		572	572DB	27-54-19
5530	TRANSMISSION SHAFT-RH		672	672DB	27-54-19
5488	STEADY BEARING-LH		572	572DB	27-54-17
5531	STEADY BEARING-RH		672	672DB	27-54-17
5489	TORSION DAMPER		572	572DB	27-54-19
5532	TORSION DAMPER		672	672DB	27-54-19
5490	KINK STEADY BEARING LH		572	575CB	27-54-18
5533	KINK STEADY BEARING RH		672	675CB	27-54-18
5491	TRANSMISSION SHAFT-LH		581	575CB 581AB 581BB	27-54-19
5534	TRANSMISSION SHAFT-RH		681	675CB 681AB 681BB	27-54-19
5492	SCREW JACK 3-LH		581		27-54-23
5535	SCREW JACK 3-RH		681		27-54-23
5493	TRANSMISSION SHAFT-LH		581	581CB	27-54-19
5536	TRANSMISSION SHAFT-RH		681	681CB	27-54-19
5494	STEADY BEARING-LH		581	581CB	27-54-17
5537	STEADY BEARING-RH		681	681CB	27-54-17

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
5495	TRANSMISSION SHAFT-LH		581	581DB 581EB	27-54-19
5538	TRANSMISSION SHAFT-RH		681	681DB 681EB	27-54-19
5496	STEADY BEARING-LH		581	581DB 581EB	27-54-17
5539	STEADY BEARING-RH		681	681DB 681EB	27-54-17
5497	TRANSMISSION SHAFT-LH		581	581FB	27-54-19
5540	TRANSMISSION SHAFT-RH		681	681FB	27-54-19
5498	STEADY BEARING-LH		581	581FB	27-54-17
5541	STEADY BEARING-RH		681	681FB	27-54-17
5499	TRANSMISSION SHAFT-LH		581	581GB	27-54-19
5542	TRANSMISSION SHAFT-RH		681	681GB	27-54-19
5500	STEADY BEARING-LH		581	581GB 581HB	27-54-17
5543	STEADY BEARING-RH			681GB 681HB	27-54-17
5501	TRANSMISSION SHAFT-LH		581		27-54-19
5544	TRANSMISSION SHAFT-RH		681		27-54-19
5502	SCREW JACK 4-LH		581		27-54-24
5545	SCREW JACK 4-RH		681		27-54-24
	CARRIAGE-FLAP TRACK 1, LH		577		27-54-25
	CARRIAGE-FLAP TRACK 1, RH		677		27-54-25
	CARRIAGE-FLAP TRACK 2, LH		532		27-54-26
	CARRIAGE-FLAP TRACK 2, RH		632		27-54-26
	CARRIAGE-FLAP TRACK 3, LH		533		27-54-27
	CARRIAGE-FLAP TRACK 3, RH		633		27-54-27
	CARRIAGE-FLAP TRACK 4, LH		534		27-54-28
	CARRIAGE-FLAP TRACK 4, RH		634		27-54-28
	CARRIAGE-FLAP TRACK 5, LH		535		27-54-29
	CARRIAGE-FLAP TRACK 5, RH		635		27-54-29

3. Description

A. The flap hydraulic actuation and power transmission system provides and transmits power from the PCU to the screw jacks which move the flap surfaces which are supported on carriages running along tracks.

B. The PCU, two torque limiters and four torque shafts are installed in the fuselage. Eleven torque shafts and one torsion damper are installed in each wing. The torque shafts are supported by self-aligning steady bearings and are provided with sliding and universal joints which permit axial or angular deflection of the torque shaft run.

C. Two right-angle gearboxes and two torque shafts, installed at the intersection of each wing with the fuselage, align the torque shaft run with the rear false spar, connecting with screw jacks 1 and 2. A kink steady bearing re-directs the torque shaft run along the outer rear spar, connecting with screw jacks 3 and 4. Between the PCU and each rear, right-angle gearbox, a torque limiter is installed which prevents overload in the wing transmission system.

D. The screw jacks change the rotary motion of the torque shaft run into linear motion, causing the flaps (and inner flap vane) to extend or retract as commanded.

4. Component Description

A. Power Control Unit (5469)
The PCU, located in the hydraulic compartment on the forward face of FR54, provides the interface between the hydraulic systems, the Slat Flap Control Computers (SFCCs) and the flap transmission system. The PCU is of modular construction and includes the following sub-units:
- Valve blocks
- Transfer tubes
- Hydraulic motors
- Pressure-off brakes
- Differential gearbox
- Intermediate gearbox

(1) Valve blocks (22CV, 23CV)
(Ref. Fig. 003)
The YELLOW and the GREEN valve blocks are mounted on the underside of the differential gearbox and provide the control and interface for the YELLOW and the GREEN hydraulic systems with the hydraulic motors. Each valve block includes the following sub-units:

(a) Enable, extend, retract and high-speed solenoid valves. The valves are controlled by the associated SFCC and operate a main control valve and a speed-change control valve. The solenoid valves are of the standard construction, solenoid-operated ball valve type and can be replaced without removing the PCU or the valve block from the aircraft. With the solenoid in the de-energized condition, the spring forces the lower plunger upward, holding the ball against the upper valve seat. This closes the pressure port and opens a connection between

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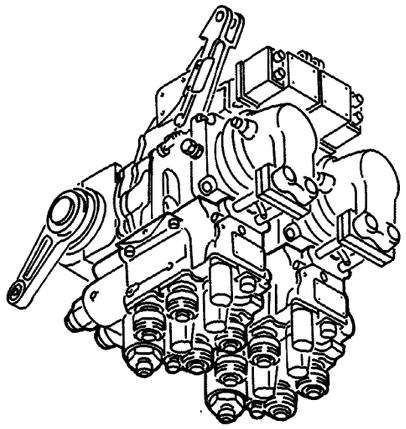

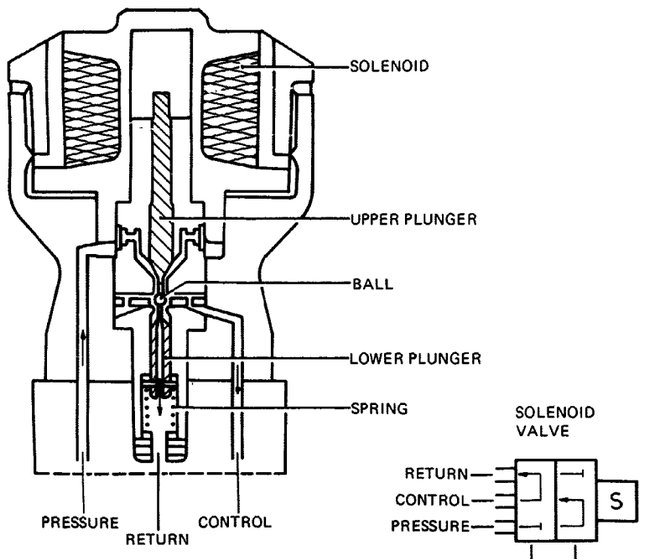

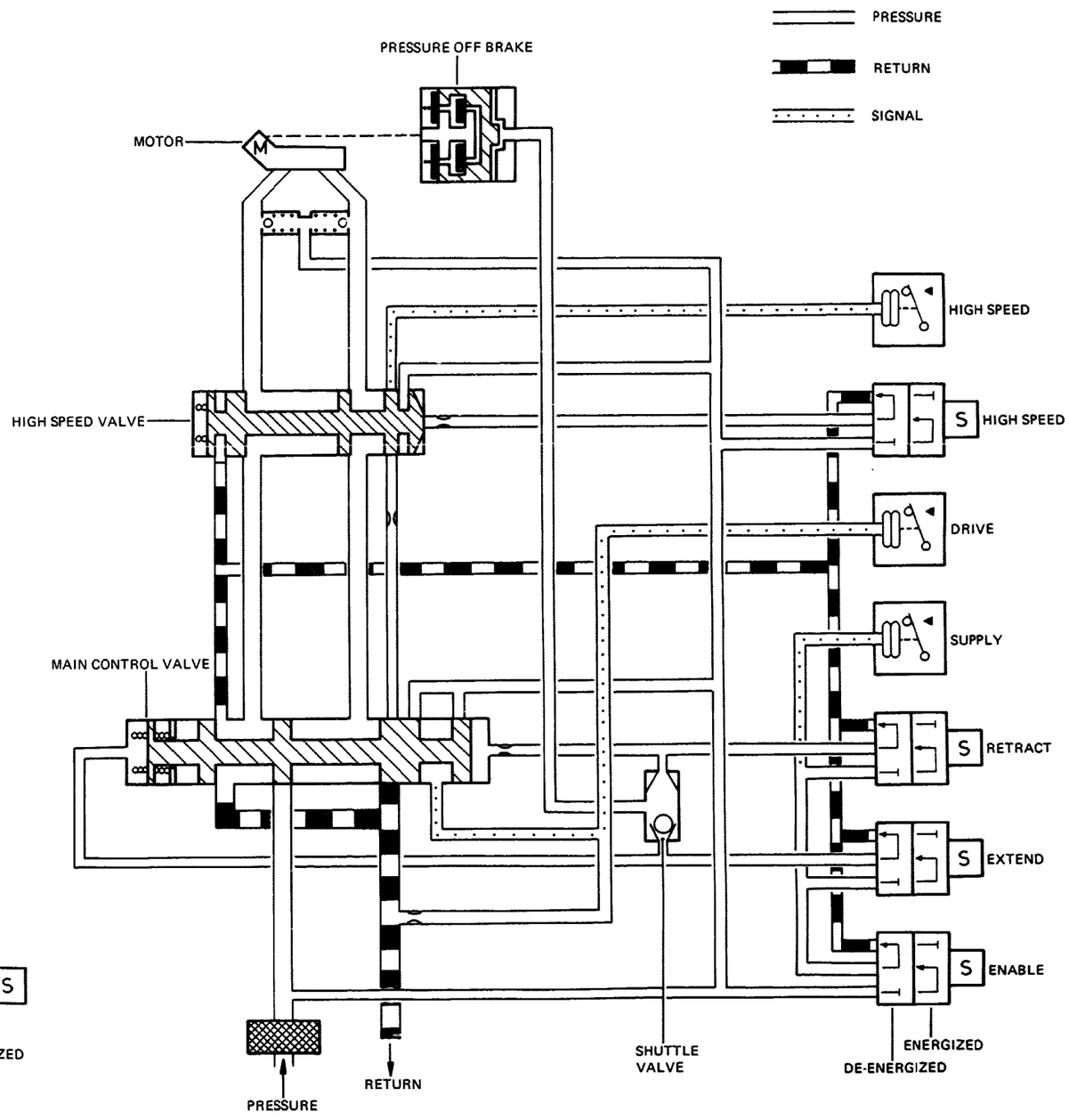

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Valve Block
Figure 003

the control and return ports.
When the solenoid is energized, the upper plunger is forced downward against the spring pressure and positions the ball against the lower valve seat, opening a connection between the pressure and control ports and closing the return port.

(b) High-speed, supply and drive pressure switches. The pressure switches are described in 27-51-00.

(c) Main control valve. The main control valve is operated by the enable, extend and retract solenoid valves and directs the hydraulic supply to the associated hydraulic motor via the speed-change valve. The main control valve is a three-position, four-way, spool valve of the spring biased, on-off type.

(d) Speed-change valve. The speed-change valve is operated by the high-speed solenoid valve and controls the flow of hydraulic fluid to the motor. The speed-change valve is a two-position, four-way spool valve, spring biased to the low speed position.

(e) Shuttle valve. The shuttle valve directs hydraulic fluid to the pressure-off brake, and is a standard conical type valve.

(f) Filter. The filter is a mesh type, replaceable filter, located across the hydraulic supply gallery.

(2) Transfer tubes
The transfer tubes connect the valve blocks to the hydraulic motors.

(3) Hydraulic Motors
(Ref. Fig. 004)

(a) Alternative hydraulic motors may be fitted to the PCU. Each is of the in-line rotating cylinder type, comprising a motor body, cylinder block, swash plate, slippers, pistons, retaining ring, bearings, port plate, motor cap, output shaft and seals. Case and seal drain connections are also provided.

(b) Two quill shafts connect the hydraulic motors to the differential gearbox.

(4) Pressure-off brakes
(Ref. Fig. 005)

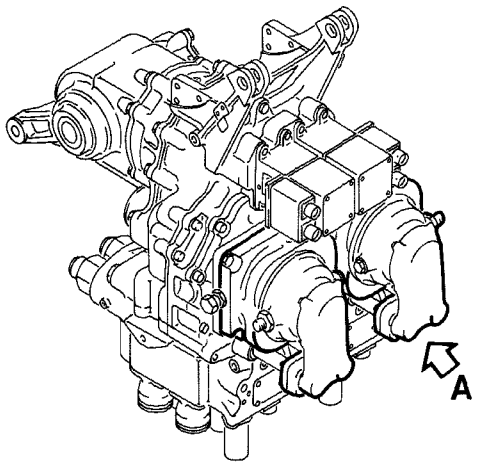
(a) A pressure-off brake is installed between each hydraulic motor and the differential gearbox. Each brake comprises a series of friction plates splined onto a cylindrical liner, and rotor plates splined onto a cylindrical shaft.

(b) Three pistons, installed in interconnected cylinders, control the operation of the brake. The pistons are driven by hydraulic fluid from the valve block (shuttle valve) and control rotor plate movement via a pressure plate and spring.

(5) Differential Gearbox
(Ref. Fig. 006)
(Ref. Fig. 007)

(a) The differential gearbox provides the interface between the valve blocks, the hydraulic motors, the pressure-off brakes and the intermediate gearbox. Attachment lugs for mounting the PCU to the aircraft structure are formed on the differential gearbox housing

(b) The differential gearbox contains the planetary and reduction gearing, the output drive and a slipping clutch. The planetary and reduction gearing comprises a spur gear, an idler gear, an annulus/ring gear,



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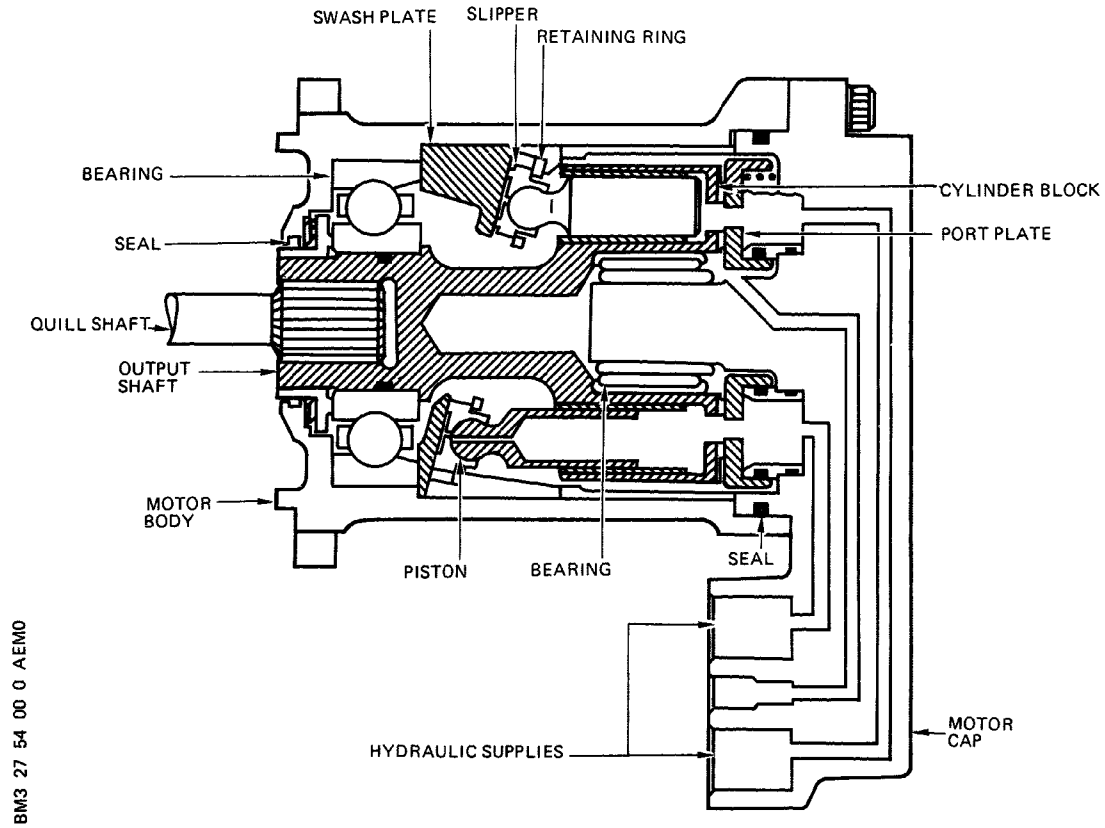
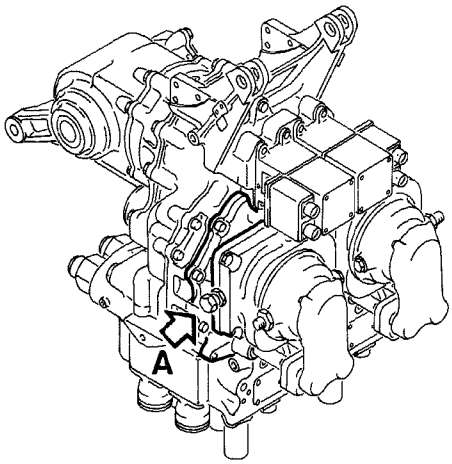


Hydraulic Motor (Typical)
Figure 004



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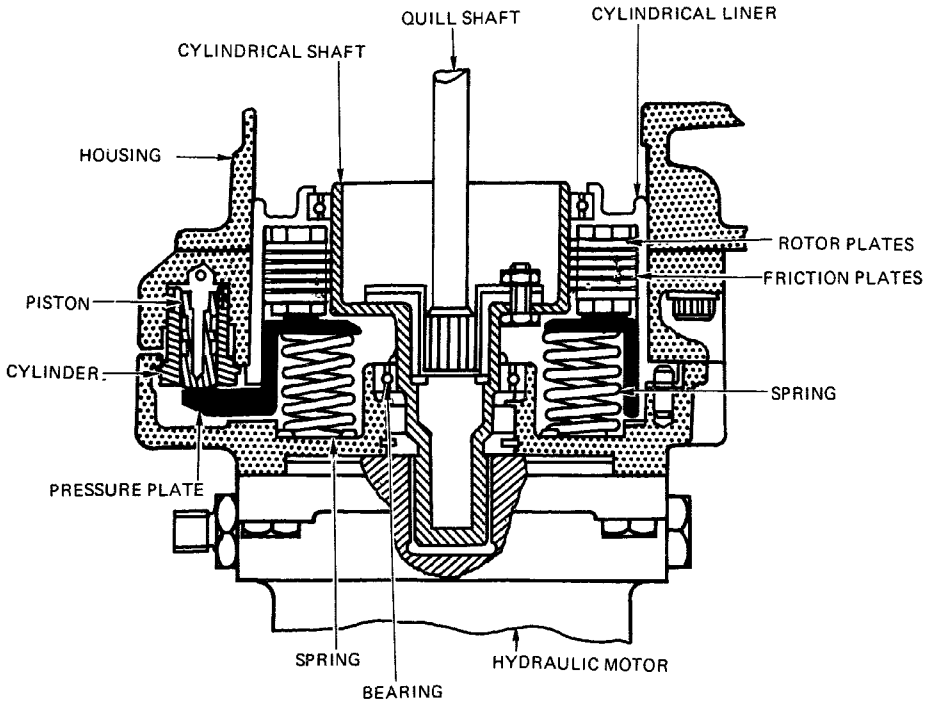

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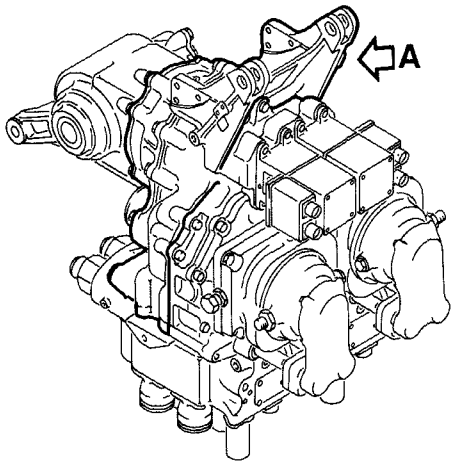
Pressure-off Brake
Figure 005



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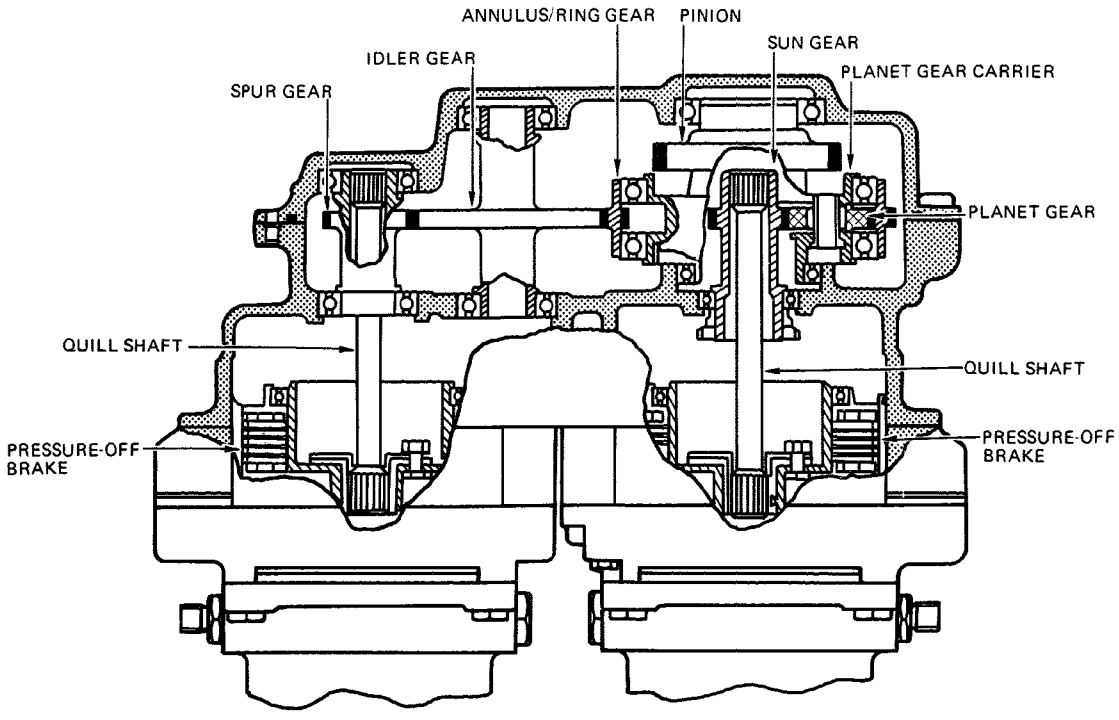
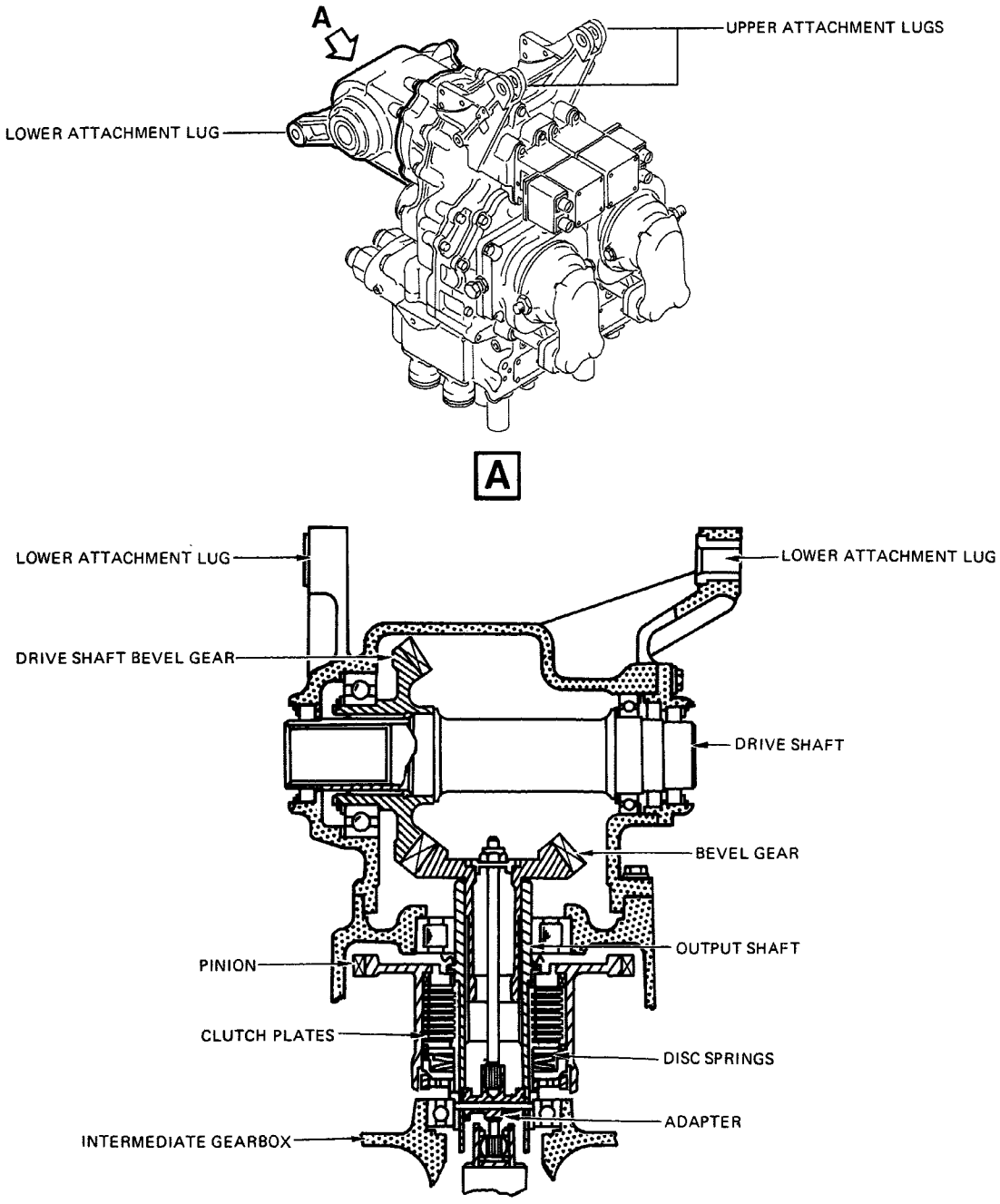


Differential Gearbox - 1
Figure 006



Differential Gearbox - 2
Figure 007

a sun gear, a planetary carrier housing three planet gears, and a pinion; the drive from the hydraulic motors is transmitted to the gear train by the two quill shafts.
The output drive comprises an output shaft, two bevel gears, a drive shaft and an adapter. The slipping clutch comprises a series of plates splined onto the pinion and output shaft alternately and is fitted to limit the amount of torque transmitted by the hydraulic motors. The adapter is attached to the output shaft and provides the interface with the intermediate gearbox.

(6)Intermediate Gearbox
(Ref. Fig. 008)

(a)The intermediate gearbox provides mounting and drives for the instrumentation PPU and the feedback PPU, and comprises a splined, self-aligning coupling, an input gear, an idler gear, reduction gears and two spur gears.

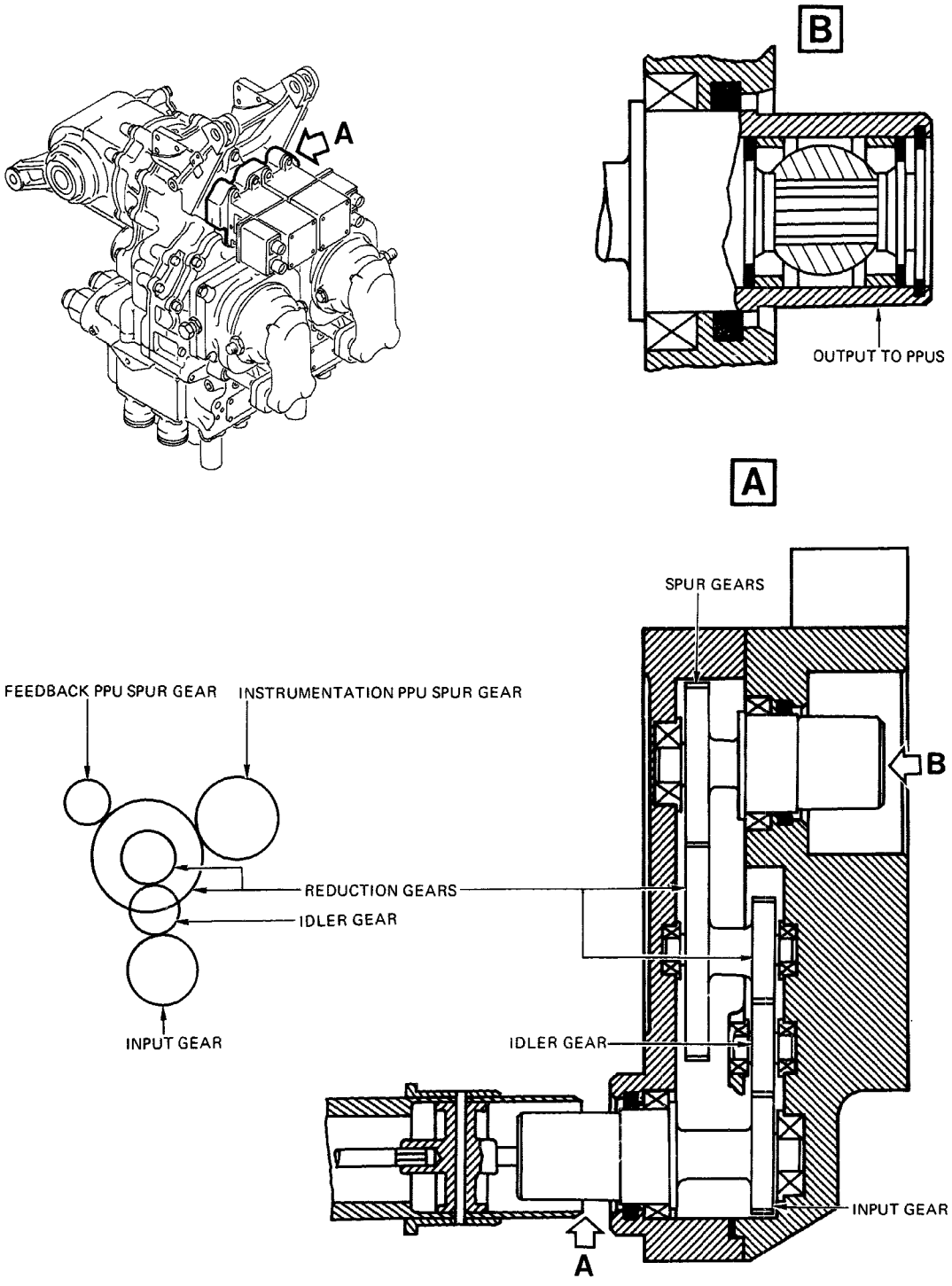
(b)The drive is transmitted from the differential gearbox adapter via the self-aligning coupling to the input gear (C), which drives the reduction gears via an idler gear. The reduction gearing meshes with the spur gears (A) and (B) which drive the feedback PPU and the instrumentation PPU respectively, rotating them through the required angles.

B. System Torque Limiters (5471, 5514)
(Ref. Fig. 009)

(1)The system torque limiters are installed between the PCU and the right-angle gearbox. They consist of a split, cast outer casing with a mounting lug formed on each half, a hardened steel earthing member, an input shaft, an output shaft and a pre-torque assembly consisting of an input and an output torque tube assembled on a torsion bar.
A torque limiter indicator provides lock-out indication. A drain plug and a combined oil filler/level plug are provided for servicing.

(2)The input shaft and the output shaft are splined at their outer ends to accept the transmission torque shafts. The inner end of the output shaft is machine formed into a castellated bearing cage, into which, rollers are placed. The inner end of the input shaft is formed into a regular polygon cam and fits inside the castellated bearing cage making contact with the rollers. Both ends have also been machined to interlock with the associated torque tube to form a duplex key and socket arrangement.
The outer ends of the torque tubes are machined with differentiated splines for assembly with the torsion bar.

(3)Principle of operation
By a predetermined displacement of the torque tubes on the torsion bar a pre-loaded torque is contained within the assembly.
The whole assembly is contained within the split cast casing, with the earthing member being installed between the two halves.
If there is a wings system jam, the output shaft is stationary. The input shaft driven by the PCU applies a torque to the stationary output shaft through the pretorqued assembly. Because of the duplex key and socket arrangement, the direction of the applied torque will always be in opposition to the pre-loaded torque, regardless of the



Intermediate Gearbox
Figure 008

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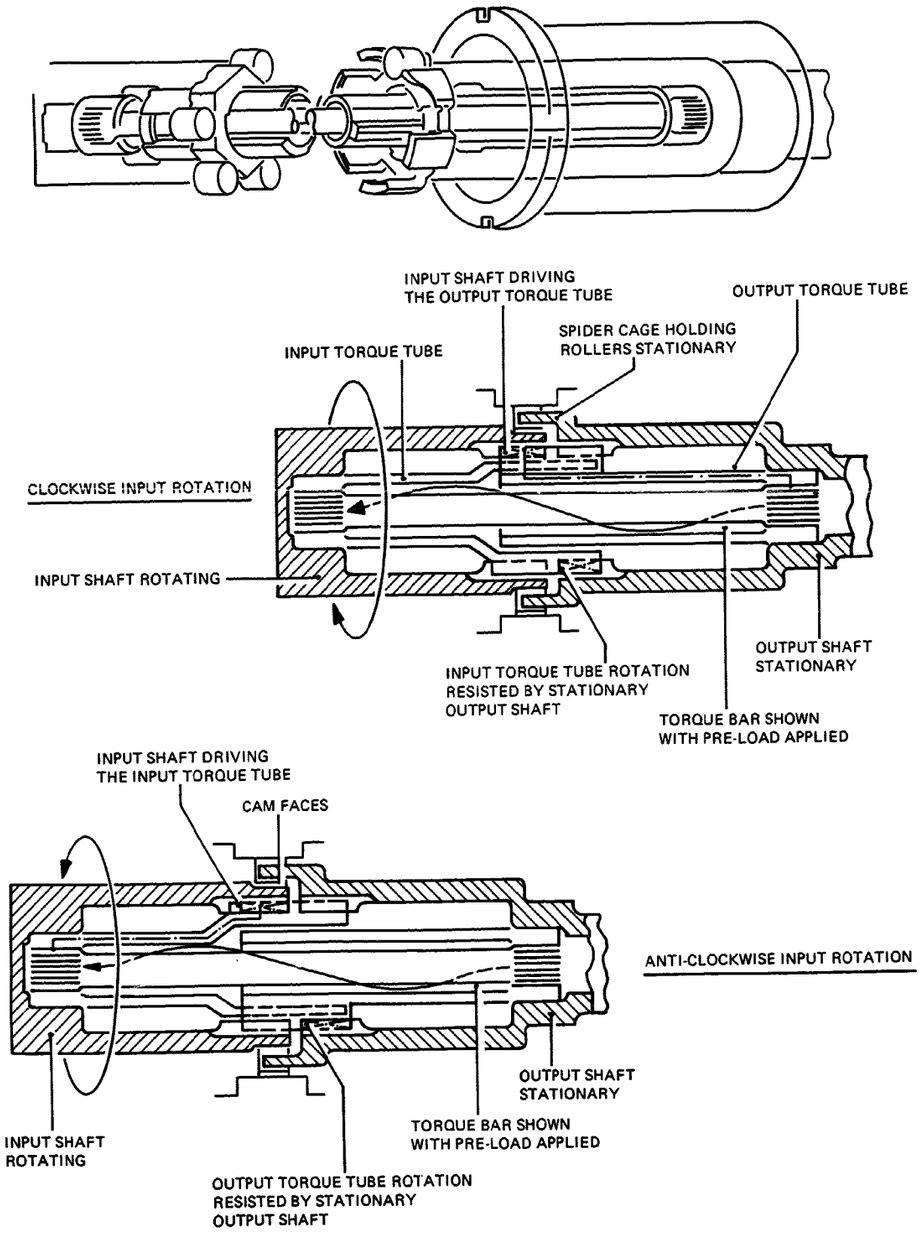

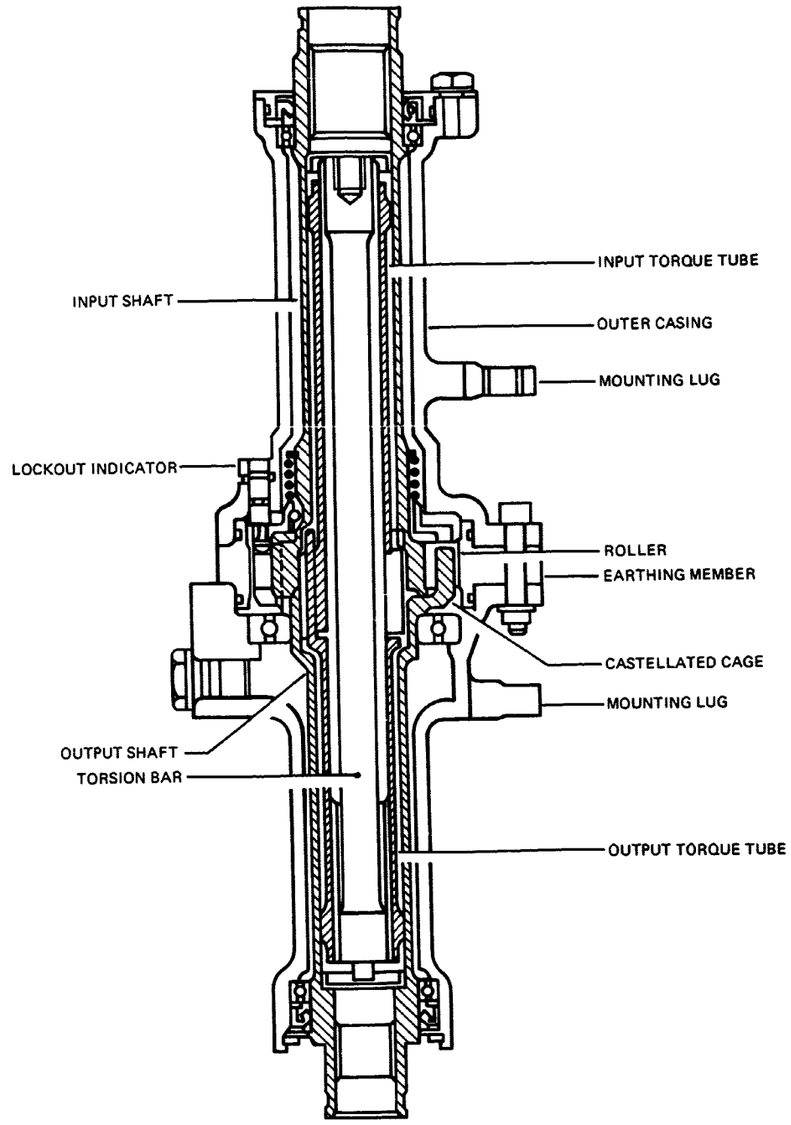

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Torque Limiter
Figure 009

direction of PCU output shaft rotation. The stationary output shaft prevents the rollers from moving and as the input shaft overcomes the pre-loaded torque the polygon cam makes contact with the rollers. When the input shaft completely overcomes the preload torque the rollers are jammed against the earthing member and the load is transfered from the transmission system to the aircraft structure. At this point the lockout indicator is operated. When the jam or torque is removed the indicator can be reset by thumb pressure.

C. Right-angle Gearboxes (5473, 5476, 5516, 5519)
(Ref. Fig. 010)

(1) Two right-angle gearboxes are provided at the intersection of each wing with the fuselage. Right-angle gearboxes 5473 (LH) and 5516 (RH) are mounted on the outside fuselage skin, between FR53 and FR54. Right-angle gearboxes 5476 (LH) and 5519 (RH) are mounted on the inboard side of screw jacks 1.

(2) The four right-angle gearboxes are identical in construction. Installation in the opposite wings is achieved by inverted mounting of two gearboxes. Each gearbox is provided with one filler plug and two drain plugs, positioned to permit filling and draining from either installed attitude.

(3) Each right-angle gearbox comprises a housing, containing two bevel gears. The input to output ratio is 1:1.

D. Screw Jacks (5477, 5520, 5484, 5527, 5492, 5535, 5502, 5545)
(Ref. Fig. 011) (Sheet 1/2)
(Ref. Fig. 011) (Sheet 2/2)

(1) The screw jacks are of fail-safe design incorporating a secondary load path which normally is unloaded.

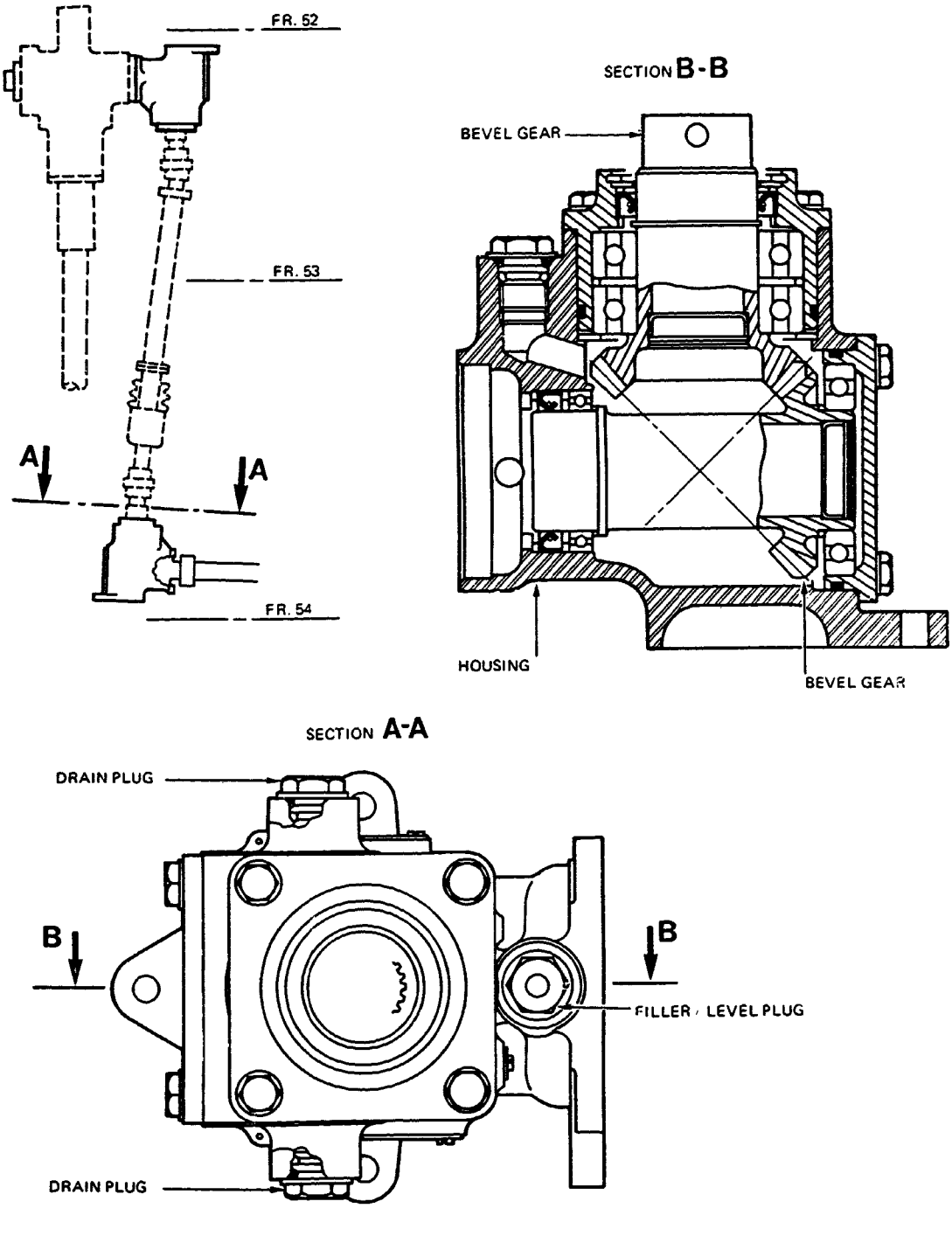
(2) Each screw jack is provided with a torque limiter to limit the load that can be transmitted through the screw jack to the flap. The torque limiters at screw jacks 1 are located inside the screw jack heads. The torque limiters at screw jacks 2, 3 and 4 are located above the screw jack heads.

(3) A series of bevel gears, contained in each screw jack head, transmits the torque to the screw shaft.

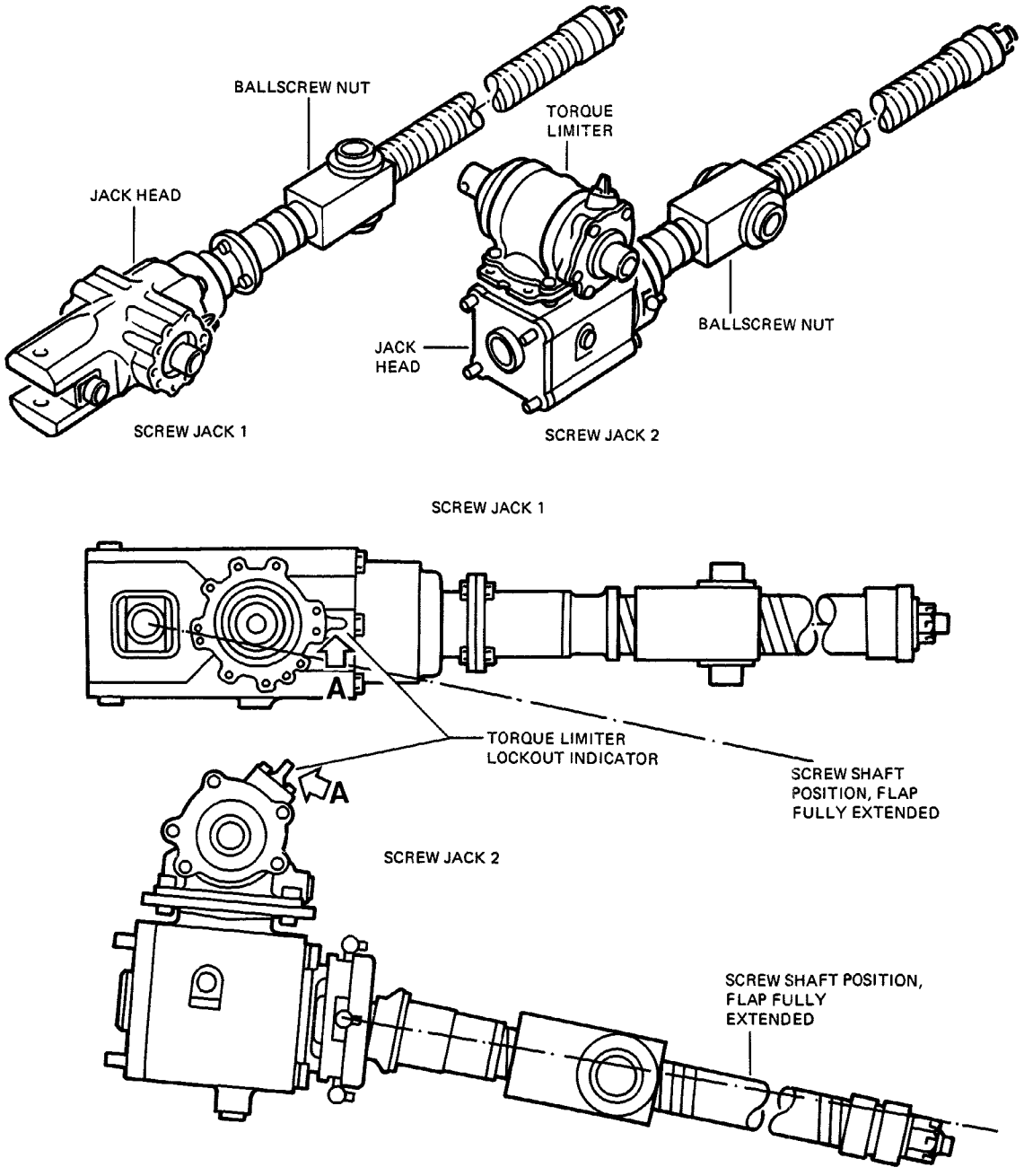
(4) A recirculating ball nut travels on each screw jack shaft. Each ball nut is provided with two independent ball circuits, separated and controlled by ball deflectors. Wiper seals are provided to retain the lubricant and prevent ingress of contaminants. Scrapers are provided to remove solid deposits; the scrapers also function as ice chippers.

(5) The head of screw jack 1 is attached to the aircraft structure by a universal joint. The head of screw jack 2 is rigidly attached to the rear false spar through a fail-safe bracket. Four bolts are employed; in the event of a single bolt failure, limit and ultimate loads can still be reacted. The attachment of screw jacks 3 and 4 to the outer rear spar is similar to the installation of screw jack 2. The screwshafts of screw jacks 2, 3 and 4 are attached to the screw jack heads by universal joints.

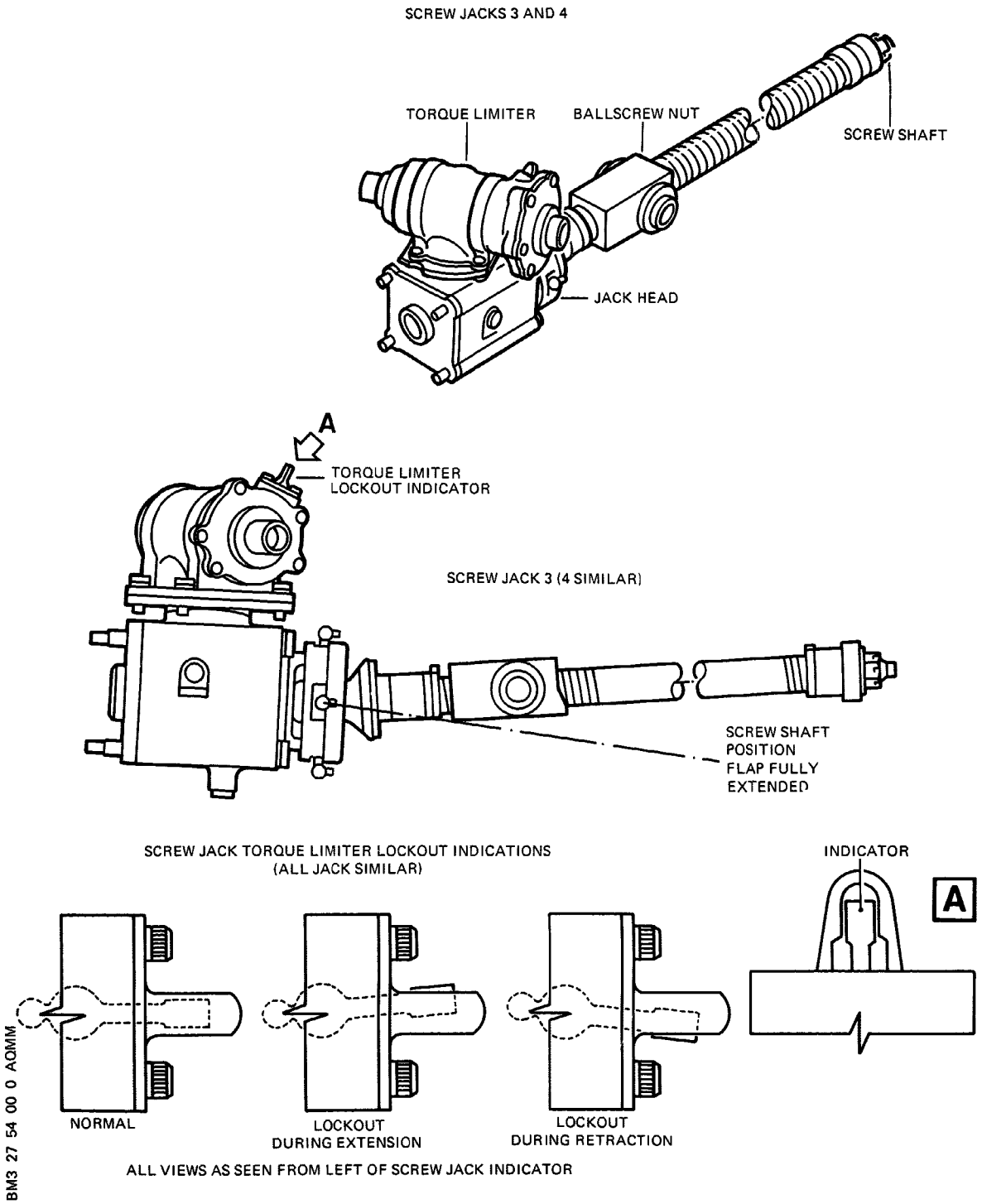
(6) Handed installation of screw jacks 3 and 4 is achieved by rotating the torque limiter and mounting plate to the required position.



Right-angle Gearbox
Figure 010



Screw Jacks 1 and 2
Figure 011

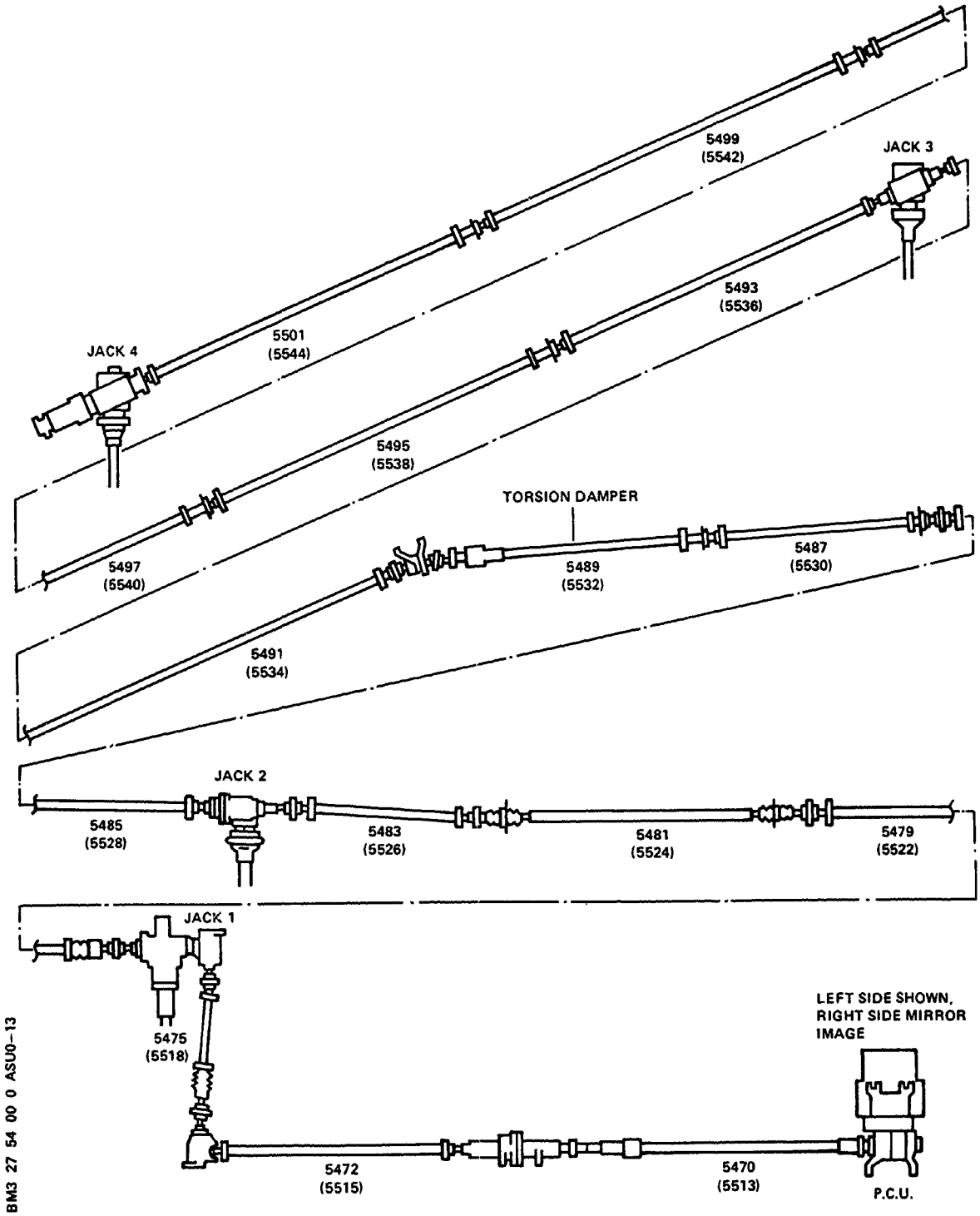


Screw Jacks 3 and 4
Figure 011

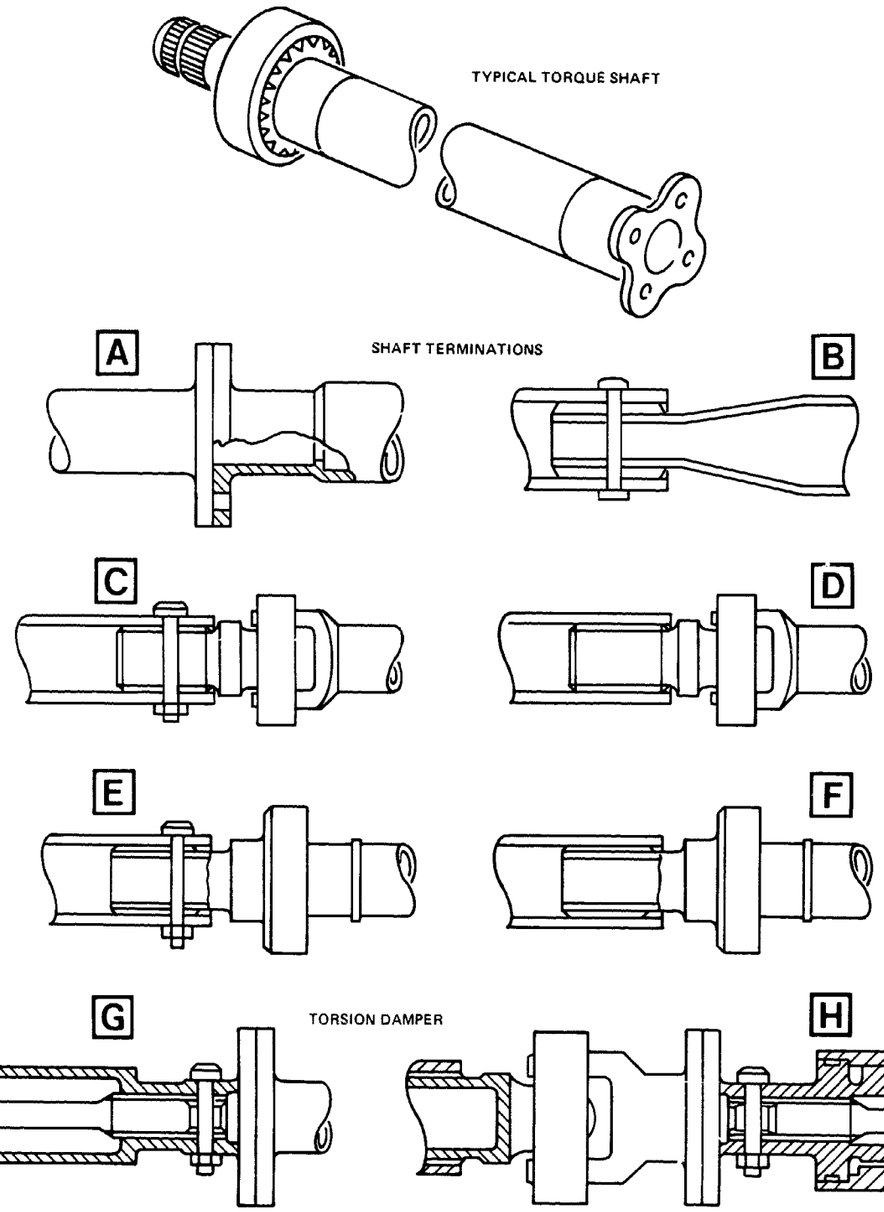
(7)The torque limiter is a bidirectional, roller lock-out torsion bar type similar to the system torque limiter. The principle of operation being the same (Ref. para. B.(3). An indicator located on the earthing ring provides lock-out indication.
Rotation of the input shaft is transmitted to the long torque tube and the short torque tube through two pairs of pins. The pins are located in the torque tubes and in coincident slots in the input shaft and in the primary and secondary pinions. If the input or output torque exceeds the predetermined toruqe the lock-out rollers are engaged with the earthing ring, the torque is transferred to the wing structure and the lockout indicator is set.
The lock-out indicator can be reset by thumb pressure when the over-torque condition has been removed.
(8)A filler/level plug and a drain plug are provided.

E. Torque Shafts
(Ref. Fig. 012)
(Ref. Fig. 013)
(1)The torque shafts are fabricated from stainless steel tube with fittings welded to both ends of each section. The length of each torque shaft and the types of end fitting provided are dictated by installation and operational requirements.
(2)The torque shafts are supported by a series of self-aligning steady bearings and connected by splined fixed and sliding joints and universal joints to ensure that the required axial and angular deflections are achieved.
(3)Two plunging joints are installed adjacent to each screw jack 1. Each plunging joint comprises a universal joint integral with a splined tube. A multi-hole flange provides installation adjustment.
(4)Two sliding bearings are installed between screwjacks 1 and 2 to accomodate axial movement of the transmission.
(5)Two torsion dampers, one in each wing, are installed between screwjack 2 and the kink steady bearing.
Their purpose is to prevent irreversible lockup of the flap transmission occuring on wing tip brake application, torque limiter lockout, vane jam or power interruption.

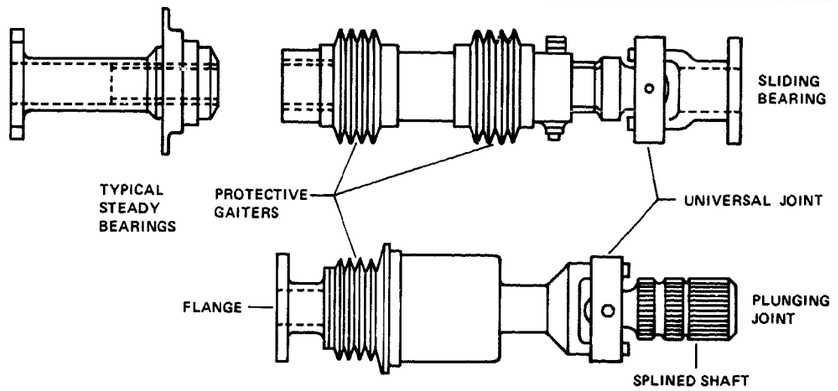
F. Flap Track Carriages
(Ref. Fig. 014)
(Ref. Fig. 015)
(1)One flap track carriage (carriage) is provided for each flap track. The carriages are of fail-safe design.
(2)Each carriage comprises two titanium sidewalls connected by an aluminium alloy bridge member. The sidewalls provide mounting trunnions for the rollers. An anti-friction pad is attached to the inside face of each sidewall. Shims are provided to permit adjustment of the anti-friction pads.
(3)Each carriage 1 is provided with one pair of support rollers and is attached to the forward, inboard end of an inner flap. The rollers are designed to take support and side loads. The carriage is suspended from track 1 and is attached to the inner flap by a link and a hinge. The



Torque Shafts and Torsion Damper - 1
Figure 012



TORQUE SHAFT NUMBER	TERMINATION		LOCATION
	UPSTREAM END	DOWN STREAM END	
5470	F	E	PCU - LH TORQUE LIMITER
5513	F	E	PCU - RH TORQUE LIMITER
5472	E	F	LH TORQUE LIMITER - RT ANGLE GEAR BOX
5515	E	F	RH TORQUE LIMITER - RT ANGLE GEAR BOX
5475	A	C	PLUNGING JOINT - RT ANGLE GEAR BOX
5518	A	C	PLUNGING JOINT - RT ANGLE GEAR BOX
5479	A	C	PLUNGING JOINT SLIDING BEARING
5481	C	C	SLIDING BEARING – SLIDING BEARING
5483	C	C	SLIDING BEARING – SCREW JACK 2
5485	F	C	SCREW FACK 2 - STEADY BEARING
5487	A	F	STEADY BEARING - STEADY BEARING
5489	G	H	STEADY BEARING - KINK STEADY BEARING
5491	D	E	KINK STEADY BEARING - SCREW JACK 3
5493	E	F	SCREW JACK 3 - STEADY BEARING
5495	A	F	STEADY BEARING - STEADY BEARING
5497	A	F	STEADY BEARING - STEADY BEARING
5499	A	F	STEADY BEARING - STEADY BEARING
5501	A	F	STEADY BEARING - SCREW JACK 4
5522	A	C	PLUNGING JOINT - STEADY BEARING
5524	B	B	STEADY BEARING - STEADY BEARING
5526	C	C	STEADY BEARING - SCREW JACK 2
5528	F	C	SCREW JACK 2 - STEADY BEARING
5530	A	F	STEADY BEARING - STEADY BEARING
5532	G	H	STEADY BEARING - KINK STEADY BEARING
5534	D	E	KINK STEADY BEARING - SCREW JACK 3
5536	E	F	SCREW JACK 3 - STEADY BEARING
5538	A	F	STEADY BEARING - STEADY BEARING
5540	A	F	STEADY BEARING - STEADY BEARING
5542	A	F	STEADY BEARING - STEADY BEARING
5544	A	F	STEADY BEARING - SCREW JACK 4



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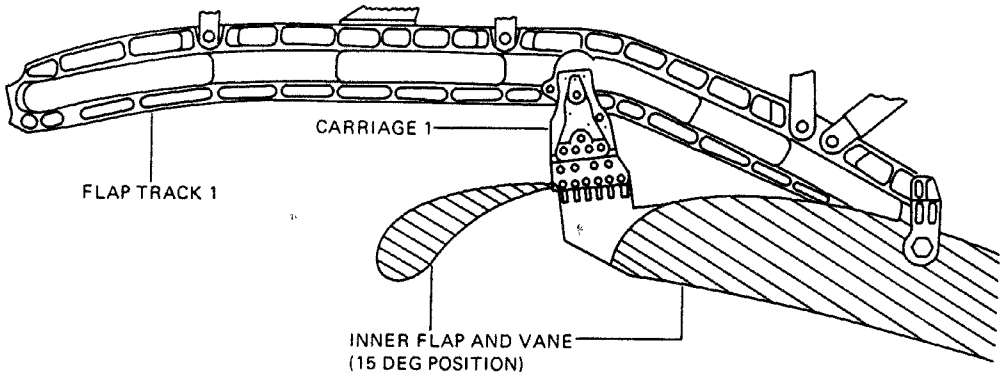
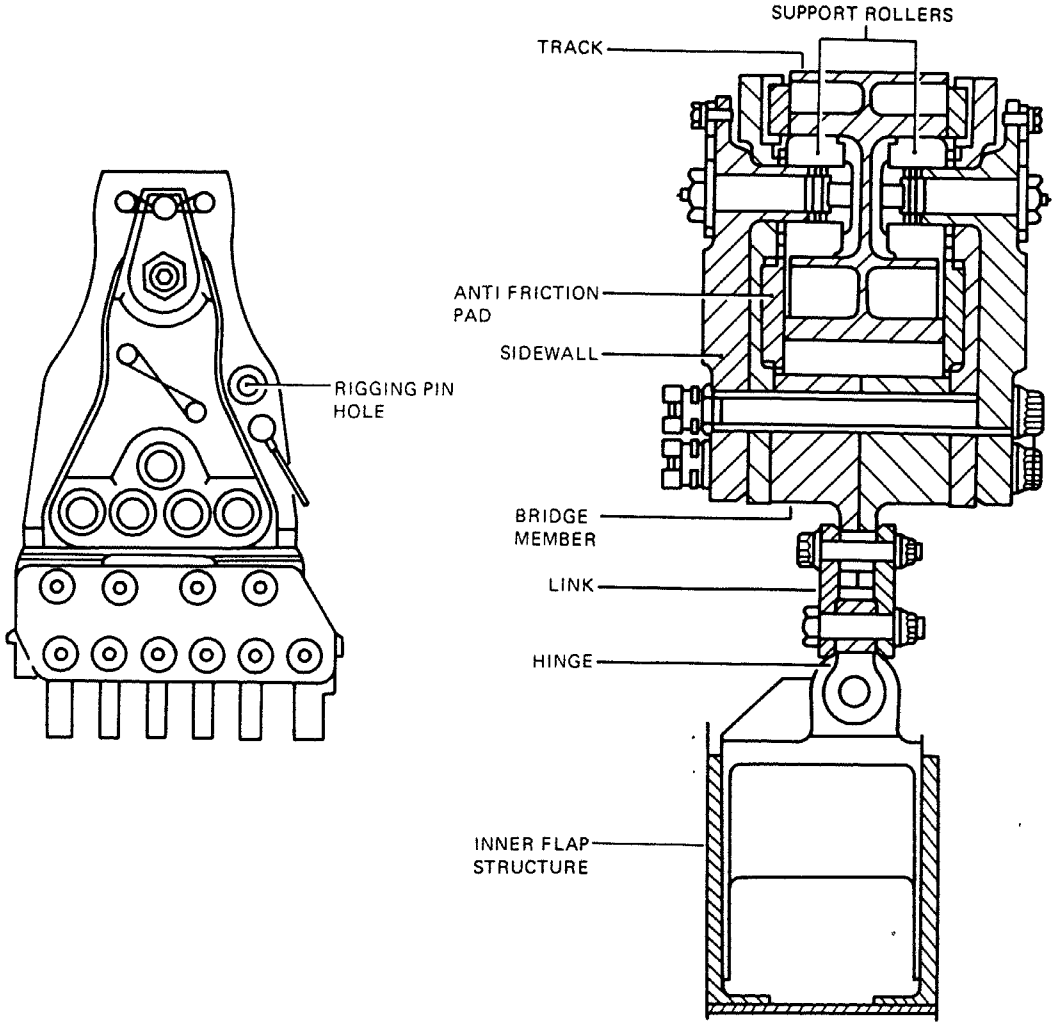
Torque Shafts and Torsion Damper - 2
Figure 013





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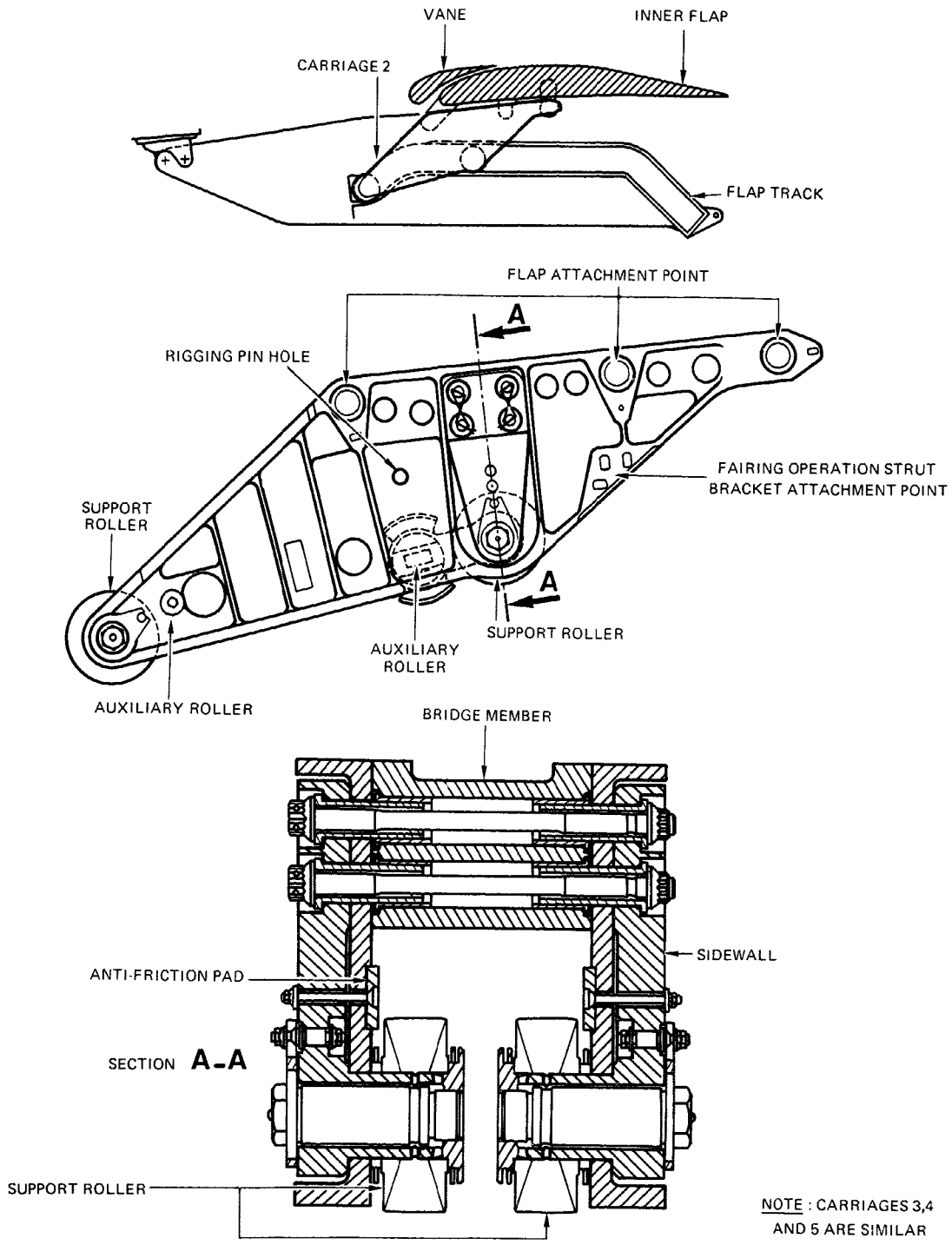
Flap Track Carriage 1
Figure 014



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Flap Track Carriage 2
Figure 015

design accommodates sideways movement of the flap.

(4)Carriages 2, 3, 4 and 5 are each provided with two pairs of support rollers and one pair of auxiliary rollers. The auxiliary rollers are designed to take side load. The carriages move along the tracks and support the flaps above them by means of links which are adjustable to allow rigging of the surfaces.

(5)The carriages are provided with holes for rigging pins. The rigging pins are designed to shear if left in position during flap operation.

(6)A mechanical link connects each carriage to the movable section of the associated flap fairing. Movement of the carriage operates the flap fairing.

5. Operation
(Ref. Fig. 016)

A. Hydraulic Actuation
The YELLOW valve block is controlled by SFCC 1, the GREEN valve block is controlled by SFCC 2. The valve blocks are identical in construction and operation.
NOTE : The operation of the YELLOW valve block and hydraulic motor is described.

(1)Flap Extension

(a)A drive command from SFCC 1 energizes the enable solenoid valve. Hydraulic fluid is supplied to the pressure port of the extend solenoid valve.

(b)A further command from SFCC 1 energizes the extend solenoid valve. Hydraulic fluid is supplied to the extend chamber of the main control valve. Hydraulic pressure moves the spool of the main control valve, directing hydraulic fluid to the flap extend port of the hydraulic motor via the speed-change valve.
NOTE : The system can operate in a slow-speed mode or a high-speed mode. Speed of operation in the slow-speed mode is approximately ten per cent of the high-speed mode. Slow-speed operation is used at start-up to reduce torque peaks but the primary function is during stopping, when the system is decelerated from the high-speed mode to improve accuracy in reaching the selected position.

(c)Hydraulic fluid passes through the shuttle valve to the pressure-off brake circuit. The brake is released and the hydraulic motor commences to drive the system in the slow-speed mode.

(d)A final command from SFCC 1 energizes the high-speed solenoid valve which activates the high-speed mode of the speed-change valve. The supply of hydraulic fluid to the hydraulic motor is increased and the system accelerates to the high-speed mode.

(e)When the flaps reach the speed-change threshold, the high-speed solenoid valve is de-energized. The high-speed mode of the speed-change valve is de-activated, the flow of hydraulic fluid to the hydraulic motor is reduced and the system decelerates to the slow-speed mode.

(f)System movement continues at slow speed until the flaps reach the cut-off threshold when the enable solenoid valve and the extend solenoid valve are de-energized. The main control valve closes and the flow of

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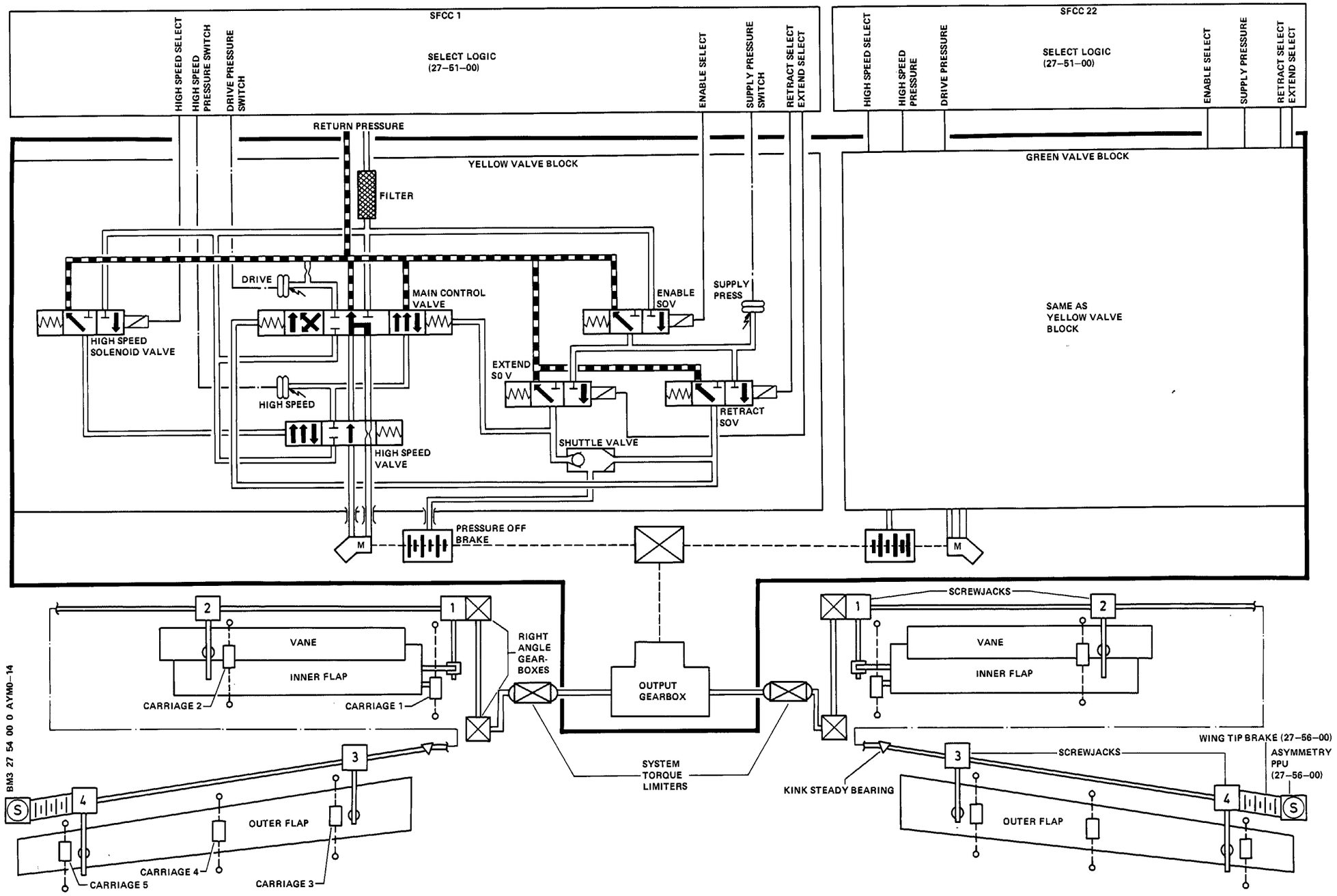


Hydraulic Actuation and Power Transmission - Schematic Diagram
Figure 016

hydraulic fluid to the hydraulic motor is halted.

(g) The flow of hydraulic fluid through the shuttle valve to the pressure-off brake circuit is halted and the pressure-off brakes are applied.

(h) System movement stops and the flaps remain in the selected position.

(2) Flap Retraction

(a) Drive commands from the SFCC energize the enable solenoid valve and hydraulic fluid is supplied to the pressure port of the retract solenoid valve.

(b) The retract solenoid valve is energized and hydraulic fluid is supplied to the retract chamber of the main control valve. Hydraulic pressure moves the spool of the main control valve and hydraulic fluid is directed to the flap retract port of the hydraulic motor via the speed-change valve.

(c) Hydraulic fluid passes through the shuttle valve to the pressure-off brake circuit. The brake is released and the hydraulic motor commences to drive the system in the slow-speed mode.

(d) Further commands from the SFCC energize the high-speed solenoid valve which activates the high-speed mode of the speed-change valve. The supply of hydraulic fluid to the hydraulic motor is increased and the system accelerates to the high-speed mode.

(e) When the flaps reach the speed-change threshold, the high-speed solenoid valve is de-energized. The high-speed mode of the speed-change valve is de-activated, the flow of hydraulic fluid to the hydraulic motor is reduced and the system decelerates to the slow-speed mode.

(f) System movement continues at slow-speed until the flaps reach the cut-off threshold when the enable solenoid valve and the retract solenoid valve are de-energized. The main control valve closes and the flow of hydraulic fluid to the hydraulic motor is halted.

(g) The flow of hydraulic fluid through the shuttle valve to the pressure-off brake circuit is halted and the pressure-off brakes are applied.

(h) System movement stops and the flaps remain in the selected position.

B. Power Transmission

(1) The outputs from the two hydraulic motors drive the differential gearbox which combines the two outputs, reduces the speed of rotation, rotates the direction of the drive through 90 degrees and directs the transmission towards the LH wing and the RH wing.

(2) The transmission passes through the torque limiters which protect the transmission system from overload. If the torque downstream of either torque limiter exceeds the pre-load setting, the torsion bar twists, forcing the rollers outwards against the earth ring, locking the torque limiter and preventing further motion. Damage to the wing transmission system is prevented.

(3) The two right-angle gearboxes, installed in each wing root, align the torque shaft run with the rear false spar. At the outboard end of the rear false spar, a kink steady bearing re-aligns the torque shaft run with the outer rear spar.

(4) Screw jacks 1 and 2 drive the inner flap, screw jacks 3 and 4 drive the outer flap.

(5) Each inner flap is supported by two carriages and each carriage runs on individual tracks. As the screwjacks rotate the translating nut extends

the flap, the carriages move on the track and a fairing operating strut connected between the carriage and the fairing, rotates the fairing about is pivot point, opening and lowering the fairing trailing edge.
As the flap extends the flap vane position is maintained by the extension of the spring struts and a single slot is formed between the leading edge of the flap and the lower surface of the flap vane.
As the flaps continue to extend the spring struts extend fully and the vane moves away from the fixed wing trailing edge to form a double slot.
As the flaps continue the carriage moves into the inclined portion of the guide track and the flaps are extended and deflected into the 40 degree position.
When the flaps have reached the desired position the SFCC closes the hydraulic solenoid valves, the motors stop driving the system and the pressure-off brakes hold the system in the new position.
When a retraction is selected the motors drive the transmission in the reverse direction, the translating nut travel reverses and the flaps are retracted. The vane contacts the fixed wing and as the flaps retract further the spring struts are compressed. As the carriage returns to the retracted position it rotates the fairing about its pivot point through the fairing operating strut and closes the fairing.

(6) Each outer flap is supported by three carriages, each carriage running on an individual track. Extension of the outer flap forms a single slot between the flap leading edge and the fixed wing trailing edge.

(7) Torque shafts transmit the drive to the screw jacks via the right-angle gearboxes and torque limiters. The torque shaft supports and joints accommodate structural and system deflections during operation.

(8) Overload on the transmission system. If there is a jam or overload of the transmission system, downstream of the system torque limiter the torque tubes are rotated differentially applying torque across the torsion bar against the pre-loaded torque.
When the torque exceeds the pre-loaded torque the input drive shaft forces the rollers against the earthing member, the input shaft is prevented from further movement in that direction and the torque limiter indicator is locked out. The PCU motor stalls and the SFCC inhibits any commands in the direction of the jam or overload. Selection in the reverse direction can be made. If there is no jam or overload in the new direction the torque limiter unlocks and the system can be moved to the new position. The SFCC removes the inhibit signal, but the torque limiter indicator remains locked out to alert the maintenance crew.

HYDRAULIC ACTUATION AND POWER TRANSMISSION (FLAPS) - ADJUSTMENT/TEST

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : FLIGHT CONTROLS - MAKE CERTAIN GROUND SAFETIES AND NOTICES ARE IN POSITION.

1. Operational Test

A. Reason for the Job

General operational test after removal/installation of components specified in the maintenance manual.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Safety Barriers
(2)	Circuit Breaker Safety Clips and Tags

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power

C. Procedure

(1) Job Set-Up

(a) Open access door 211PZ or 121BL.

(b) Position safety barriers.

(c) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(d) Make certain that electronics racks ventilation is correct.

(e) Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301 or 29-10-00, P. Block 301).

NOTE : If required, YELLOW system may be used if GREEN system is unavailable. As only one system is utilized flaps will move at half normal speed.

(f)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65

NOTE : On overhead panel 428VU, SLATS/SYS1/FAULT and SLATS/SYS2/FAULT lights come on.

(g)Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM/FLT WARN MONITOR	24WW	108/B7
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS & SLATS/POS/ECAM	2CN	334/S65
133VU	FLT CTL/FLAPS & SLATS/POS/IND	1CN	334/S66
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/FLAPS/WTB 1	11CV	336/Q66
133VU	FLT CTL/FLAPS/WTB 2	12CV	336/Q67

(2)Test

NOTE : If the GREEN hydraulic E-pumps are used to operate the flaps, the FLAPS/SYS/FAULT light, on overhead panel 428VU, may flash on and off. This is due low pump capacity and can be ignored.

ACTION	RESULT
1. On maintenance panel 472VU - set ANN LT switch to READ position.	On maintenance panel 471VU, section FLIGHT CONTROLS - annunciators SFCC1 and SFCC2/BITE DISPLAY are off.
2. On avionics rack 90VU - check fault code indicators on SFCC1 and SFCC2, if necessary reset (record any fault codes).	- SFCC1 and SFCC2 fault code indicators are black.
3. Move flap/slat control lever on center pedestal to second notch (SLATS 15/FLAPS 0).	- Flaps do not move On flap/slat position indicator 5CN, - Flap position indicator band should not move.
4. Move flaps/slat control lever to third, fourth and fifth notches (SLATS 15/FLAPS 15, SLATS 20/ FLAPS 20 and SLATS 30/FLAPS 40), in turn checking that flaps move	- Flap position indicator band moves to FLAPS 15, FLAPS 20 and then to FLAPS 40 positions on further selections.

ACTION	RESULT
to selected position before making next selection.	
5. Return flap/slat control lever to first notch, stopping at intermediate positions and checking that flaps move to selected position before making next selection.	- Flap position indicator band moves to FLAPS 20, FLAPS 15 and then to FLAPS 0 positions on further selections.
6. On maintenance panel 471VU, section FLIGHT CONTROLS - check annunciators SFCC1 and SFCC2/BITE DISPLAY.	- Annunciators SFCC1 and SFCC2/BITE DISPLAY are off.
7. On maintenance panel 472VU - set ANN LT switch to OFF.	

(3)Close-Up

(a)Remove safety clips and tags and close circuit breakers 3CV and 4CV.

NOTE : On overhead panel 428VU, SLATS/SYS1/FAULT and SLATS/SYS2/FAULT lights go off.

(b)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301 or 29-10-00, P. Block 301).

(c)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(d)Close access door 211PZ or 121BL.

(e)Remove safety barriers, notices and ground equipment.

(f)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

2. System Test

A. Reasons for the Job

NOTE : Test the flap operating times only for trouble shooting purposes.

(1)Test of flap system 1 operating time and measurement of flap deflection angles.
(2)Test of flap system 2 operating time.
(3)Test of flap systems 1 and 2 operating time and measurement of flap deflection angles.
(4)Test of flap GREEN low hydraulic pressure function.
(5)Test of flap YELLOW low hydraulic pressure function.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 2 thru 3.5 m (6.5 thru 11.5 ft.)
(2)	2 Clinometers
(3)	Clinometer Support Strips
(4)	Stopwatch
(5)	Circuit Breaker Safety Clips and Tags
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

C. Procedure

(1)Job Set-Up

(a)Make certain that flap/slat control lever on center pedestal is in first notch position (SLATS 0/FLAPS 0).
(b)Position access platform.
(c)Install clinometer support strips on right and left inboard and outboard flaps.
(d)Using clinometers measure zero position of surfaces and record for use as datum for deflection measurements.
(e)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301.
(f)Make certain that electronics racks ventilation is correct.
(g)Connect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(h)Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM/FLT WARN MONITOR	24WW	108/B7
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS & SLATS/POS/ECAM	2CN	334/S65
133VU	FLT CTL/FLAPS & SLATS/POS/IND	1CN	334/S66
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/FLAPS/WTB 1	11CV	336/Q66
133VU	FLT CTL/FLAPS/WTB 2	12CV	336/Q67

(i)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65

NOTE : On overhead panel 428VU, SLATS/SYS1/FAULT and SLATS/SYS2/FAULT lights come on.

(j)Make certain that aircraft is in ground condition.

D. Test
(1)Flap System 1 Operating Time and Measurement of Flap Deflection Angles

ACTION	RESULT
1. Pressurize YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).	
2. Open, safety and tag circuit breakers 2CV and 6CV.	- On overhead panel 428VU, FLAPS/SYS2/FAULT light comes on.
3. Move flap/slat control lever on center pedestal to second notch (SLATS 15/FLAPS 0).	- On flap/slat position indicator 5CN, flap position indicator band does not move - Flaps do not move.
4. Move flap/slat control lever to third notch (SLATS 15/FLAPS 15).	- Flap position indicator band moves to FLAPS 15 - Inboard flap deflects to an angle of 15.03 ±1° - Outboard flap deflects to an angle of 8 ±1° - Flap operation time is 27 ±3 s.
5. Move flap/slat control lever to fourth notch (SLATS 20/FLAPS 20).	- Flap position indicator band moves to FLAPS 20 - Inboard flap deflects to an angle of 22.1 ±1° - Outboard flap deflects to an angle of 17.25 ±1° - Flap operation time is 4 ±0.5 s.
6. Move flap/slat control lever to fifth notch (SLATS 30/FLAPS 40).	- Flap position indicator band moves to FLAPS 40 - Inboard flap deflects to an angle of 41.02 ±1° - Outboard flap deflects to an angle of 33.25 ±1° - Flap operation time is 8 ±1 s.
7. Return flap/slat control lever to fourth notch.	- Flap position indicator band moves to FLAPS 20 - Flap operation time is 8 ±1 s.
8. Return flap/slat control lever to third notch.	- Flap position indicator band moves to FLAPS 15 - Flap operation time is 4 ±0.5 s.

ACTION	RESULT
9. Return flap/slat control lever to second notch.	- Flap position indicator band moves to FLAPS 0 - Flap operation time is 27 ±3 s.
10. Return flap/slat control lever to first notch.	- Flap position indicator band does not move.
11. Depressurize YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).	
12. Remove safety clips and tags and close circuit breakers 2CV and 6CV.	- On overhead panel 428VU, Flaps/SYS2/FAULT light goes off.

(2)Flap System 2 Operating Time

ACTION	RESULT
1. Pressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301).	
2. Open, safety and tag circuit breakers 1CV and 5CV.	- On overhead panel 428VU, FLAPS/SYS1/FAULT light comes on.
3. Repeat steps as detailed in Para. (1) 3. thru 10. above and check flap operating time	- As in Para. (2) 3. thru 10 above.
4. Depressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301).	
5. Remove safety clips and tags and close circuit breakers 1CV and 5CV.	- On overhead panel 428VU, FLAPS/SYS1/FAULT light goes off.

(3)Flap Systems 1 and 2 Operating Time and Measurement of Flap Deflection Angles

ACTION	RESULT
1. Pressurize GREEN and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).	
2. Move flap/slat control lever to second notch (SLATS 15/FLAPS 0).	- On flap/slat position indicator 5CN, flap position indicator band does not move - Flaps do not move.
3. Move flap/slat control lever to third notch (SLATS 15/FLAPS 15).	- Flap position indicator band moves to FLAPS 15 - Inboard flap deflects to an angle of 15.03 ±1° - Outboard flap deflects to an angle of 8 ±1 ° - Flap operation time is 14 ±1.5 s.
4. Move flap/slat control lever to fourth notch (SLATS 20/FLAPS 20).	- Flap position indicator band moves to FLAPS 20 - Inboard flap deflects to an angle of 22.1 ±1° - Outboard flap deflects to an angle of 17.25 ±1° - Flap operation time is 2 ±0.5 s.
5. Move flap/slat control lever to fifth notch (SLATS 30/FLAPS 40).	- Flap position indicator band moves to FLAPS 40 - Inboard flap deflects to an angle of 41.02 ±1° - Outboard flap deflects to an angle of 33.25 ±1° - Flap operation time is 4 ±0.5 s.
6. Return flap/slat control lever to fourth notch.	- Flap position indicator band moves to FLAPS 20 - Flap operation time is 4 ±1 s.
7. Return flap/slat control lever to third notch.	- Flap position indicator band moves to FLAPS 15 - Flap operation time is 2 ±0.5 s.

ACTION	RESULT
8. Return flap/slat control lever to first notch.	- Flap position indicator moves to FLAPS 0 - Flap operation time is 14 ±1.5 s.
9. Depressurize GREEN and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).	

(4)Flap GREEN Low Hydraulic Pressure Function

ACTION	RESULT
1. Pressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301) to check flap system 2.	
2. Move flap/slat control lever from first notch (SLATS 0/FLAPS 0) to fifth notch (SLATS 30/FLAPS 40) and during flap movement gradually decrease hydraulic pressure output from hydraulic supply.	- Flaps start moving and stop at decreasing pressure of approx. 140 bars (2030 psi). After flaps have stopped FLAPS/SYS2/FAULT light on overhead panel 428VU comes on.
3. Return flap/slat control lever to first notch (SLATS 0/FLAPS 0) and gradually increase hydraulic pressure output from hydraulic supply.	- At approx. 160 bars (2320 psi) flaps start moving and FLAPS/SYS2/FAULT light on panel 428VU goes off.
4. Depressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301).	

(5)Flap YELLOW Low Hydraulic Pressure Function

ACTION	RESULT
1. Pressurize YELLOW hydraulic system (Ref. 29-10-00, P. Block 301) to check flap system 1.	
2. Move flap/slat control lever from first notch (SLATS 0/FLAPS 0) to fifth notch (SLATS 30/FLAPS 40) and during flap movement gradually decrease hydraulic pressure output from hydraulic supply.	- Flaps start moving and stop at decreasing pressure of approx. 140 bars (2030 psi). After flaps have stopped FLAPS/SYS1/FAULT light on overhead panel 428VU comes on.
3. Return flap/slat control lever to first notch (SLATS 0/FLAPS 0) and gradually increase hydraulic pressure output from hydraulic supply.	- At approx. 160 bars (2320 psi) flaps start moving and FLAPS/SYS1/FAULT light on panel 428VU goes off.
4. Depressurize YELLOW hydraulic system (Ref. 29-10-00, P. Block 301).	

E. Close-Up

(1)Remove safety clips and tags and close circuit breakers 3CV and 4CV.

NOTE : On overhead panel 428VU, SLATS/SYS1/FAULT and SLATS/SYS2/FAULT lights go off.

(2)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(3)Shut down and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).

(4)Remove clinometer support strips.

(5)Remove access platform.

HYDRAULIC ACTUATION AND POWER TRANSMISSION (FLAPS) - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. General Condition Inspection and Load Path Integrity Check of Flap Screwjacks 1,2,3 and 4

A. Reason for the Job

(1)To inspect complete units and attachments.

(2)To check primary and secondary loadpath integrity.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.5 to 4.5 m (11 to 14 ft.)
R (2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
(3)	Torque Wrench, 1.35 to 2.7 m.daN (10 to 20 lbf.ft.)
(4)	Safety Barriers
(5)	Circuit Breaker Safety Clips and Tags
(6)	Cotter Pins
(7)Material No. 04-004	Common Greases (Ref. 20-31-00)

Referenced Procedure

- 27-50-00, P. Block 301	Flaps

C. Procedure

(Ref. Fig. 601)

(Ref. Fig. 602)

(Ref. Fig. 603)

(1)Job Set-Up

(a)Position safety barriers.

(b)Extend flaps to 40° (Ref. 27-50-00, P. Block 301).

(c)Open, safety and tag the following circuit breakers:

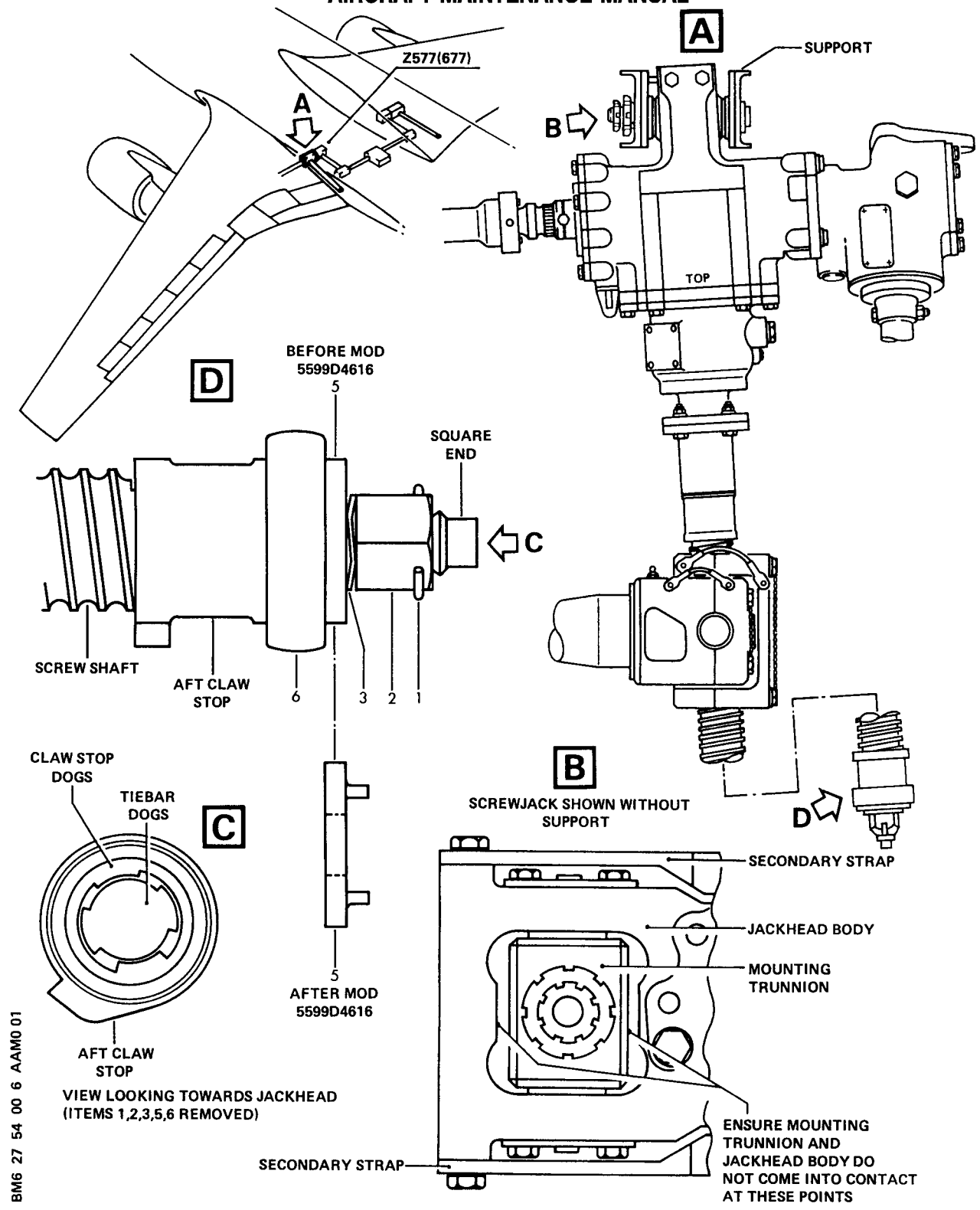
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(d)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(e)Position access platform.

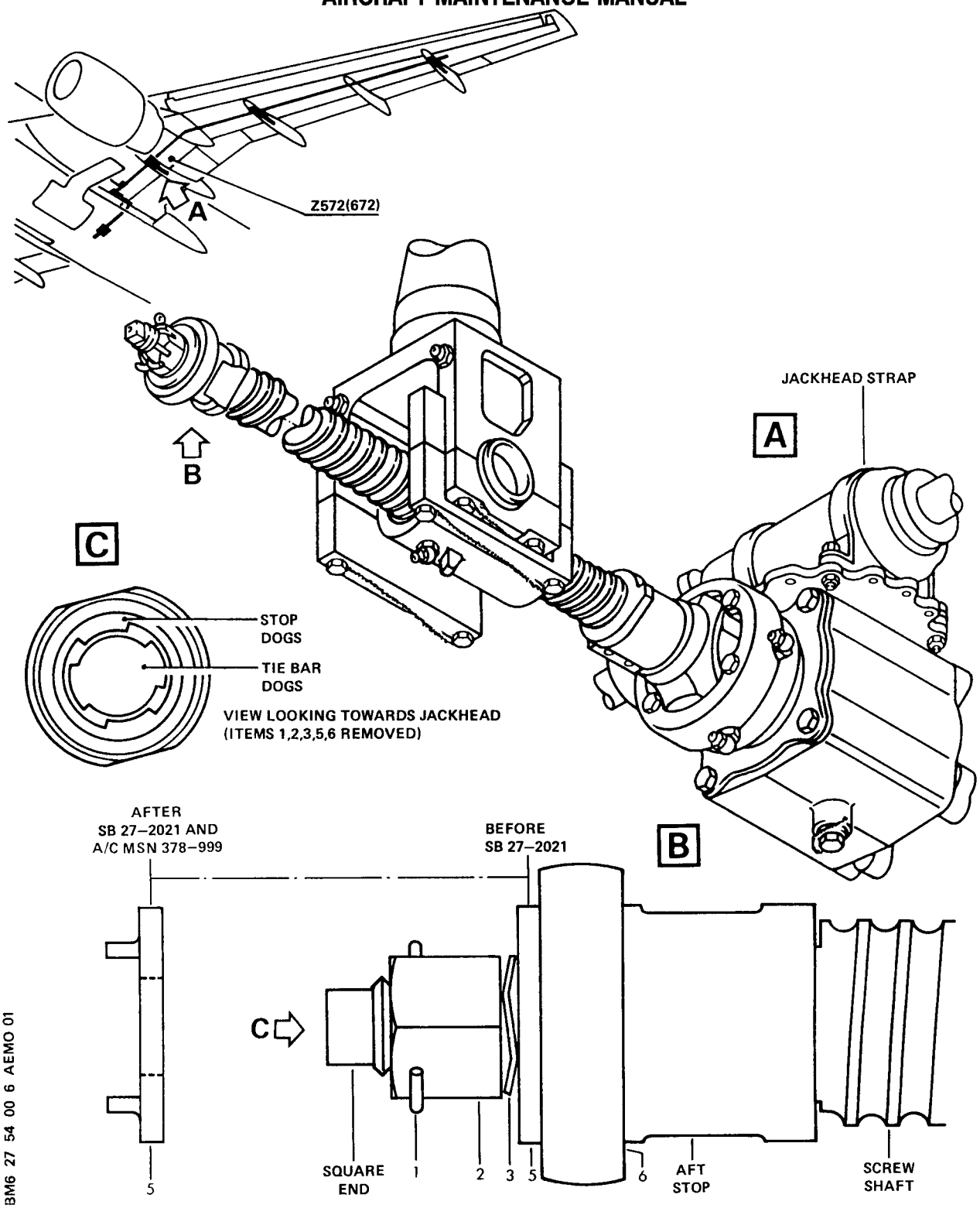
(2)Inspection of Complete Units and Attachments
(a)Inspect screwjack bodies, spindles, jackhead straps and bolts (jacks 2,3,4, only), secondary straps (jack 1 only) for evidence of undue wear, corrosion, oil leakage or other damage; none are permitted.
(b)For screwjack 1 only check that there is clearance between pivot block and screwjack body.
NOTE : Mounting trunnion contact with jack head assembly indicates damage or wear of dual concentric pins or teflon bearings.
(c)Check screwjacks for security of attachment and make certain that all safetying devices are intact.
(d)Remove tags and safety clips, close circuit breakers 5CV, 6CV and 10CV.
(e)Remove safety guard from flap/slat control lever quadrant.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACES ARE CLEAR.
(f)Retract flaps to 20° position (Ref. 27-50-00, P. Block 301).
(g)Open, safety and tag circuit breakers 5CV, 6CV and 10CV.
(h)Install safety guard on flap/slat control lever quadrant.
(i)Inspect rear portion of screwjack spindles for evidence of undue wear, cracks, corrosion or other damage; none are permitted.

(3)Check of Primary and Secondary Loadpath Integrity
(a)Using standard wrenches on the aft (claw) stop flats and on the square end of the screwjack spindle, apply opposing torques of between 1.35 m.daN and 2.7 m.daN (10 lbf.ft. and 20 lbf.ft.) to primary and secondary loadpaths in both directions.
R (b)If any relative rotational movement is apparent, proceed as follows:
1 Remove and discard cotter pin (1), remove nut (2), wavy washers (3), washers (4),(5) and roller (6).
NOTE : Screwjacks 1 and 2 have one wavy washer (3), screwjacks 3 and 4 have two.
2 Repeat step (a) and observe (claw) stop dogs and tie bar dogs, which must remain centred relative to each other. If on application
R of torque there is rotational movement, and the dogs come into contact this indicates a failure of the primary or secondary load path, and the screwjack must be replaced.
(c)To reassemble screwjack spindle end assembly, proceed as follows:
1 Wipe old grease from roller (6) to spindle contact surfaces and smear with grease (Material No. 04-004).
2 Install roller (6), washer (5), wavy washers (3), washer (4) and nut (2).



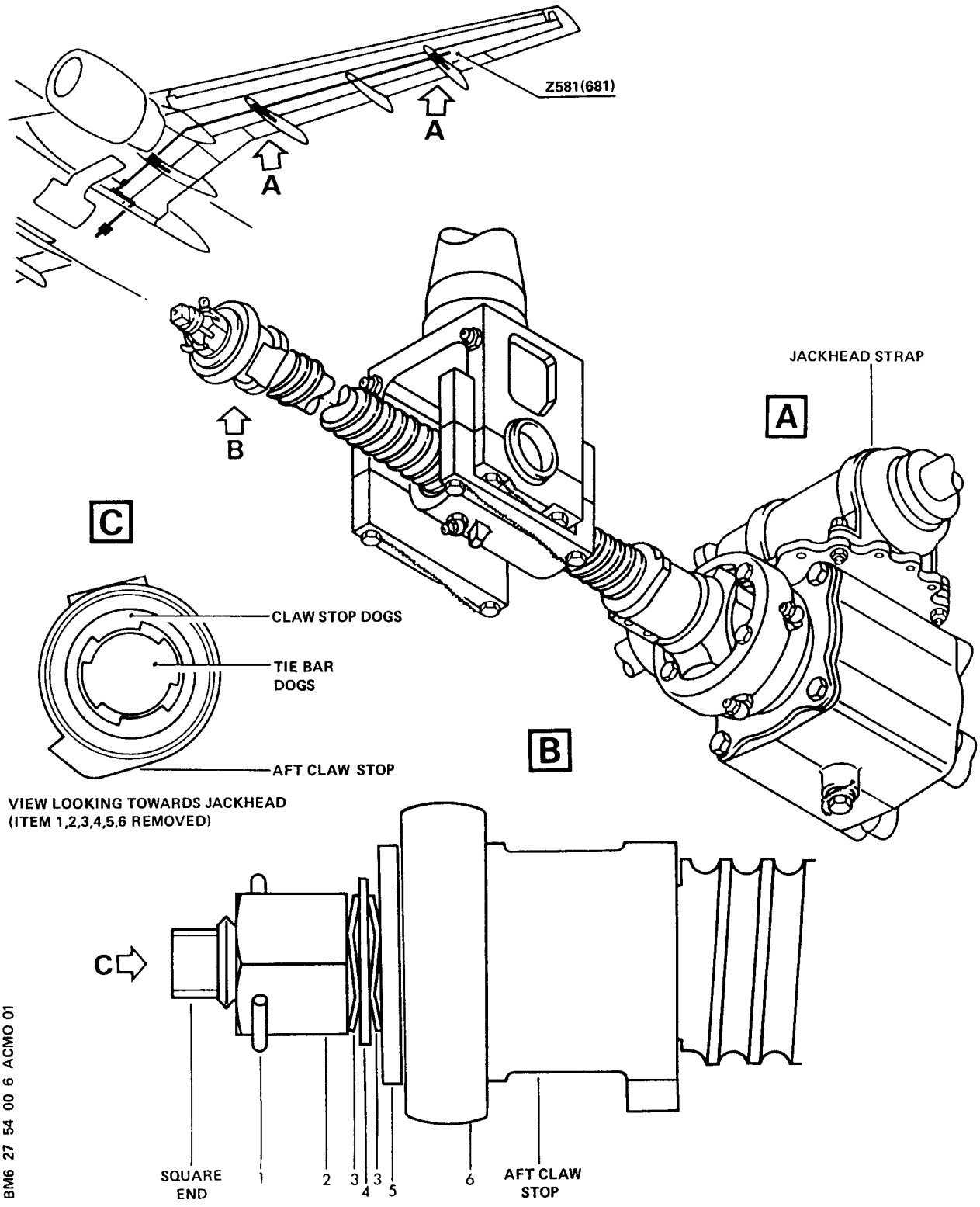
Flap Screwjack 1
Figure 601

R



Flap Screwjack 2
Figure 602

R



Flap Screwjacks 3 and 4
Figure 603

R

3 Tighten nut (2) only sufficiently to take up any free play and then tighten further until next cotter pin hole aligns.

4 Safety with cotter pin (1).

(4)Close-Up

(a)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.

(b)Remove safety guard from flap/slat control lever quadrant.

WARNING : BEFORE OPERATING FLAPS MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACES IS CLEAR.

(b)Fully retract flaps (Ref. 27-50-00, P. Block 301).

(c)Remove access platform.

(d)Remove safety barriers.

2. Ballnut/Spindle Backlash Check of Flap Screwjacks 1,2,3 and 4

A. Reason for the Job
(1)To check backlash between ballnut and flap screwjack spindle.

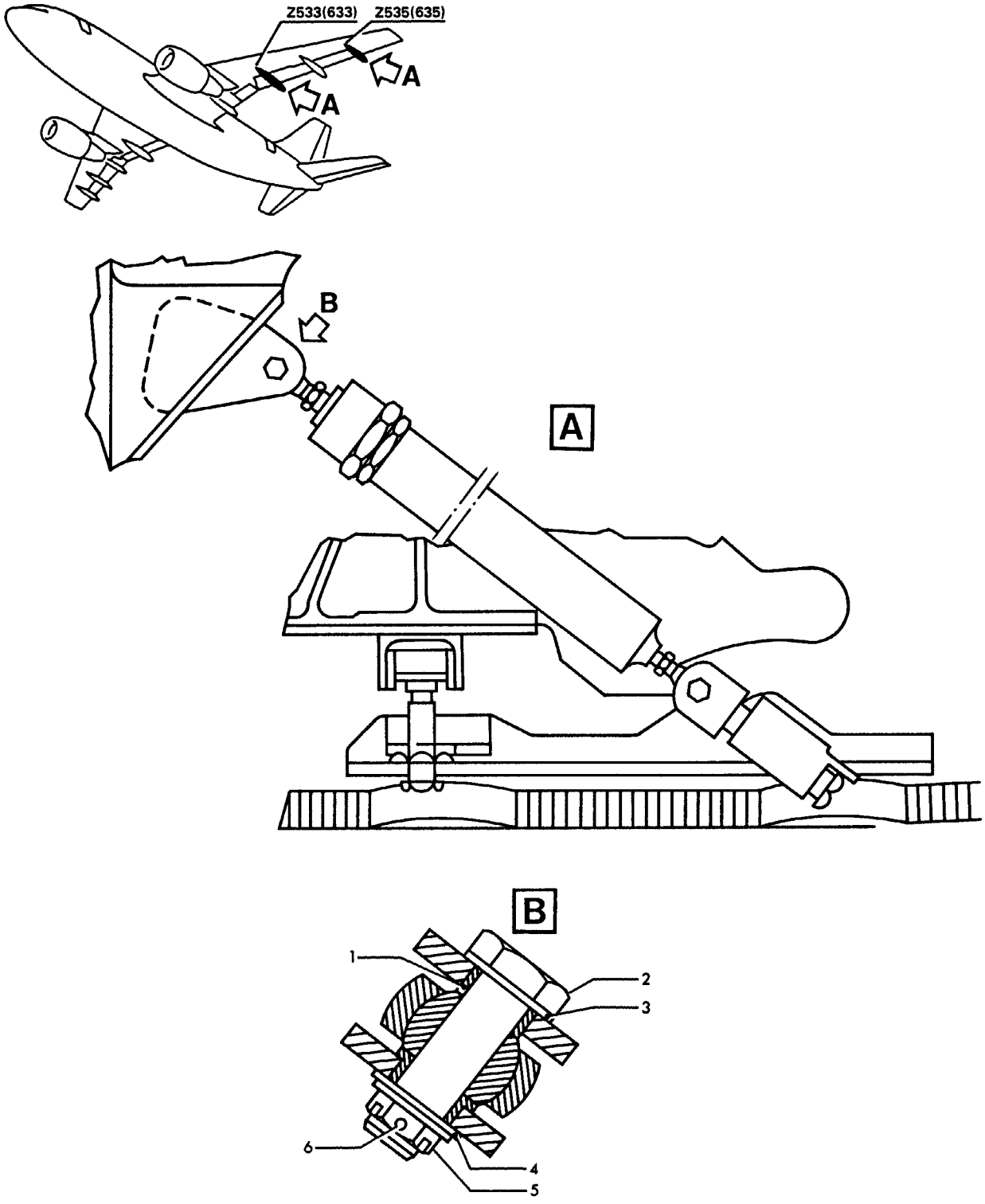
B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 3.5 to 4.5 m (11 to 14 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)LLA537A204	Backlash Checking Tool - Flap Screwjacks 1,3 and 4
	(4)LLA547A108	Backlash Checking Tool - Flap Screwjack 2
	(5)	Torque Wrench, 2.7 to 15 Nm (2.0 to 11 lbf.ft.)
	(6)	Circuit Breaker Safety Clips and Tags
	(7)	Safety Barriers
	(8)Material No. 05-002	Special Materials (Ref. 20-31-00)
	(9)Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
	Referenced Procedure	
	- 27-50-00, P. Block 301	Flaps

C. Procedure
(1)Job Set-Up
(a)Position safety barriers.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.
(b)For backlash check of screwjacks 2, 3 and 4
- Extend flaps to 15° (Ref. 27-50-00, P. Block 301).
For backlash check of screwjack 1
- Extend flaps to 20° (Ref. 27-50-00, P. Block 301).
(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

R (d)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(e)Position access platform.
(f)For backlash check of screwjacks 3 and 4 only, gain access to screwjack spindle.
(Ref. Fig. 604)
1 Remove and discard cotter pin (6).
2 Remove nut (5) and washer (4).
3 Hold the top of the operating strut in position by tieing it to



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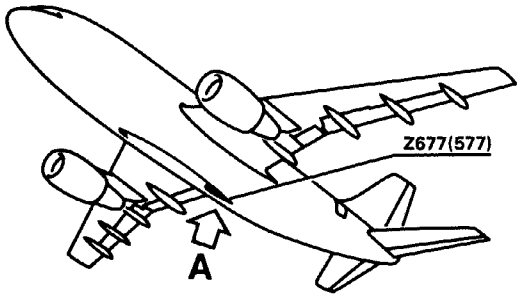
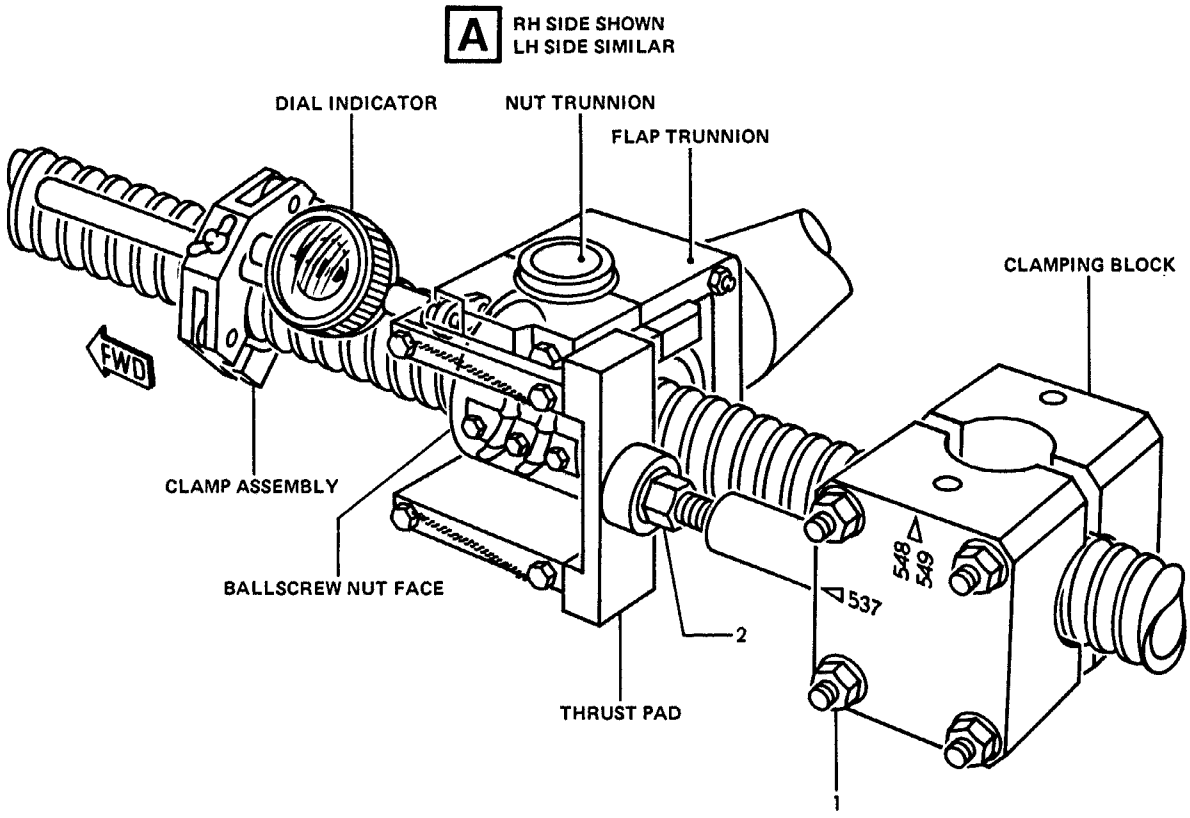
Disconnection of Operating Strut
Figure 604

nearby structure.
4 Support fairing.
5 Remove bolt (2), washer (3) and bush (1).
6 Let fairing go to its lowest position, where it will be held by the side-load stay.

(2)Backlash Check of Screwjack 1
(Ref. Fig. 605)
(a)Remove access panels 577AB, BB (677AB, BB).
(b)Install clamping block and thrust pad PN LL537A208 of backlash checking tool set PN LLA537A204 on screwjack spindle to rear of flap trunnion, making certain that clamping block is correctly orientated (with inscription "537" in line with spindle) and thrust pad is in contact with flap trunnion.
(c)TORQUE clamping block nuts (1) to 15 Nm (11 lbf.ft.).
NOTE : Tighten nuts (1) alternately to avoid distortion.
(d)Install clamp assembly PN LLA537A211 of backlash checking tool set PN LLA537A204 complete with dial indicator on screwjack spindle forward of flap trunnion. Make certain that the dial indicator probe contacts the face of the ballscrew nut in line with the nut trunnion.
(e)Make certain that no load is being applied to the flap trunnion (slacken the thrust pad adjuster (2) if necessary), and zero the dial indicator.
(f)TORQUE the thrust pad adjuster (2) to 8 Nm (5.9 lbf.ft.) to apply a load to the flap trunnion.
(g)Record dial indicator reading which must not exceed 0.026 in. (0.66 mm).
(h)Slacken thrust pad adjuster (2) to relieve load.
(i)Remove clamp assembly and dial indicator.
(j)Remove clamping block and thrust pad.
(k)Install access panels 577AB, BB (677AB, BB).

(3)Backlash Check of Screwjacks 2, 3 and 4
(Ref. Fig. 606)
(a)For backlash check of screwjack 2 only:
1 Install clamping block and thrust pad PN LL547A171 of backlash checking tool set PN LLA547A108 on screwjack spindle to rear of flap trunnion, making certain that thrust pad is in contact with flap trunnion and correctly positioned.
2 Tighten knurled screw.
3 TORQUE clamping block nuts (1) to 15 Nm (11 lbf.ft.).
NOTE : Tighten nuts (1) alternately to avoid distortion.
4 Install clamp assembly PN LLA547A162 of backlash checking tool set PN LLA547108 on screwjack spindle forward of flap trunnion with dial indicator probe in contact with front face of ballscrew nut.
(b)For backlash check of screwjacks 3 and 4 only:
1 Install clamping block (inscription "548/549" in line with spindle) and thrust pad PN LL537A113 of backlash checking tool set PN LLA537A204 on screwjack spindle to rear of flap trunnion, making certain that thrust pad is in contact with flap trunnion and correctly positioned.





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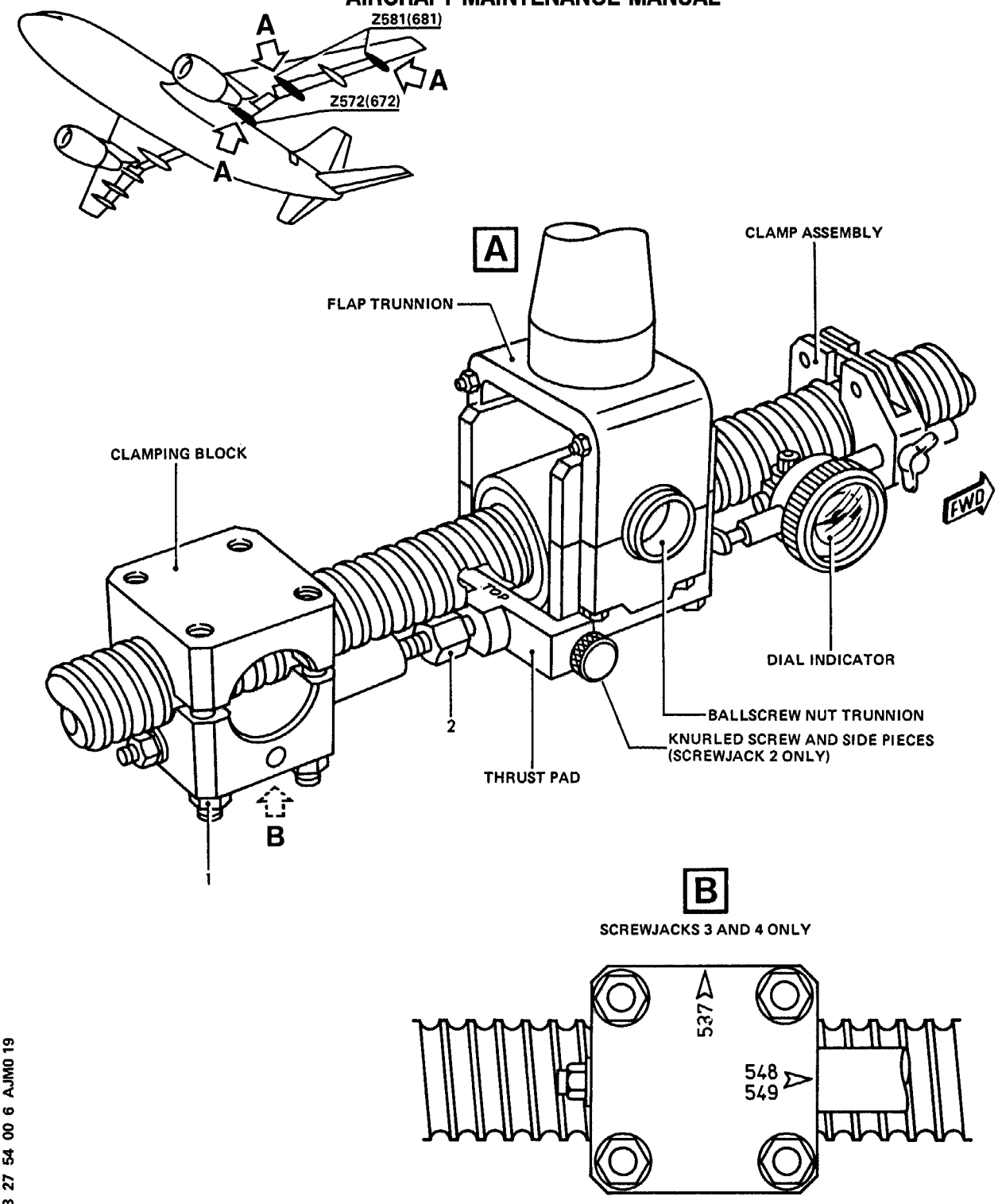
Screwjack 1 Backlash Check
Figure 605



BM3 27 54 00 6 AJM0 19

Screwjacks 2, 3 and 4 Backlash Check
Figure 606

2 TORQUE clamping block nuts (1) to 15 Nm (11 lbf.ft.).
NOTE : Tighten nuts (1) alternately to avoid distortion.
3 Install clamp assembly PN LLA548A383 of backlash checking tool set PN LLA537A204 on screwjack spindle forward of flap trunnion. Make certain that the dial indicator probe contacts the face of ballscrew nut in line with the nut trunnion.
(c)Make certain that no load is being applied to the flap trunnion (slacken the thrust pad adjuster (2) if necessary), and set the dial indicator to zero.
(d)TORQUE the thrust pad adjuster (2) to 8 Nm (5.9 lbf.ft.) for screwjack 2, 3 and 4, to apply a load to the flap trunnion.
(e)Record dial indicator reading which must not exceed:
- 0.021 in. (0.53 mm) for screwjack 2
- 0.014 in. (0.36 mm) for screwjacks 3 and 4.
(f)Slacken thrust pad adjuster (2) to relieve load.
(g)Remove clamp assembly and dial indicator.
(h)Remove clamping block and thrust pad.

(4)Close-Up (Ref. Fig. 604)
(a)Install fairings on flap tracks 3 and 5 (screwjacks 3 and 4):
1 Clean bush (1) and fitting with white spirit (Material No. 11-002) to remove old anti-corrosion compound.
2 Put anti-corrosion compound (Material No. 05-002) on outer surface of bush (1).
3 Lift fairing into position and engage end of operating strut in fitting.
4 Install bush (1), washer (3) and bolt (2).
5 Remove any cord or other material which was used to hold the operating strut in position.
6 Install washer (4) and nut (5).
7 TORQUE nut (5) to between 1.95 and 2.2 m.daN (14.4 and 16.2 lbf.ft.) and safety with cotter pin (6).
(b)Make certain that the work area is clean and clear of tools and miscellaneous items of equipment.
(c)Remove safety clips and tags, close circuit breakers 10CV, 6CV and 5CV.
(d)Remove safety guard from flap/slat control lever quadrant.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.
(e)Retract flaps (Ref. 27-50-00, P. Block 301).
(f)Remove access platform.
(g)Remove safety barriers.

3. Flap Track Beams/Carriage Rollers 1 thru 5 - Clearance and Wear Check

A. Reason for the Job
(1)To check clearances between flap track beams and carriage rollers.
(2)To check for evidence of wear at flap track beams and carriage rollers.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 3.5 to 4.5 m (11 to 14 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)	Feeler Gage
	(4)	Safety Barriers
	(5)	Circuit Breakers Safety Clips and Tags
	(6)Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

-	12-22-27, P. Block 1	Flight Controls Lubrication
-	27-50-00, P. Block 301	Flaps
-	27-50-21, P. Block 401	Flap Track Fairings

C. Procedure
(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.
(f)Remove flap track fairings 2 thru 5 (Ref. 27-50-21, P. Block 401).
(g)Remove access panels 572AB, 577AB, 577BB, 672AB, 677AB and 677BB.
(h)Remove grease from the channels at flap track beams 2 thru 5 using cleaning agent (Material No. 11-002) and lint-free cloth.
(2)Clearance and Wear Check
(a)Using feeler gage, check clearance between carriage main support rollers and flap track beams LH and RH side. The clearance must not exceed the following values:

flap track beam 1	0.59 mm	(0.0232 in.)
flap track beam 2	0.78 mm	(0.0307 in.)
flap track beam 3	0.86 mm	(0.0339 in.)
flap track beam 4	0.88 mm	(0.0346 in.)

flap track beam 5 0.86 mm (0.0339 in.)

(b)Remove safety guard from flap slat control lever quadrant.

(c)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.

WARNING : WHEN THE FLAPS HAVE REACHED EACH SELECTED POSITION, OPEN CIRCUIT BREAKERS 5CV, 6CV AND 10CV AND INSTALL SAFETY GUARD
R PN 98A27503003000 ON FLAP/SLAT CONTROL LEVER QUADRANT.

(d)Retract flaps to 20°, 15° and 0° position (Ref. 27-50-00, P. Block 301) in turn and check clearances (refer to step (a)).

(e)Open, safety and tag circuit breakers 5CV, 6CV and 10CV.

R (f)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(g)Check support rollers and side rollers for evidence of wear.

(h)Check flap track beams 1 thru 5 for evidence of wear particularly at selected 15°, 20° and 40° positions.

The depth of the wear marks should not exceed the following values:

flap track beam 1 - support roller path	0.15 mm	(0.0059 in.)
flap track beam 2 - side roller path	0.26 mm	(0.0102 in.)
- support roller path	0.24 mm	(0.0095 in.)
flap track beam 3 - side roller path	0.35 mm	(0.0138 in.)
- support roller path	0.32 mm	(0.0126 in.)
flap track beam 4 - side roller path	0.38 mm	(0.0150 in.)
- support roller path	0.34 mm	(0.0134 in.)
flap track beam 5 - side roller path	0.35 mm	(0.0138 in.)
- support roller path	0.32 mm	(0.0126 in.)

The gap between the flap track beam and the side and support rollers (at track 1 - side plates) should not exceed the following values:

flap track beam 1 -	0.45 mm	(0.0178 in.)
flap track beam 2 -	0.41 mm	(0.0161 in.)
flap track beam 3 -	0.50 mm	(0.0197 in.)
flap track beam 4 -	0.53 mm	(0.0207 in.)
flap track beam 5 -	0.50 mm	(0.0197 in.)

(i)Remove safety guard from flap/slat control lever quadrant.

(j)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.

(k)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).

R (l)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(m)Open, safety and tag circuit breakers 5CV, 6CV and 10CV.

(n)Check flap track beams 1 thru 5 for evidence of wear particularly at selected 0° position (refer to step (h).

(3)Close-Up

(a)Lubricate flap track channels 2 thru 5 (Ref. 12-22-27, P. Block 1).

(b)Install flap track fairings 2 thru 5 (Ref. 27-50-21, P. Block 401).

(c)Install access panels 577AB, 577BB, 677AB and 677BB.

(d)Remove access platform.

(e)Remove safety guard from flap/slat control lever quadrant.
(f)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(g)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(h)Remove safety barriers.

4. Visual Inspection of Flap Link Bearings and Trunnion Bushes

A. Reason for the Job
To inspect flap link bearings at carriage/flap connections and flap trunnion bushes for damage of teflon lining.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 3.5 to 4.5 m (11 to 14 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)	Circuit Breakers Safety Clips and Tags
	(4)	Safety Barriers

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-50-11, P. Block 401	Inboard Flap
- 27-50-12, P. Block 401	Outboard Flap
- 27-54-37, P. Block 401	Flap Trunnion Screwjacks 1 thru4

C. Procedure
(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.
(f)Only necessary for inspection of trunnion bushes:
Remove trunnions of flap screwjacks 1 thru 4 (Ref. 27-54-37, P. Block 401).
(2)Inspection
(a)Visually inspect trunnion bushes for damage of teflon lining. If teflon lining is damaged, replace bush in accordance with the Component Maintenance Manual (CMM) 57-52-15 and 57-53-12.
(b)Visually inspect all flap link bearings at inboard and outboard flaps.
NOTE : The teflon lining is bonded to the inside of the outer bearing race.
(c)If the teflon lining protudes from bearing race, remove appropriate inboard or outboard flap (Ref. 27-50-11, P. Block 401 or 27-50-12, P. Block 401) and replace the flap link bearing in accordance with the CMM 57-52-15 and 57-53-12.

(3)Close-Up
(a)Install trunnions of flap screwjacks 1 thru 4 (Ref. 27-54-37, P. Block 401).
(b)Remove access platform.
(c)Remove safety guard from flap/slat control lever quadrant.
(d)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(e)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(f)Remove safety barriers.

R **ON A/C 001-005, 105-105,

R Post SB 27-2054 For A/C 001-005,105-105,

5. Inspection of Universal Joints

A. Reason for the Job
To inspect the universal joints for the presence of the non-metalic bushes.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.5 to 4.5 m (11 to 14 ft.)
(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
(3)	Safety Barriers
(4)	Circuit Breaker Safety Clips and Tags
(5)	Ohmmeter

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-54-19, P. Block 401	Transmission Shafts

C. Procedure
(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
(c)Install safety guard PN 98A27503003000 on flap /slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

R **ON A/C 001-005, 105-105,

R Post SB 27-2054 For A/C 001-005,105-105,

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

R **ON A/C 001-005, 105-105,

R Post SB 27-2054 For A/C 001-005,105-105,

(e)Position access platform.

(2)Inspection of the Universal Joints between the Right Angle Gearbox and Screwjack 3 on LH and RH Flap Transmission System

R **ON A/C 001-005, 105-105,

R Post SB 27-2054 For A/C 001-005,105-105,

(Ref. Fig. 607) (Sheet 1 of 2)

R **ON A/C 001-005, 105-105,

R Post SB 27-2054 For A/C 001-005,105-105,

(Ref. Fig. 607) (Sheet 2 of 2)

R **ON A/C 001-005, 105-105,

R Post SB 27-2054 For A/C 001-005,105-105,

(a)Check each universal joint for the presence of the non-metalic bush by a continuity test using an ohmmeter as follows:

NOTE : The absence of the non-metalic bush will result in excessive rotational and lateral backlash.

NOTE : As the non-metalic bush is made of a nonconductive material,an electrical continuity test using an ohmmeter is possible to find a damaged non-metalic bush.

1 Position the ohmmeter probes on the flanged fork end and the outer ring of the halo ring and test for electric continuity.

NOTE : Move the flanged fork end slightly for optimal contact between fork end and halo ring.

- No fault exists, if there is no current flow.
- The non-metalic bushes between the flanged fork end and the halo ring are damaged or lost, if there is a current flow.

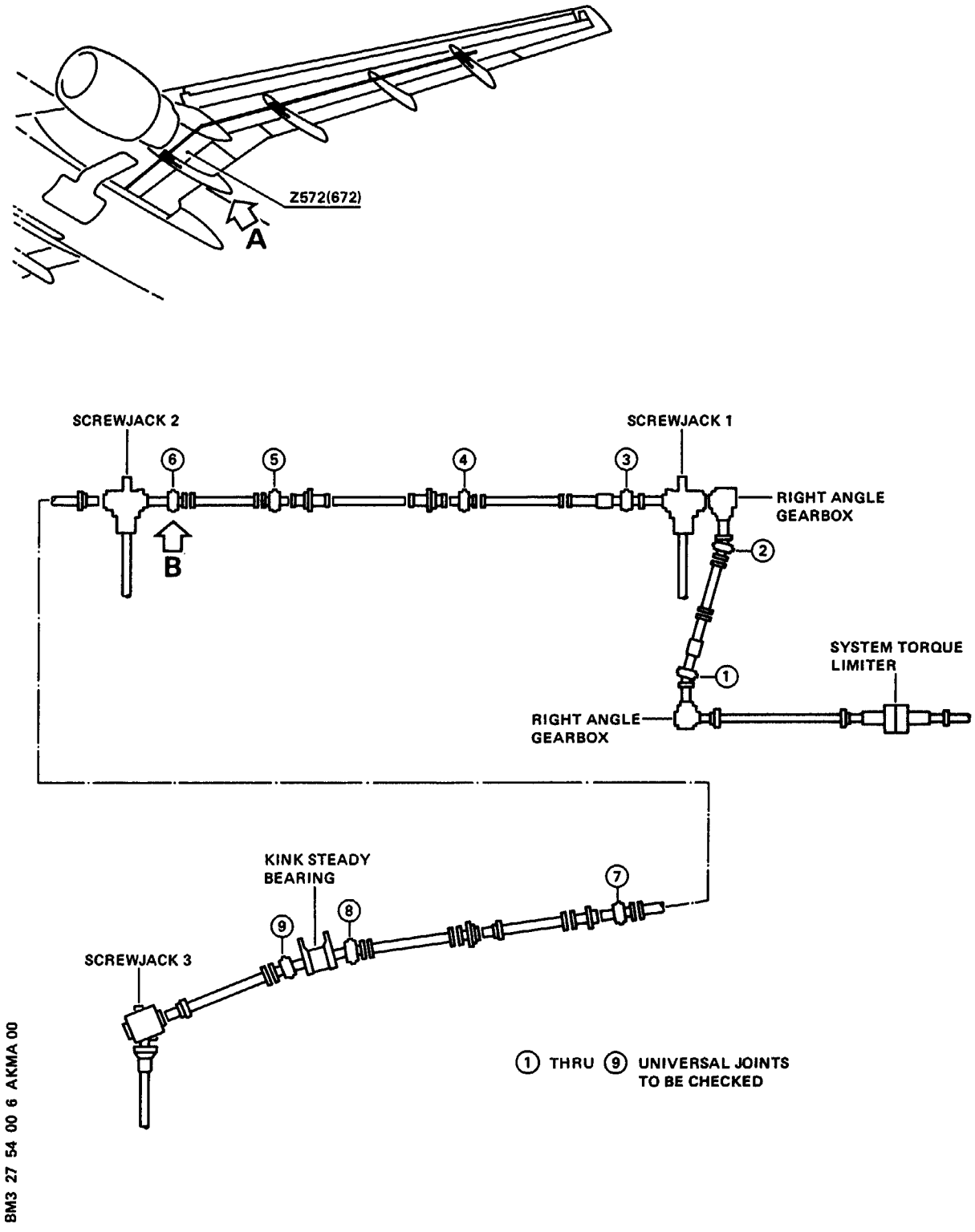
2 Position the ohmmeter probes on the splined fork end and the outer ring of the halo ring and test for electric continuity.

NOTE : Move the splined fork end slightly for optimal attachment contact between fork end and halo ring.

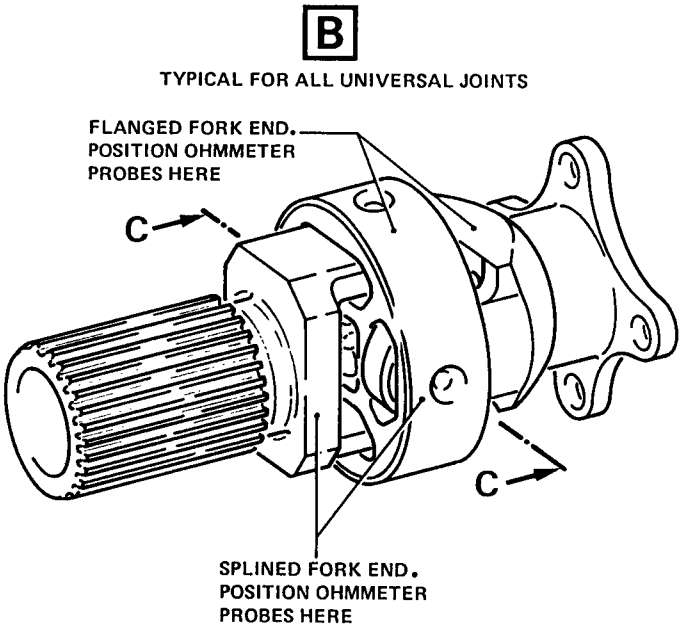
- No fault exists, if there is no current flow.
- The non-metalic bushes between the splined fork end and the halo ring are damaged or lost, if there is a current flow.

(b)If the test fails, clean the universal joints very carefully, using a lint free cloth and do the continuity test again.

(c)Replace the universal joints which failed during test (Ref. 27-54-19,



Checking Procedure of Universal Joints
Figure 607



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Checking Procedure of Universal Joints
Figure 607

P. Block 401).

(3)Close-Up
(a)Remove access platform.
(b)Remove safety guard from the flap/slat control lever quadrant.
(c)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(d)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(e)Remove safety barriers.

**ON A/C ALL

Post SB 27-2067 For A/C ALL

6. Inspection of Steady Bearings

A. Reason for the Job
To inspect each steady bearing for detachment of the flange.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 3.5 to 4.5 m (11 to 14 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)	Safety Barriers
	(4)	Circuit Breaker Safety Clips and Tags

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-54-15, P. Block 401	Sliding Bearing
- 27-54-16, P. Block 401	Short Steady Bearing
- 27-54-17, P. Block 401	Steady Bearing

C. Procedure
(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap /slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

**ON A/C ALL

Post SB 27-2067 For A/C ALL

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

**ON A/C ALL

Post SB 27-2067 For A/C ALL

(e)Position access platform.
(2)Inspection of the Steady Bearings of the RH and LH Flap Transmission System.

**ON A/C ALL

Post SB 27-2067 For A/C ALL

(Ref. Fig. 608) (Sheet 1 of 3)

**ON A/C ALL

Post SB 27-2067 For A/C ALL

(Ref. Fig. 608) (Sheet 2 of 3)

**ON A/C ALL

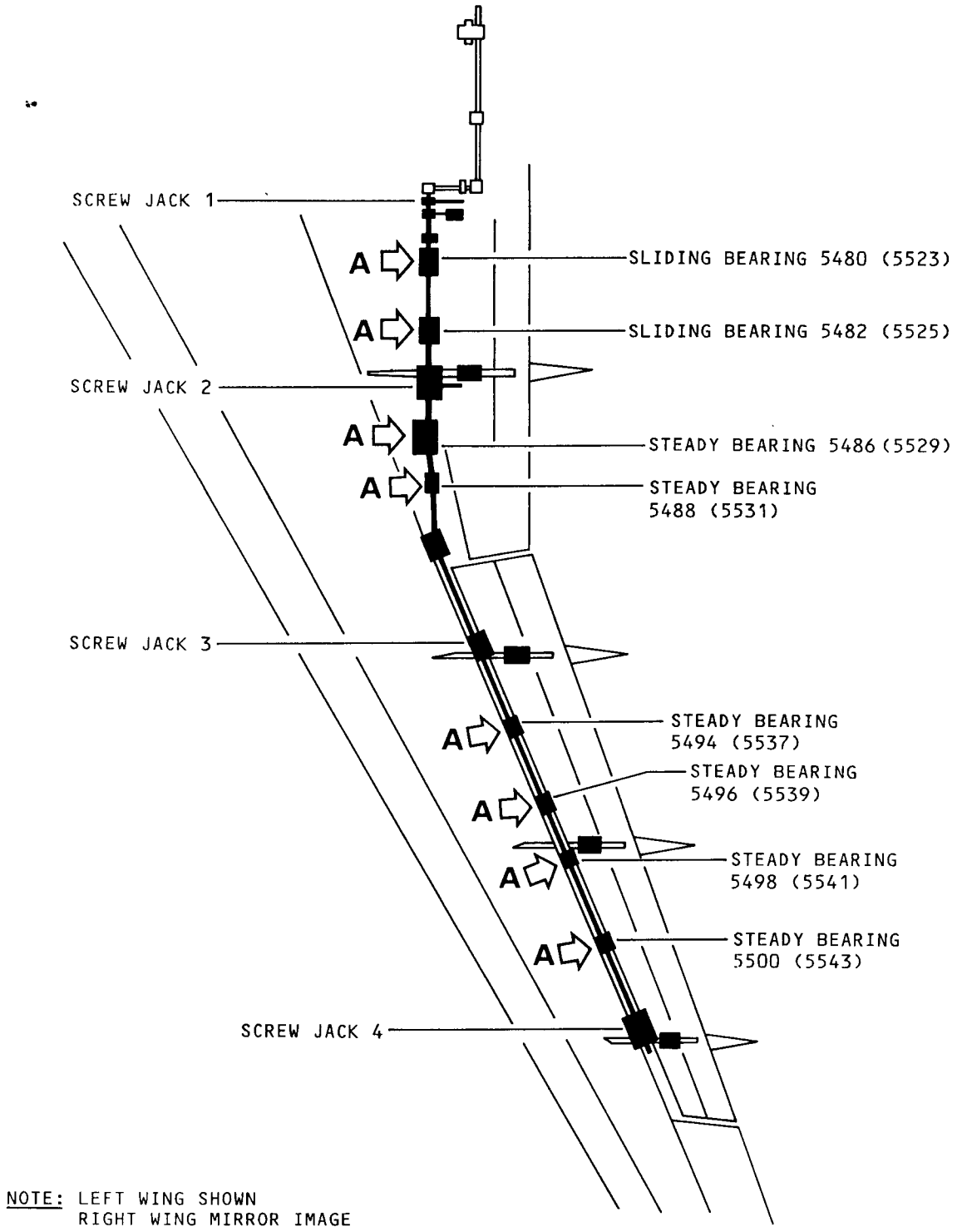
Post SB 27-2067 For A/C ALL

(Ref. Fig. 608) (Sheet 3 of 3)

**ON A/C ALL

Post SB 27-2067 For A/C ALL

(a)Check each sliding and steady bearings for detachment of the spherical part of the flanged bearing from its mounting flange.
(b)Inspect the shaft for any grooves or damage.
(c)If any damage or grooves are found on a steady bearing, replace the steady bearing (Ref. 27-54-15, P. Block 401), (Ref. 27-54-16, P. Block 401) and/or (Ref. 27-54-17, P. Block 401).



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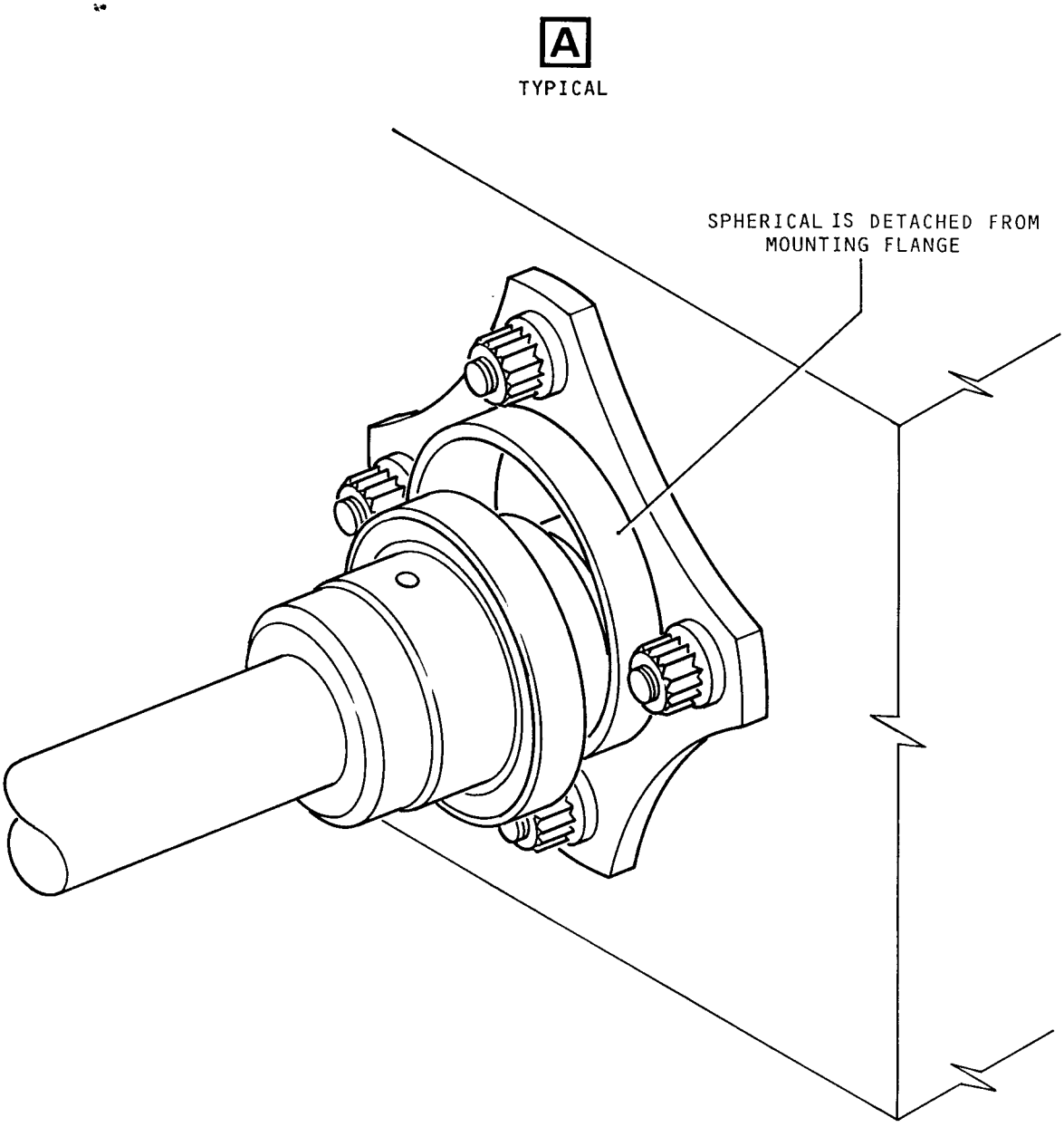
Damage Criteria of Steady Bearings
Figure 608

R



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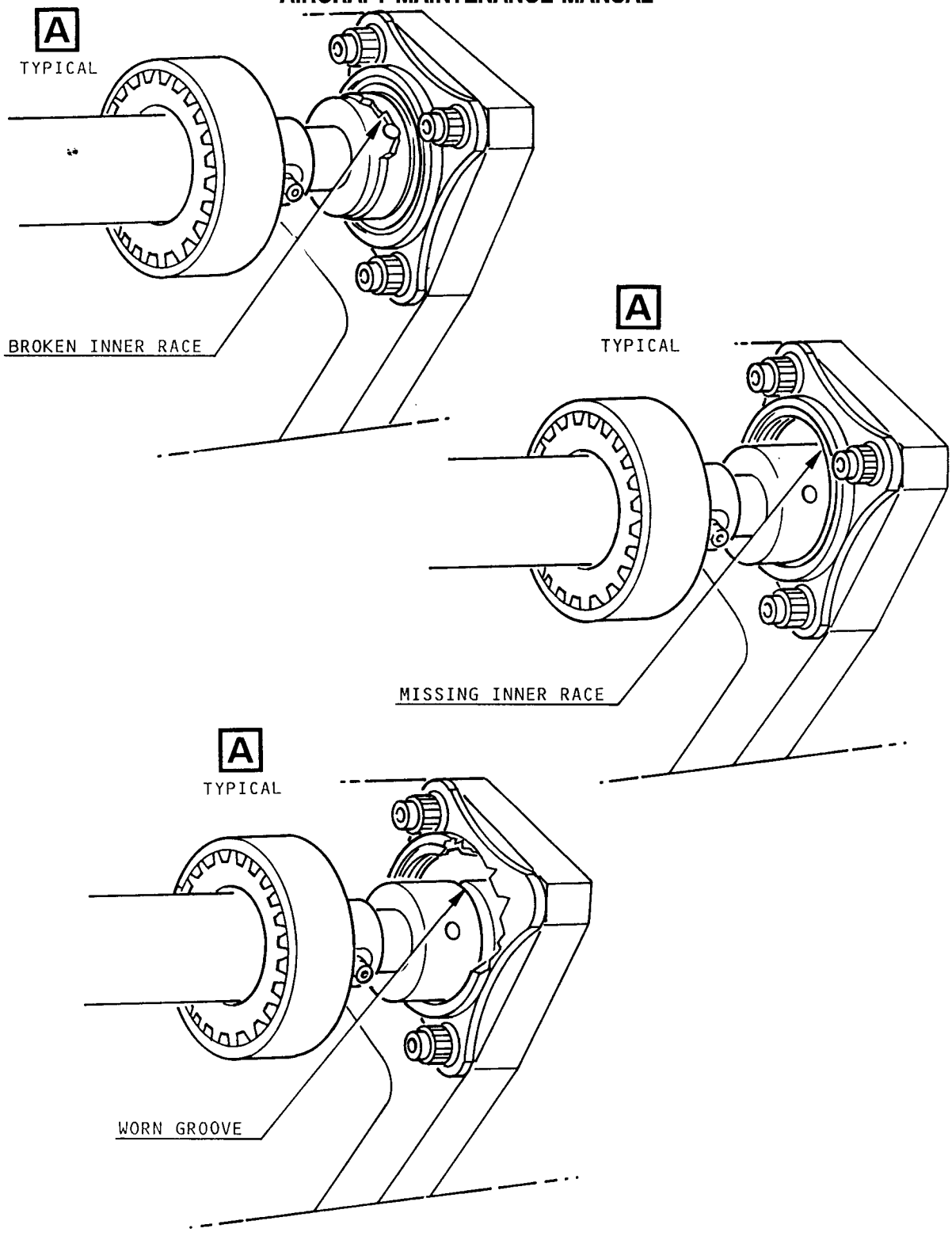
Damage Criteria of Steady Bearings
Figure 608

R



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Damage Criteria of Steady Bearings
Figure 608

R

(3)Close-Up
(a)Remove access platform.
(b)Remove safety guard from the flap/slat control lever quadrant.
(c)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(d)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(e)Remove safety barriers.

**ON A/C ALL

7. Inspection of Flap Transmission after Vibration
A. Reason for the Job
To inspect the flap transmission system after vibration.
B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 3.5 to 4.5 m (11 to 14 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)	Safety Barriers
	(4)	Circuit Breaker Safety Clips and Tags

Referenced Procedures

- 27-50-00, P. Block 301	Flaps

C. Procedure
(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap /slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.
(2)Inspection of the Flap Transmission System on the LH and RH side.
(a)Check that no excessive backlash is found on transmission shafts.
(b)Check that all transmission components (steady bearings, gearboxes, screwjacks and shafts) are correctly secured.
(c)Check for abnormal wear of the flap track guide rails.
(d)Inspect flap carriage rollers for absence of wear and corrosion.
(e)Make sure that flap carriage rollers are free to rotate during normal operation.

(3)Close-Up

(a)Remove access platform.
(b)Remove safety guard from the flap/slat control lever quadrant.
(c)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(d)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(e)Remove safety barriers.

R 8. Screw/Jackhead Backlash Check of Flap Screwjacks 2,3 and 4

R A. Reason for the Job
R (1)To check the backlash between the jackhead and flap screwjack spindle.

R B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.5 to 4.5 m (11 to 14 ft.)
(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
(3)LLA547A194	Backlash Checking Tool - Flap Screwjack 2,3,4
(4)	Safety Barriers
(5)	Circuit Breaker Safety Clips and Tags
(6)Material No. 04-024	Common Greases (Ref. 20-31-00)
(7)Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

R Referenced Procedure

- 27-50-00, P. Block 301	Flaps
- 27-50-21, P. Block 401	Flap Track Fairing
- 27-54-22, P. Block 401	Screwjack 2
- 27-54-23, P. Block 401	Screwjack 3
- 27-54-24, P. Block 401	Screwjack 4
- 57-20-35, P. Block 401	Fillets and Fairings

R C. Procedure
R (1)Job Set-Up
R (a)Position safety barriers.
R (b)Remove flap track fairing 2,3 and 5 (Ref. 27-50-21, P. Block 401).
R (c)Remove flap track fixed fairing 3 and 5 (Ref. 57-20-35, P. Block 401).
R (d)Monitor the position from both rollers of flap track 5.

R NOTE : Flap track 5 shows the maximum slope and the shortest
R horizontal part of the considered tracks.

R WARNING : BEFORE OPERATING FLAPS, MAKE SURE THAT THE TRAVEL RANGE OF
R THE SURFACES ARE CLEAR.

R (e)For backlash check of screwjack 2,3 and 4, retract flaps from 15° to 0°
R (Ref. 27-50-00, P. Block 301).

R NOTE : For the backlash check, it is necessary to stop the flap drive
R system in a position so that both rollers of each flap carriage
R lie on the horizontal part of the flap track (Ref. 27-50-00,

P. Block 301).
This flap position does not correspond to a gated slat/flap control lever position.

(f)Stop the hydraulic supply during retraction of the flaps when this position is reached (Ref. 27-50-00, P. Block 301).
(g)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/FLAPS/SYS 1	10CV	335/R67

(h)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(j)Position access platform.
(2)Preparation of Screwjacks for Tool Installation
(Ref. Fig. 609)

WARNING : DO NOT INGEST LIQUIDS. DO NOT INHALE FUMES. DO NOT ALLOW THE MATERIALS TO CONTACT YOUR SKIN OR SPLASH INTO YOUR EYES.

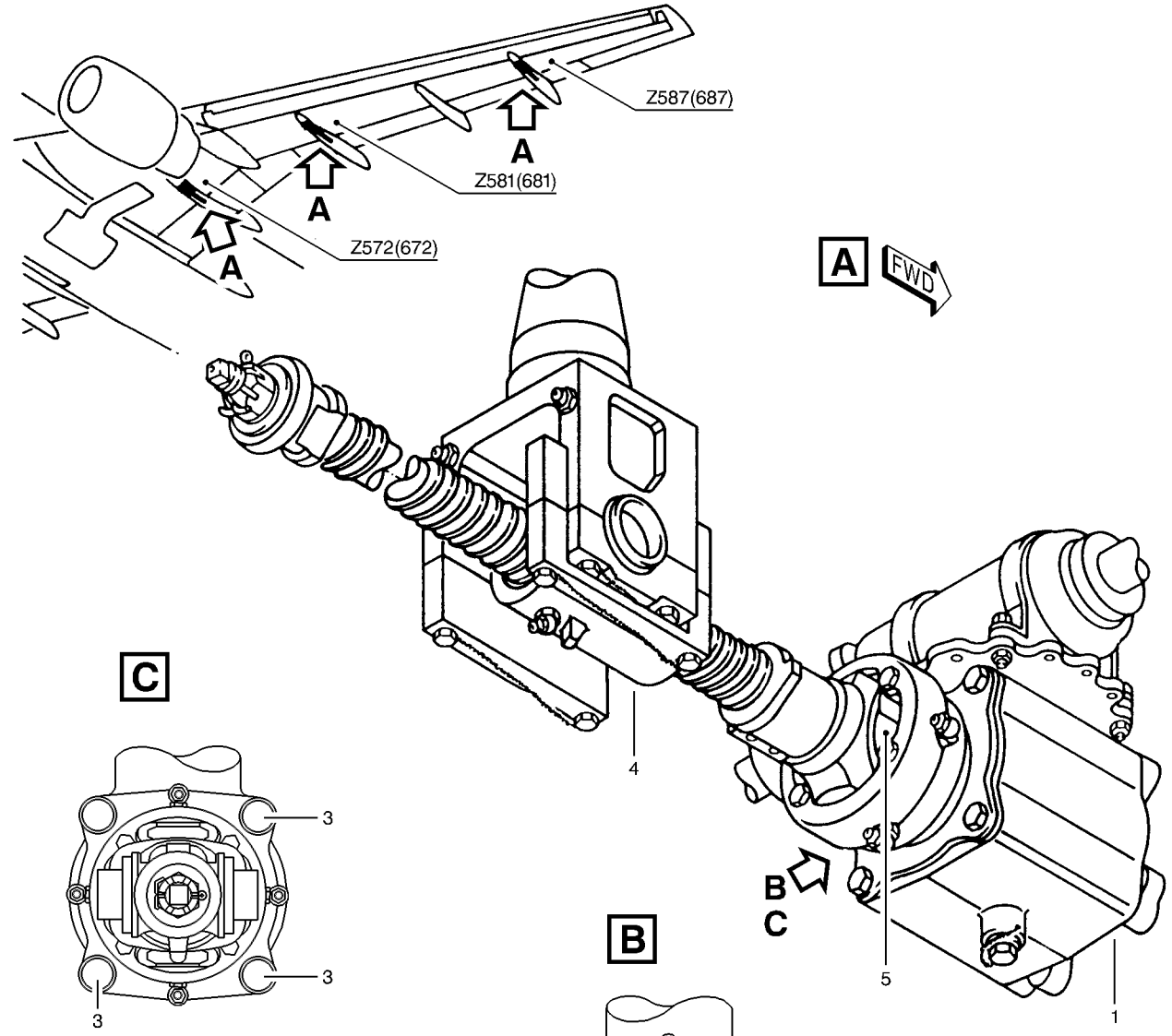
(a)Clean the screwshaft between the jackhead (1) and the ballnut (4) with cleaning agent (Mat. No. 11-002).
(b)Clean the top exposed part of the universal joint (5) from the jackhead (1) with cleaning agent (Mat. No. 11-002).
(c)Loosen the bolts (2,3) from jackheads (1) by approximately 6.00 mm (0.24 in.).
1 For screwjack 2, (Ref. 27-54-22, P. Block 401).
2 For screwjack 3, (Ref. 27-54-23, P. Block 401).
3 For screwjack 4, (Ref. 27-54-24, P. Block 401).
(3)Backlash Checking Tool LLA547A194 Installation.
(Ref. Fig. 610)

CAUTION : REMOVE THE GREASE NIPPLES WHICH COULD INHIBIT THE PLATE INSTALLATION.

R (a)Remove grease nipples (18) if necessary.
R (b)Install plate (15) at the jackhead (17).
R 1 Tighten bolts (16).

R WARNING : MAKE SURE THAT THE UPPER AND LOWER SHELLS ARE SUFFICIENTLY
R HELD DURING INSTALLATION TO AVOID INJURY TO PERSONNEL.

CAUTION : MAKE SURE THAT THERE IS ADEQUATE CLEARANCE BETWEEN THE CLAMP ASSEMBLY AND THE BALLNUT.

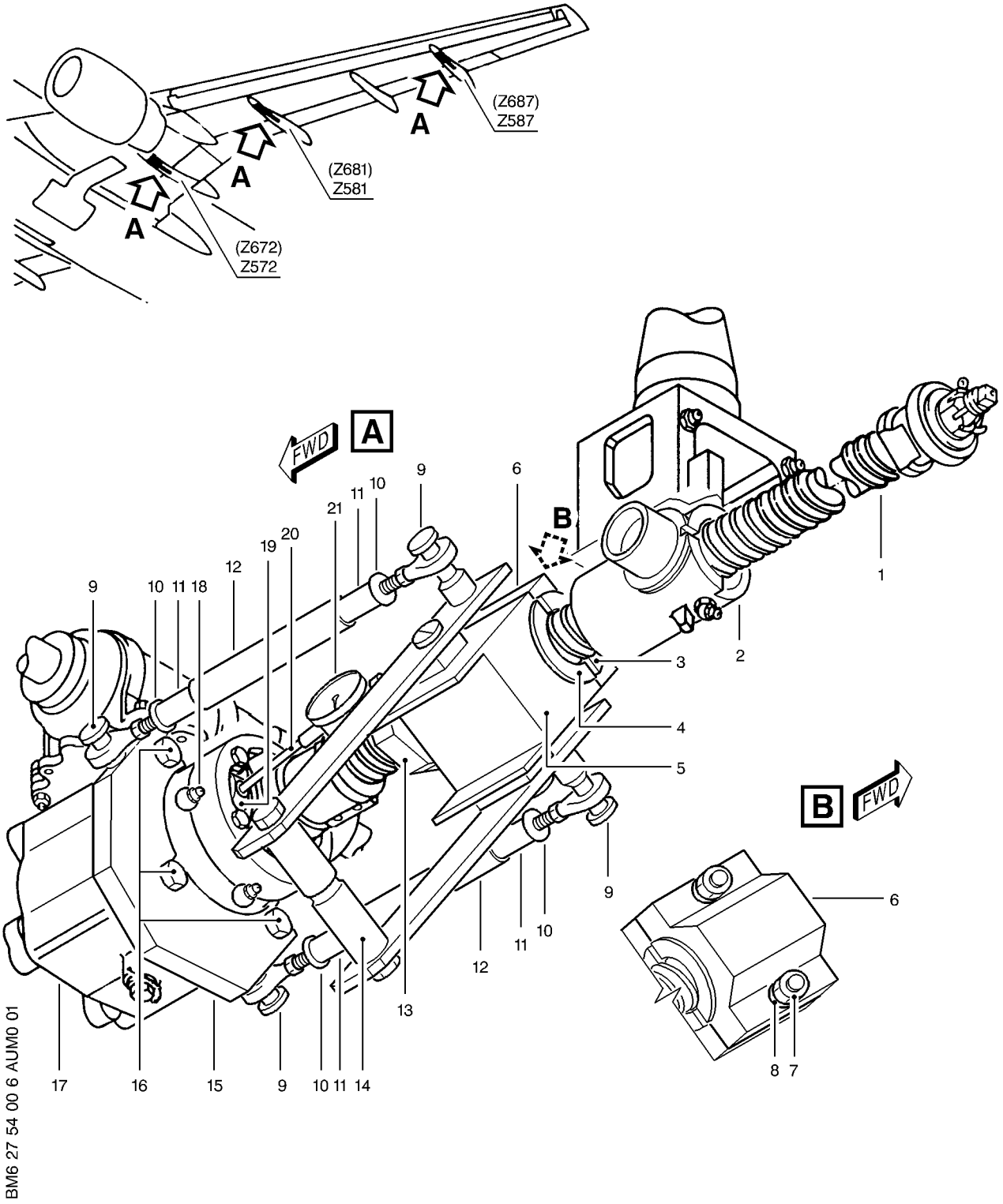


TRACK 2 SCREWJACK NO.2 RH WING
TRACK 3 SCREWJACK NO.3 LH WING
TRACK 5 SCREWJACK NO.4 LH WING

TRACK 2 SCREWJACK NO.2 LH WING
TRACK 3 SCREWJACK NO.3 RH WING
TRACK 5 SCREWJACK NO.4 RH WING

BM6 27 54 00 6 ASM0 00

R Jackhead/Screw Backlash Check Preparation
Figure 609



Jackhead/Spindle Backlash Check - Screwjack 2,3 and 4
Figure 610

R

R (c)Install the clamp assembly (5,6) on the screwshaft (1) as follows:
R 1 Position upper shell (6) on screwshaft (1).
R 2 Position lower shell (5). Install washers (8) and nuts (7).
R Do not tighten the nuts (7) at this stage.

R NOTE : Use half shells (3,4) for screwjack 3 and 4.

R (d)Make sure that the clamp assembly handle (14) is pointing away from the flap track.
R (e)Install side arms (12) onto pins on the lower shell (5) and the
R plate (15) with spherical bearings and thumbscrews (9).

R NOTE : Use the shorter side arms (12) for screwjack 4.

R (f)Adjust position of the clamp assembly (5,6) by using the turnbuckles
R (11).

R NOTE : Make sure that the handle (14) is perpendicular to the screw-
R shaft axis and the side arms (12) are not twisted.

R 1 Tighten the nuts (7).
R (g)Install the dial gage clamp (13) on the screwshaft (1) between the
R jackhead (17) and the clamp assembly (5,6) using the thumbscrews.

R NOTE : Install the smaller diameter clamp (13) on screwjack 3 and 4.

R (h)Lock the turnbuckles (11) of the side arms (12) by using the
R lock (10).
R (j)Install the dial test indicator (21).
R 1 Use the 75 mm (3 in.) dial test indicator extension (20) for screwjack 2 and 3.
R 2 Use the 25 mm (1 in.) dial test indicator extension (20) for screwjack 4.
R (k)Make sure that the dial test indicator extension (20) contacts the end
R of the universal joint (19).

NOTE : This is the measuring position for the backlash check.

(4)Backlash Check
(Ref. Fig. 610)

(a)For screwjack 2,3 and 4
R 1 Move handle (14) towards the jackhead (17) with a force of approximately 15 daN (33.7 lbf.).

NOTE : Make sure that the load is applied in axial direction.

R 2 Set the dial test indicator (21) to zero.
R 3 Move handle (14) away from the jackhead (17) with a force of approximately 15 daN (33.7 lbf.).

NOTE : Make sure that the load is applied in axial direction.

R 4 Record dial indicator reading.

NOTE : Repeat steps 1 to 3 three times to ensure consistency of reading.

5 If backlash is greater than 1.5 mm (0.06 in.), replace the screwjack.
a For screwjack 2, (Ref. 27-54-22, P. Block 401).
b For screwjack 3, (Ref. 27-54-23, P. Block 401).
c For screwjack 4, (Ref. 27-54-24, P. Block 401).

R 6 Remove the force from the handle (13).

(5)Backlash Checking Tool LLA547A194 Removal
(Ref. Fig. 610)
(a)Remove backlash checking tool
R 1 Remove the dial test indicator (21).
R 2 Loosen the locks (10) from the turnbuckles (11) of the side arms (12).
R 3 Loosen the turnbuckles (11).
R 4 Remove the dial gage clamp (13).
R 5 Remove the side arms (12) with the thumbscrews (9).

R WARNING : MAKE SURE THAT THE UPPER AND LOWER SHELLS ARE SUFFICIENTLY
R HELD DURING REMOVAL TO AVOID INJURY TO PERSONNEL.

R 6 Hold lower shell (5) in position,
R - remove nuts (7) and washers (8),
R - remove upper shell (6) and half shell (3),
R - remove lower shell (5) and half shell (4).

R NOTE : Half shells are installed on screwjack 3 and 4 only.
R

R 7 Loosen bolts (16) approximately 6 mm (0.24 in.) and remove plate (15).
R 8 Install grease nipples (18) if previously removed.

NOTE Make sure that the grease nipples face the ballnut (2).

(b)Install the bolts (2,3) of the jackheads (1).
(Ref. Fig. 609)
1 For screwjack 2, (Ref. 27-54-22, P. Block 401).
2 For screwjack 3, (Ref. 27-54-23, P. Block 401).
3 For screwjack 4, (Ref. 27-54-24, P. Block 401).
(c)Regrease the top of the primary universal joints (5) with grease (Mat. No. 04-024).
(d)Regrease the screwshaft (1) with grease (Mat. No. 04-024).
(6)Close-Up
(a)Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.

WARNING : THIS FLAP POSITION DOES NOT CORRESPOND TO THE CURRENT GATED SLAT/FLAP CONTROL LEVER POSITION.

R (b)Remove safety clips and tags and close circuit breakers 5CV, 6CV and
R 10CV.
(c)Remove safety guard from flap/slat control lever quadrant.

WARNING : BEFORE OPERATING FLAPS, MAKE SURE THAT TRAVEL RANGE OF THE SURFACES ARE CLEAR.

(d)Fully retract the flaps (Ref. 27-50-00, P. Block 301).
(e)Install flap track fixed fairing 3 and 5 (Ref. 57-20-35, P. Block 401).
(f)Install flap track fairing 2,3 and 5 (Ref. 27-50-21, P. Block 401).
(g)Remove access platform.
(h)Remove safety barriers.

FLAPS POWER CONTROL UNIT (5469) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11.5 ft)
B. 98A27501500000	Installation Equipment - Flap Power Control Unit
R C. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
D. 98A27508015000	Check Pin Set - Flap Neutral Setting
E.	Mini Hoist
F. 55914S0000	Alignment Plug
G.	Circuit Breaker Safety Clips and Tags
H.	Blanking Plugs/Caps for Electrical Connectors
J.	Blanking Plugs/Caps for Hydraulic Lines
K.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
L.	Container for Collecting Spilt Fluid
M.	Warning Notices Prohibiting Pressurization of Hydraulic System
N. Material No. 04-004	Common Greases (Ref. 20-31-00)

Referenced Procedures

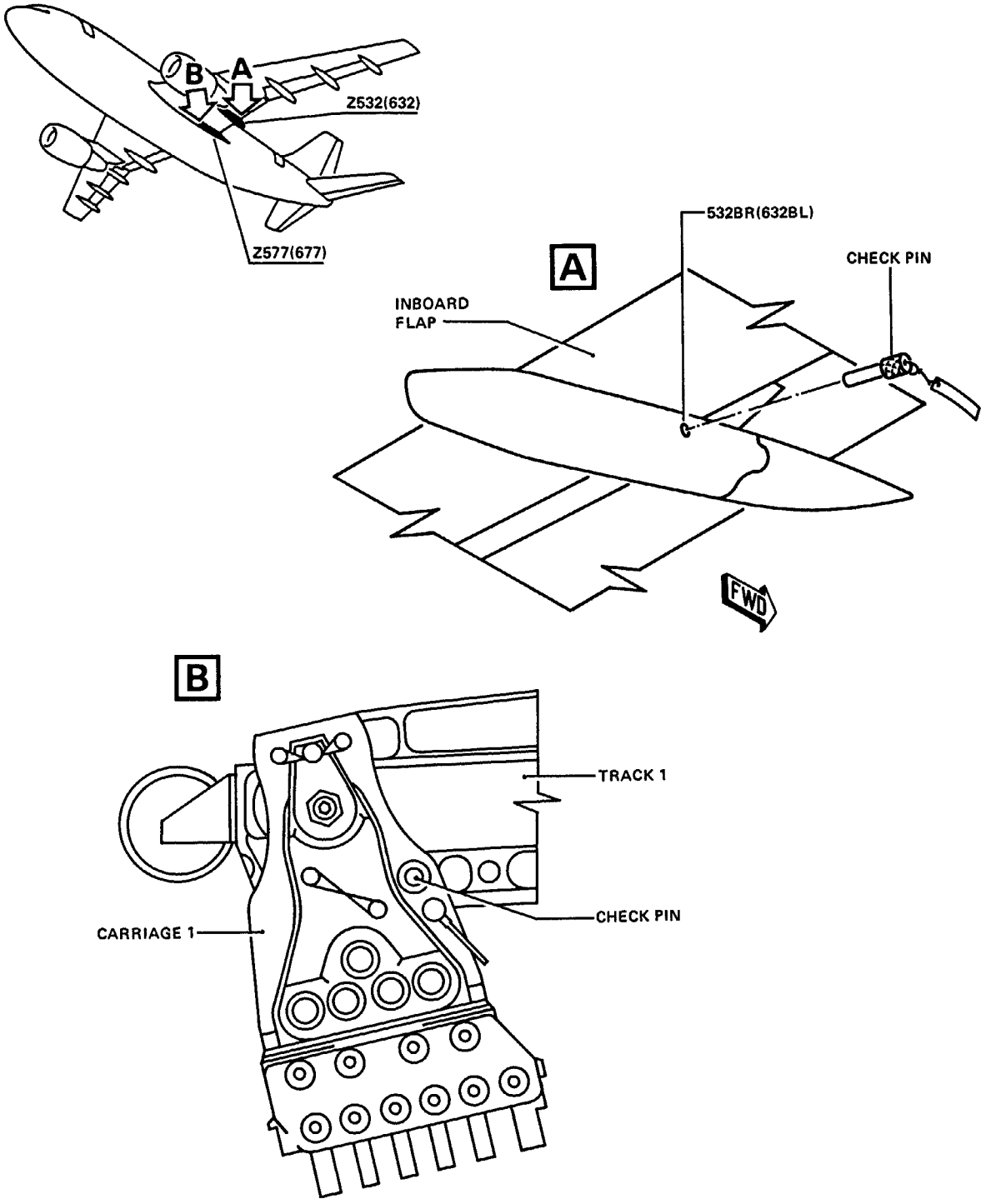
- 12-12-29, P. Block 1	Hydraulics
- 12-13-27, P. Block 1	Flight Controls Replenishing
- 20-28-11, P. Block 1	Electrical Bonding
- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up
(Ref. Fig. 401)

(1)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).

R (2)Install safety guard PN 98A27503003000 on flap/slat control lever



Component and Rigging Point Location
Figure 401

quadrant.

(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS SYS 1	10CV	335/R67

WARNING : PRIOR TO IMMOBILIZING FLAP TRACK CARRIAGES WITH RIGGING PINS, MAKE CERTAIN THAT POWER CONTROL UNIT OUTPUT SHAFTS ARE STABILIZED AND HYDRAULIC SYSTEMS ARE DEPRESSURIZED.

(4)Put access platform in position.

(5)Open access panels 532BR and 572AB for left wing, 632BL and 672AB for right wing.

(6)On each wing, immobilize flap track 1 and 2 carriages with check pins PN 98A27508015000.

(7)Display warning notices prohibiting pressurization of Green and Yellow hydraulic systems :
- on HYD PWR panel 427VU in flight compartment
- on ground connectors.

(8)Depressurize Green and Yellow hydraulic reservoirs (Ref. 29-14-00, P. Block 301).

(9)Open one main gear main door (Ref. 32-12-11, P. Block 301).

(10)Position a hydraulic fluid recovery container under Power Control Unit (PCU) to be removed.

B. Removal

(Ref. Fig. 402)

R (1)Make sure that there is no torque load in the transmission system.

R NOTE : There is no torque load in the transmission system if you can move the transmission shafts with your hands.

R (2)Cut and remove lockwire and remove locknuts (42),(44) and bolts (41),(43).

R (3)Cut and remove lockwire and remove locknut (21), remove bolt (27) and disconnect RH torque tube (22) from PCU (23) by pushing torque tube (22) towards torque limiter (26).

R (4)Cut and remove lockwire and remove locknut (11), remove bolt (5) and disconnect LH torque tube (3) from PCU (23) by pushing torque tube (3) towards torque limiter (6).

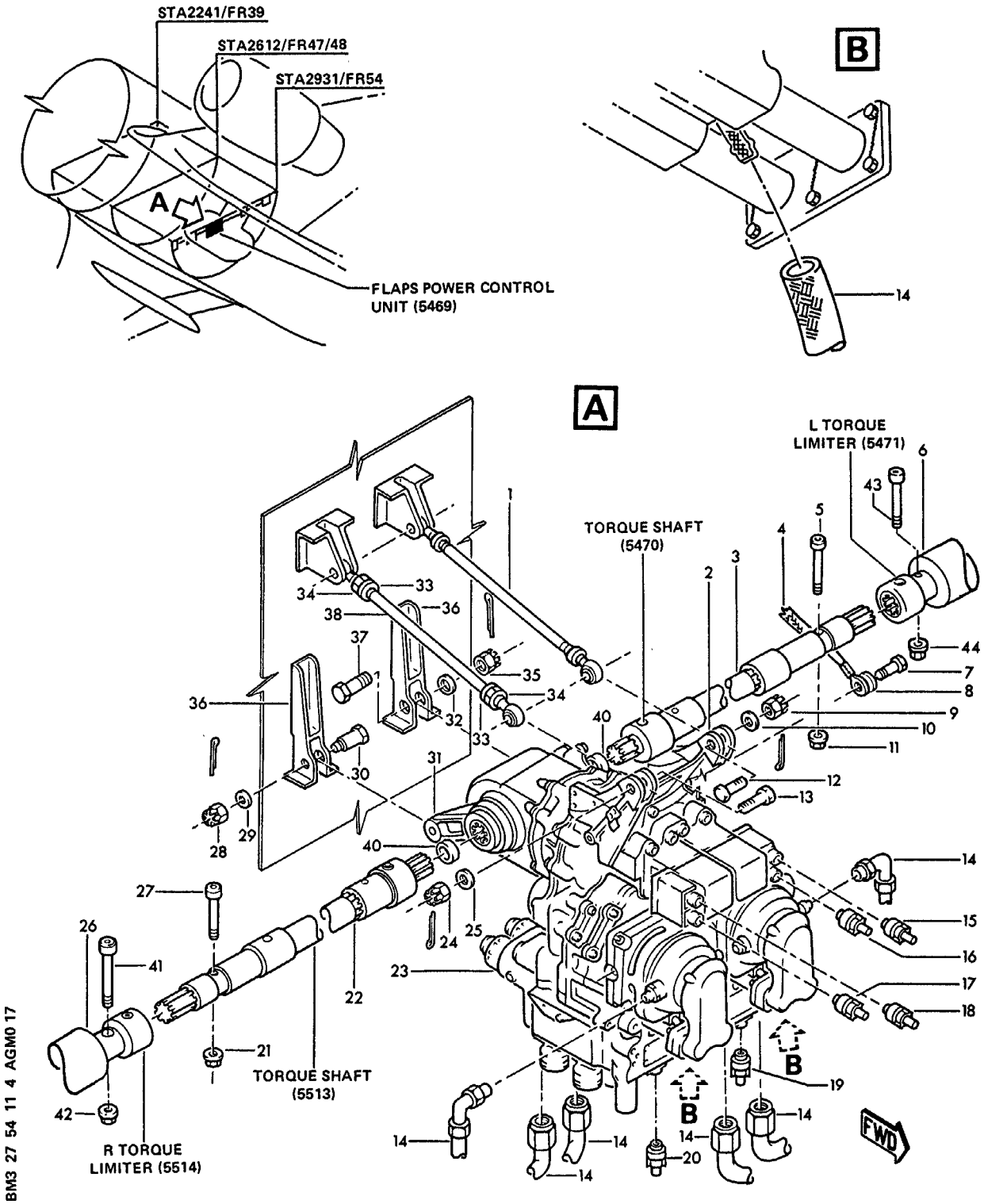
R (5)Support left and right torque tubes (22) and (23) on nearby structure.

R (6)Disconnect hydraulic lines (14) and install blanking plugs/caps on open line (14) ends and on power control unit (PCU) (23).

R (7)Disconnect electrical connectors 27CV-A (18), 27CV-B (17), 3CN-A (16), 3CN-B (15), 23CV-A (20) and 24CV-A (19). Install protective caps.

R (8)Disengage electrical leads from attaching clamps on PCU.

R (9)Remove and discard cotter pins and remove nuts (9),(24),(28),(35). Retain washers (10),(25),(29),(32).



Flaps Power Control Unit
Figure 402

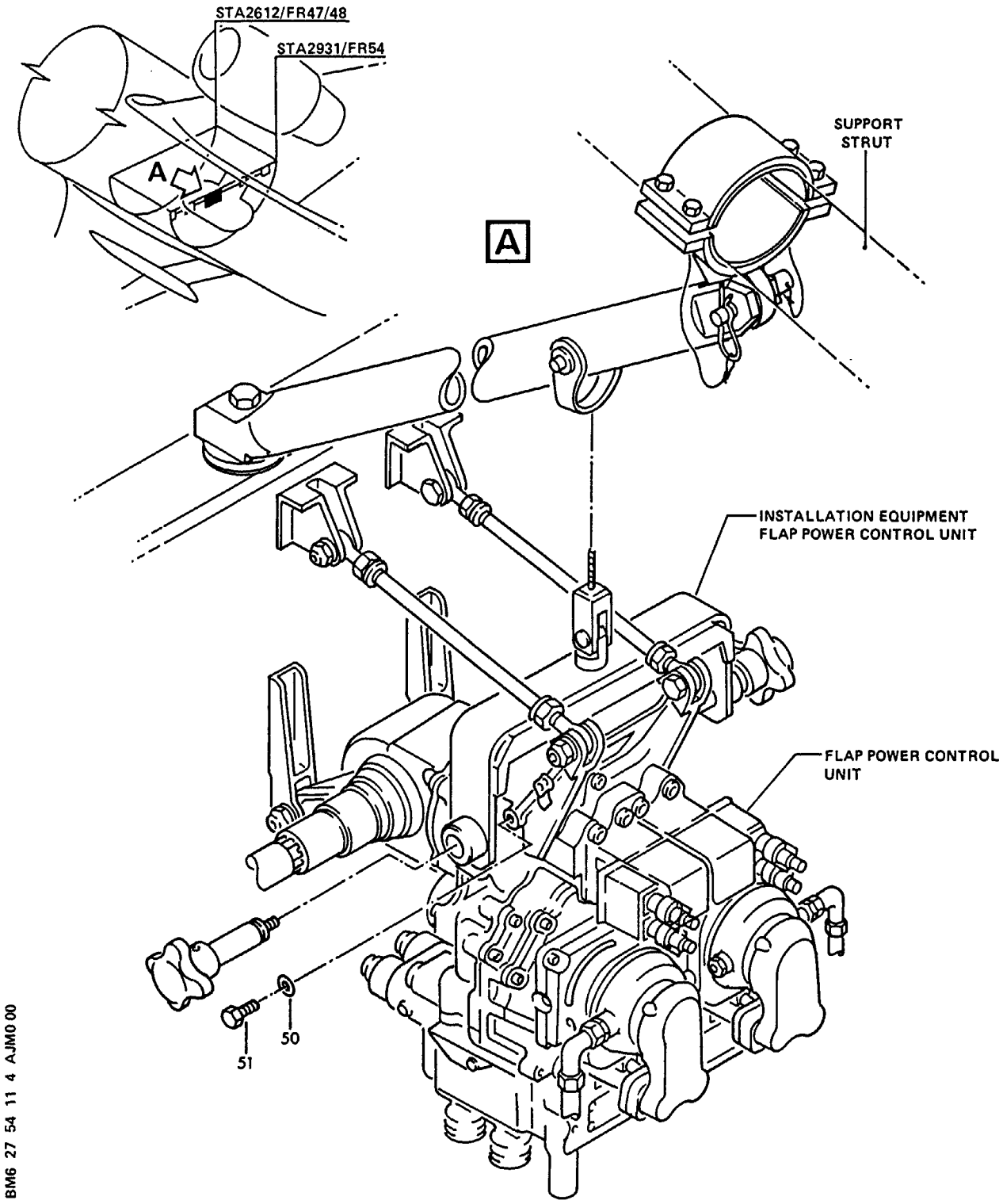
R (10)Remove screw (7), retain washer (8) and disconnect bonding strap (4).
R (11)Remove screw (50) and washer (51) and install removal/installation equipment PN 98A27501500000 (Ref. Fig. 403).
NOTE : Use a standard mini hoist to take the weight of PCU.
R (12)Remove bolts (12) and (13) securing PCU (23) to links (1) and (38).
R (13)Remove bolts (30) and (37) securing the PCU (23) to fork fittings (36).
R (14)Remove removal/installation equipment PN 98A27501500000.

C. Preparation of Replacement Component
NOTE : PCU is adjusted to zero.
CAUTION : FLAP PCU IS EQUIPPED WITH A WIPER RING (40) ON EACH SIDE INSIDE THE GEARBOX OUTPUT SHAFT.
(1)Remove screw (50) and washer (51) and install removal/installation equipment PN 98A27501500000 on the PCU and support strut (Ref. Fig. 403).
(2)Make certain that replacement PCU (23) is equipped with bushes on the upper fork fittings (2) and on bearings (31).

D. Installation
NOTE : Apply grease (Material No. 04-004) to splined ends.
(1)Using removal/installation equipment PN 98A27501500000 and a mini hoist, put replacement PCU (23) on structural support.
(2)Attach PCU (23) on lower fork fittings (36) with bolts (30),(37).
(3)Connect link (1) to PCU (23) with bolt (12).
(4)Connect adjusting link (38) to PCU (23) with bolt (13).
(5)If required, cut and remove lockwire and loosen nuts (34), disengage lockwashers (33) and adjust link (38) body to enable installation of shoulder bolt (13). Bend down lockwashers (33), tighten nuts (34) and safety with lockwire.
(6)Remove mini hoist and removal/installation equipment PN 98A27501500000 and install the screw (50) and washer (51) (Ref. Fig. 403).
(7)Install washer (10) and nut (9) and safety with cotter pin.
(8)Install washer (25) and nut (24) and safety with cotter pin.
(9)Secure lower section of PCU (23) to fork fittings (36) with washers (29),(32) and nuts (28),(35). Tighten nuts (28),(35) and safety with cotter pins.
(10)Attach bonding strap (4) to PCU (23) with washer (8) and screw (7) (Ref. 20-28-11, P. Block 1).
(11)Align wiper ring (40) in splines using alignment plug 55914S0000. Remove alignment plug.

NOTE : Make sure that you install a new wiper ring.

(12)Engage splined end of LH torque tube (3) into housing in PCU (23), so as to connect LH torque tube (3) to LH torque limiter (6).
(13)Carefully align holes (for bolt (5)) in male and female portions of telescopic sections.
CAUTION : BY EXTENDING TELESCOPIC SECTION OF TORQUE TUBES TOO MUCH, IT IS POSSIBLE TO INSTALL THE BOLT BEHIND THE OUTBOARD TORQUE TUBE SECTION. MAKE SURE THAT HOLES IN BOTH SECTIONS ARE CORRECTLY ALIGNED.



Removal/Installation Equipment
Figure 403

R

(14)Install bolts (5),(43) and nuts (11),(44).
(15)TORQUE nuts (11),(44) to between 0.733 and 0.895 m.daN (65 and 79 lbf.in.).
(16)Safety bolts (5),(43) with lockwire.
(17)Align wiper ring (40) in splines using alignment plug 55914S0000. Remove alignment plug.

NOTE : Make sure that you install a new wiper ring.

(18)Engage splined end of RH torque tube (22) into housing in PCU (23), so as to connect RH torque tube (22) to RH torque limiter (26).
(19)Carefully align holes (for bolts (27)) in male and female portions of telescopic sections.
CAUTION : BY EXTENDING TELESCOPIC SECTION OF TORQUE TUBES TOO MUCH, IT IS POSSIBLE TO INSTALL THE BOLT BEHIND THE OUTBOARD TORQUE TUBE SECTION. MAKE SURE THAT HOLES IN BOTH TUBE SECTIONS ARE CORRECTLY ALIGNED.
(20)Install bolts (27),(41) und nuts (21),(42).
(21)TORQUE nuts (21),(42) to between 7.33 and 8.95 m.daN (65 and 79 lbf.in.).
(22)Safety bolts (27),(41) with lockwire.
(23)Remove blanking plugs/caps and connect hydraulic lines (14) to PCU (23).
(24)Remove protective caps. Note correct identification and connect electrical connectors 23CV-A (20), 24CV-A (19), 27CV-A (18), 27CV-B (17), 3CN-A (16) and 3CN-B (15). Secure electrical leads to PCU with clamps.
WARNING : MAKE CERTAIN THAT CONNECTORS ARE NOT CROSS-CONNECTED.
(25)Check lubricant level in PCU and replenish if necessary (Ref. 12-13-27, P. Block 1).
(26)Remove warning notices.
(27)On each wing, remove rigging pins PN 98A27508015000 from flap track 1 and 2 carriages.
(28)Pressurize Green and Yellow hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(29)Check hydraulic fluid level in Green and Yellow hydraulic reservoirs and top up if required (Ref. 12-12-29, P. Block 1).
(30)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV and 10CV.
(31)Remove safety guard from flap/slat control lever quadrant.
(32)Operate several times (approx. ten times) flap and slat control lever (without reaching end of travel stops) to bleed hydraulic lines (Ref. 27-50-00, P. Block 301).

E. Test
(1)Carry out operational test of flap system (Ref. 27-54-00, P. Block 501).
(2)Check PCU and all disturbed connections for evidence of leakage.

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove hydraulic fluid recovery container.
(3)Close main gear main door (Ref. 32-12-11, P. Block 301) and access doors.

(4)Install access panels 532BR, 572AB, 632BR und 672AB.
(5)Remove access platform.

TORQUE LIMITER 5471 (5514) - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 2 to 6 m (6.5 ft to 19.6 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27508015000	Check Pin Set - Flap Neutral Setting
	D.	Circuit Breaker Safety Clips and Tags
	E.	Lockwire, Corrosion Resistant Steel, Dia. 0.8 mm (0.032 in.)
	F. Material No. 04-004	Common Greases (Ref. 20-31-00)
	F. Material No. 15-008	Storage Preservation (Ref. 20-31-00)
	Referenced Procedures	
	- 12-13-27, P. Block 1	Flight Controls Replenishing
	- 27-50-00, P. Block 301	Flaps
	- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
	- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up
(Ref. Fig. 401)

(1) Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).

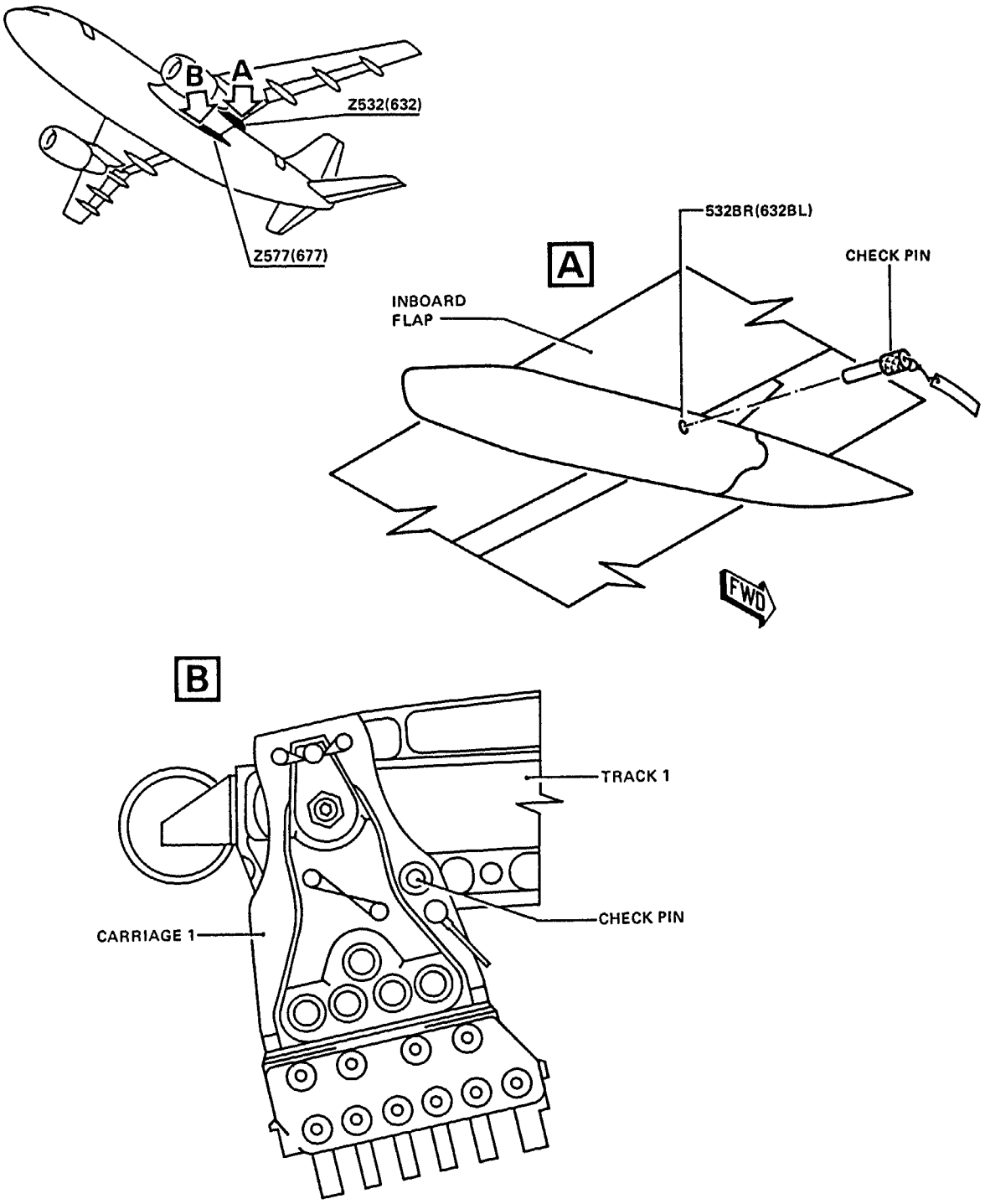
R (2) Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

WARNING : PRIOR TO IMMOBILIZING FLAP TRACK CARRIAGES WITH RIGGING PINS, MAKE CERTAIN THAT OUTPUT SHAFTS OF POWER CONTROL UNITS ARE STABILIZED.

(3) Put access platform in position.

(4) For removal of LH torque limiter (5471) open access panels 532BR and 572AB and immobilize flap track 1 and 2 carriages on left wing using check pins PN 98A27508015000.

(5) For removal of RH torque limiter (5514), open access doors 632BL and 672AB and immobilize right wing flap track 1 and 2 carriages using



Component and Rigging Pin Location
Figure 401

check pins PN 98A27508015000.

(6)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(7)Open one main gear main door (Ref. 32-12-11, P. Block 301).

B. Removal

(Ref. Fig. 402)

NOTE : As removal/installation procedures for LH (5471) and RH (5514) torque limiters are identical only the procedure concerning LH (5471) torque limiter is described.

R (1)Make sure that there is no torque load in the transmission system.

R NOTE : There is no torque load in the transmission system if you can move the transmission shafts with your hands.

R (2)Cut and remove lockwire, remove and discard locknut (3) and remove bolt (2) securing splined end of coupling (4) to torque tube (1).

R (3)Cut and remove lockwire and nut (21), remove bolt (5) connecting coupling (4) to torque limiter (6).

R (4)Move splined end of coupling (4) in torque tube (1) so as to free coupling (4) from the torque limiter (6). Support torque tube (1) with straps.

R (5)Cut and remove lockwire and remove nut (10) and bolt (7) securing splined end of torque shaft (8) to torque limiter (6).

R (6)Remove cotter pin (20) and nuts (19), retain washers (18).

R (7)Remove cotter pin (13) and nuts (12), retain washers (11).

R (8)Support torque limiter (6).

R (9)Remove bolts (16) and shoulder bolts (15).

R (10)Remove torque limiter (6) from brackets (14) and (17) and shaft (8).

C. Preparation of Replacement Component

(1)Clean all splined portions with a lint-free cloth.

(2)Apply new grease (Material No. 04-004) to all splined portions.

D. Installation

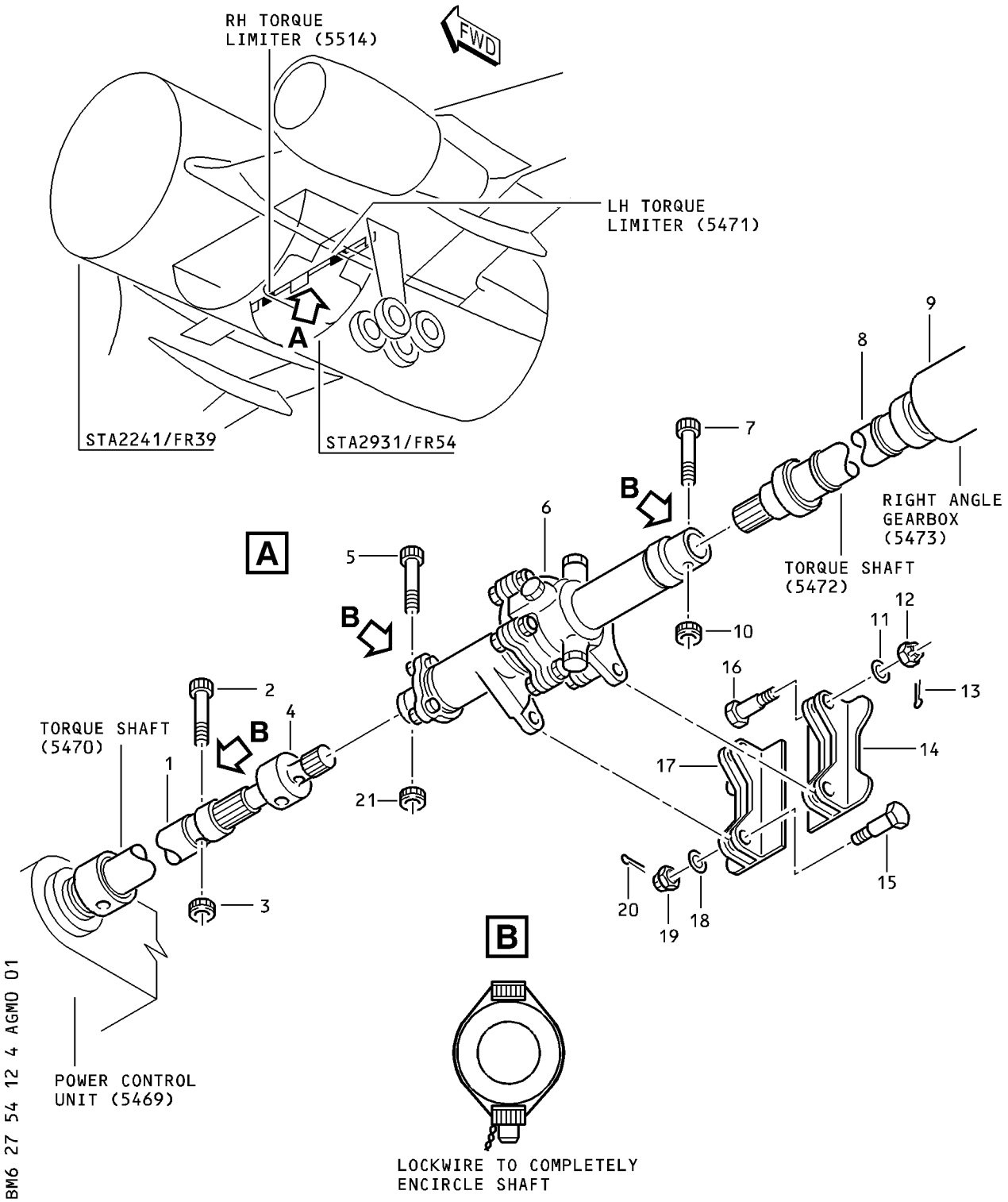
(1)Install splined end of shaft (8) in replacement torque limiter (6) making certain that bores are aligned and put torque limiter (6) in position.

(2)Install bolts (16) and shoulder bolts (15), securing torque limiter (6) to structural brackets (14) and (17).

(3)On bolts (16), install washers (11) and nuts (12) and safety nuts (12) with cotter pins (13).

(4)On shoulder bolts (15), install washers (18) and nuts (19) and safety nuts (19) with cotter pins (20).

(5)Engage splined end of coupling (4) in torque limiter (6) and safety with bolt (5). On bolt (5) install nut (3).



Torque Limiter
Figure 402

R

(6)TORQUE nut (3) to between 7.33 and 8.95 m.N (65 and 79 lbf.in.) and safety with lockwire.
NOTE: Lockwire is to completely encircle shaft.
(7)Carefully align holes in male and female portions of torque shaft (1) and splined end of coupling (4).
CAUTION : BY EXTENDING TELESCOPIC SECTION OF SHAFT TOO MUCH IT IS POSSIBLE TO INSTALL THE BOLT (2) BEHIND THE OUTBOARD SHAFT SECTION. MAKE SURE THAT HOLES IN BOTH SHAFT SECTIONS ARE CORRECTLY ALIGNED.
(8)Install bolt (2) and nut (3).
(9)TORQUE nut (3) to between 7.33 and 8.95 m.N (65 and 79 lbf.in.) and safety with lockwire.
NOTE: Lockwire is to completely encircle shaft.
(10)Install bolt (7) and nut (10).
(11)TORQUE nut (10) to between 7.33 and 8.95 m.N (65 and 79 lbf.in.) and safety with lockwire.
NOTE: Lockwire is to completely encircle shaft.
(12)Apply corrosion preventive (Material No. 15-008) to all attachment parts.
(13)Check lubricant level in torque limiter, replenish if necessary (Ref. 12-13-27, P. Block 1).
(14)Remove check pins PN 98A27508015000 immobilizing right or left wing flap track 1 and 2 carriages.
(15)Remove safety guard PN 98A27503003000 from flap/slat control lever quadrant.
(15)Remove safety clips and tags and close circuit breakers 5CV, 6CV, 10CV.

E. Test
(1)Carry out operational test of flap system (Ref. 27-54-00, P. Block 501).

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close main gear main door (Ref. 32-12-11, P. Block 301) and access panels 532BR and 632BL.
(3)Remove access platform.

RIGHT ANGLE GEARBOX 5473 (5516) - 5476 (5519) - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2 to 6 m (6.5 to 19.6 ft.)
R B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C. 98A27508060000	Locking Device - Flap Drive Shaft
D.	Circuit Breaker Safety Clips and Tags
E.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
F. Material No. 04-004	Common Greases (Ref. 20-31-00)
G. Material No. 15-008	Storage Preservation (Ref. 20-31-00)

Referenced Procedures

- 12-13-27, P. Block 1	Flight Controls Replenishing
- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)
(Ref. Fig. 402)

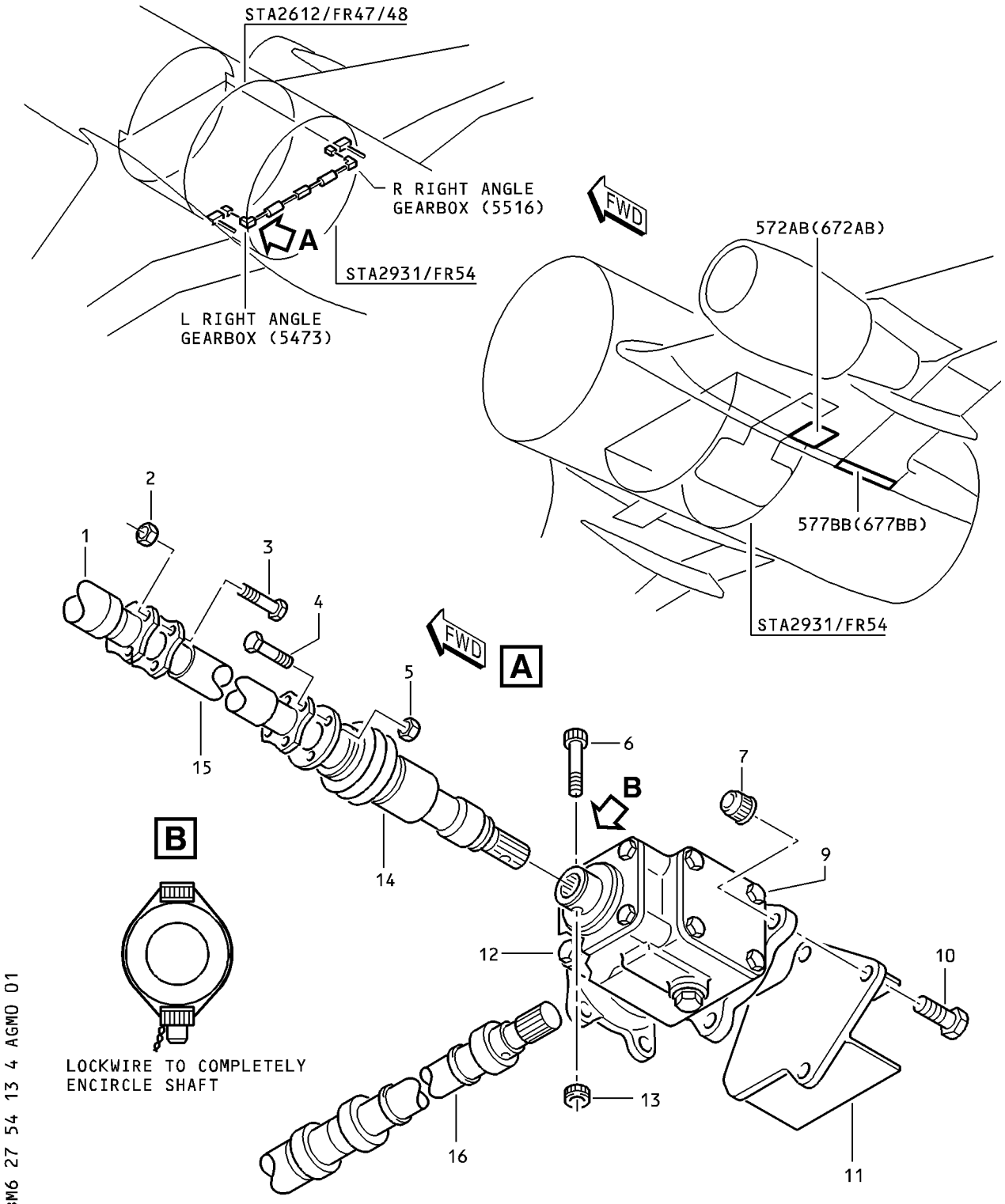
A. Job Set-Up

(1)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).

R (2)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

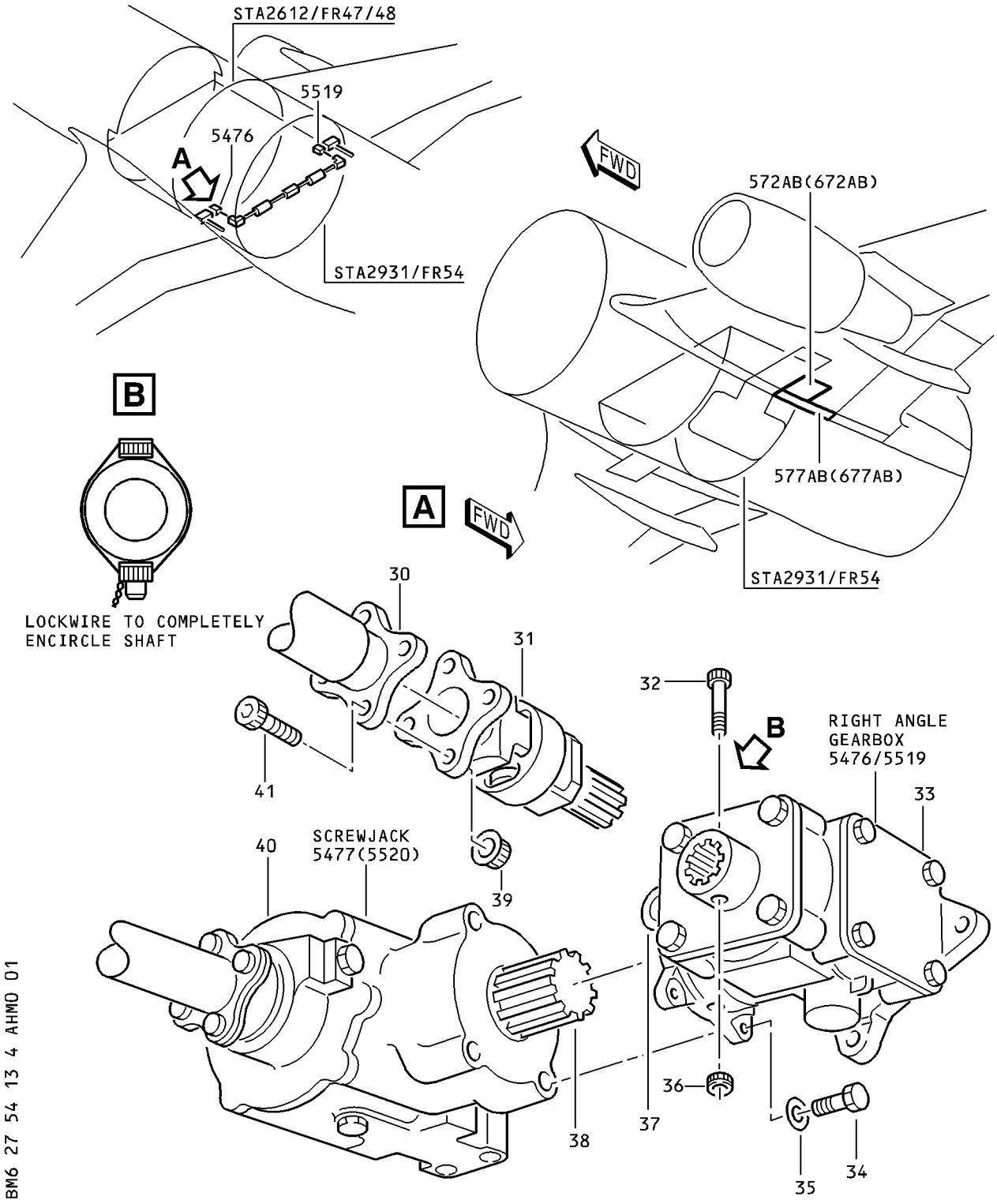
(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/FLAPS/SYS 1	10CV	335/R67



Right Angle Gearbox 5473 (5516)
Figure 401

R



Right Angle Gearbox 5476 (5519)
Figure 402

R

(4)Install access platform.
(5)Open one main gear main door (Ref. 32-12-11, P. Block 301).
(6)For removal of right angle gearbox 5473 (5516), remove access panels 572AB and 577BB (672AB and 677BB).
(7)For removal of right angle gearbox 5476 (5519), remove access panels 572AB and 577AB (672AB and 677AB).
CAUTION : MAKE CERTAIN THAT OUTPUT SHAFTS OF THE POWER CONTROL UNIT ARE STABILIZED.
(8)Install flap drive shaft locking device PN 98A27508060000 between a rib and flap transmission shaft in LH and RH wings.

B. Removal of Right Angle Gearbox 5473 (5516) (Ref. Fig. 401)
NOTE : As removal of RH (5516) and LH (5473) right angle gearboxes are identical, only LH right angle gearbox 5473 removal/installation procedure is described.

R (1)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can
R move the transmission shafts with your hands.
R (2)Cut and remove lockwire and remove nut (13). Remove bolt (6) securing splined end of plunging joint (14) to right angle gearbox (9).
R (3)Remove torque tube (15) as follows:
(a)Remove nuts (5) and bolts (4) securing torque tube (15) to plunging joint (14).
(b)Remove nuts (2), support torque tube (15) and remove bolts (3) securing torque tube (15) to universal joint (1).
(c)Remove torque tube (15).
R (4)Remove plunging joint (14).
R (5)Support torque tube (16) on nearby structure.
R (6)Remove nuts (7) and bolts (10) and remove right angle gearbox (9) from bracket (11) and shaft (16).

C. Removal of Right Angle Gearbox 5476 (5519) (Ref. Fig. 402)
NOTE : As removal of LH (5476) and RH (5519) right angle gearboxes are identical, only LH right angle gearbox 5476 removal/installation procedure is described.

R (1)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can
R move the transmission shafts with your hands.
R (2)Remove nuts (39) and bolts (41) securing torque tube (30) flanges.
R (3)Support torque tube (30) on nearby structure.
R (4)Remove screws (34), retain washers (35). Disengage right angle gearbox (33) and universal joint (31) from screwjack (40) splined end (38) by pushing assembly towards fuselage.
R (5)Cut and remove lockwire and remove nut (36) and bolt (32) securing universal joint (31) to right angle gearbox (33).
NOTE : Transmission shaft includes universal joints and splined ends. Take care not to damage splines of shafts and components.

D. Preparation of Replacement Component 5473 (5516)
(1)Engage splined end of shaft (16) and splined end of plunging joint

(14) in right angle gearbox (9) and check that gearbox rotates freely. Remove shaft (16) and plunging joint (14).
(2)Clean all splined portions with a lint-free cloth.
(3)Apply grease (Material No. 04-004) to splines of tubes and gearbox (9).

E. Preparation of Replacement Component 5476 (5519)
(1)Clean all splined portions with a lint-free cloth.
(2)Apply grease (Material No. 04-004) to splines of universal joint (31) and right angle gearbox (33).
(3)Engage splined universal joint (31) in right angle gearbox (33), then install bolt (32) and tighten nut (36).
(4)TORQUE nut (36) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
(5)Safety bolt (32) and nut (36) with lockwire and check that gearbox rotates freely.
NOTE: Lockwire is to completely encircle shaft.

F. Installation of Right Angle Gearbox 5473 (5516)
(1)Position right angle gearbox (9) on support (11).
(2)On right angle gearbox (9) input side, engage splined coupling of shaft (16).
(3)Secure right angle gearbox (9) to bracket (11) using bolts (10) and nuts (7). Tighten nuts (7).
(4)Engage splined end of plunging joint (14) on output side of right angle gearbox (9). Make sure that holes in splined portions are aligned.
(5)Connect splined end of plunging joint (14) to right angle gearbox with bolt (6).
(6)On bolt (6), install and tighten nut (13).
(7)TORQUE nut (13) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.). Safety with lockwire.
NOTE: Lockwire is to completely encircle shaft.
(8)Install torque tube (15) as follows:
(a)Connect torque tube (15) to universal joint (1) with bolts (3).
(b)On bolts (3), install nuts (2) and tighten.
(c)TORQUE nuts (2) to between 10.2 and 12.4 Nm (90 and 109 lbf.in.).
(d)Connect torque tube (15) to plunging joint (14) using bolts (4).
(e)On bolts (4), install and tighten nuts (5).
(f)TORQUE nuts (5) to between 10.2 and 12.4 Nm (90 and 109 lbf.in.).

G. Installation of Right Angle Gearbox 5476 (5519)
(1)Apply grease (Material No. 04-004) to splines of screwjack (40) and right angle gearbox (33).
(2)Position right angle gearbox (33) and universal joint (31) on screwjack (40).
(3)Connect assembly (33),(31) to screwjack (40) with screws (34) and washers (35).
(4)TORQUE screws (34) to between 7.8 and 9.6 Nm (69 and 85 lbf.in.).
(5)Connect universal joint (31) to torque tube (30).
(6)Install junction bolts (41) and tighten nuts (39).
(7)TORQUE nuts (39) to between 10.2 and 12.4 Nm (90 and 109 lbf.in.).
(8)Apply corrosion preventive (Material No. 15-008) to all attachment parts.

H. Test
(1)Remove flap drive shaft locking device PN 98A27508060000.
(2)Check lubricant level in gearbox, replenish if necessary (Ref. 12-13-27, P. Block 1).
(3)Remove safety guard from flap/slat control lever quadrant.
(4)Remove safety clips and tags and close circuit breakers 5CV, 6CV, and 10CV.
(5)Carry out operational test (Ref. 27-54-00, P. Block 501).

I. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close main gear main door (Ref. 32-12-11, P. Block 301) and access panels.
(3)Remove access platform.

PLUNGING JOINT 5474 (5517), 5478 (5521) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2 to 6 m (6.5 to 19.6 ft.)
B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C. 98A27508060000	Locking Device - Flap Drive Shaft
D.	Circuit Breaker Safety Clips and Tags
E.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
F. Material No. 04-004	Common Greases (Ref. 20-31-00)
H. Material No. 15-008	Storage Preservation (Ref. 20-31-00)

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)

2. Procedure

A. Job Set-Up

(1)Fully extend flaps (Ref. 27-50-00, P. Block 301).

R (2)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(4)Install access platform.

(5)Gain access to plunging joint to be removed:

- open access doors 572AB and 572BB for plunging joints 5474 and 5478
- open access doors 672AB and 672BB for plunging joints 5517 and 5521.

CAUTION : MAKE CERTAIN THAT OUTPUT SHAFTS OF THE POWER CONTROL UNIT ARE

STABILIZED.

(6)Install flap drive shaft locking device PN 98A27508060000 between a rib and flap transmission shaft outboard of the plunging joint to be removed.

B. Removal

NOTE : As removal/installation procedures for plunging joints 5474 (5517) and 5478 (5521) are identical, only the procedure concerning plunging joint 5474 (5517) is described.

(Ref. Fig. 401)

R (1)Make sure that there is no torque load in the transmission system.

R NOTE : There is no torque load in the transmission system if you can move the transmission shafts with your hands.

R (2)Cut and remove lockwire and remove nut (5) and bolt (3).

R (3)Support torque shaft (7).

R (4)Remove nuts (2) and bolts (1) connecting torque shaft (7) to plunging joint (6).

R (5)Compress plunging joint (6) and withdraw it from housing and remove.

C.Preparation for Installation

(1)Clean all splined portions with a lint free cloth.

(2)Apply grease (Material No. 04-004) to all splined portions.

D. Installation

(1)Engage splinded end of plunging joint (6) in housing on right angle gearbox (or srewjack No.1). Make sure that fixing holes are aligned.

(2)Install bolts (1) and nuts (2) connecting torque shaft (7) on plunging joint (6).

(3)TORQUE nuts (2) to between 10.2 and 12.4 mN (90 and 110 lbf.in.).

(4)Install bolt (3) and nut (5). TORQUE nut (5) to between 7.33 and 8.95 mN (65 and 79 lbf.in.). Safety nut (5) with lockwire.

NOTE: Lockwire is to completely encircle shaft.

(5)Apply corrosion preventive (Material No. 15-008) to all attachment parts.

(6)Remove warning notices.

(7)Remove flap drive shaft locking device PN 98A27508060000.

(8)Remove safety guard PN 98A27503003000 from flap/slat control lever quadrant.

(9)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.

(10)Fully retract flaps (Ref. 27-50-00, P. Block 301).

E. Test

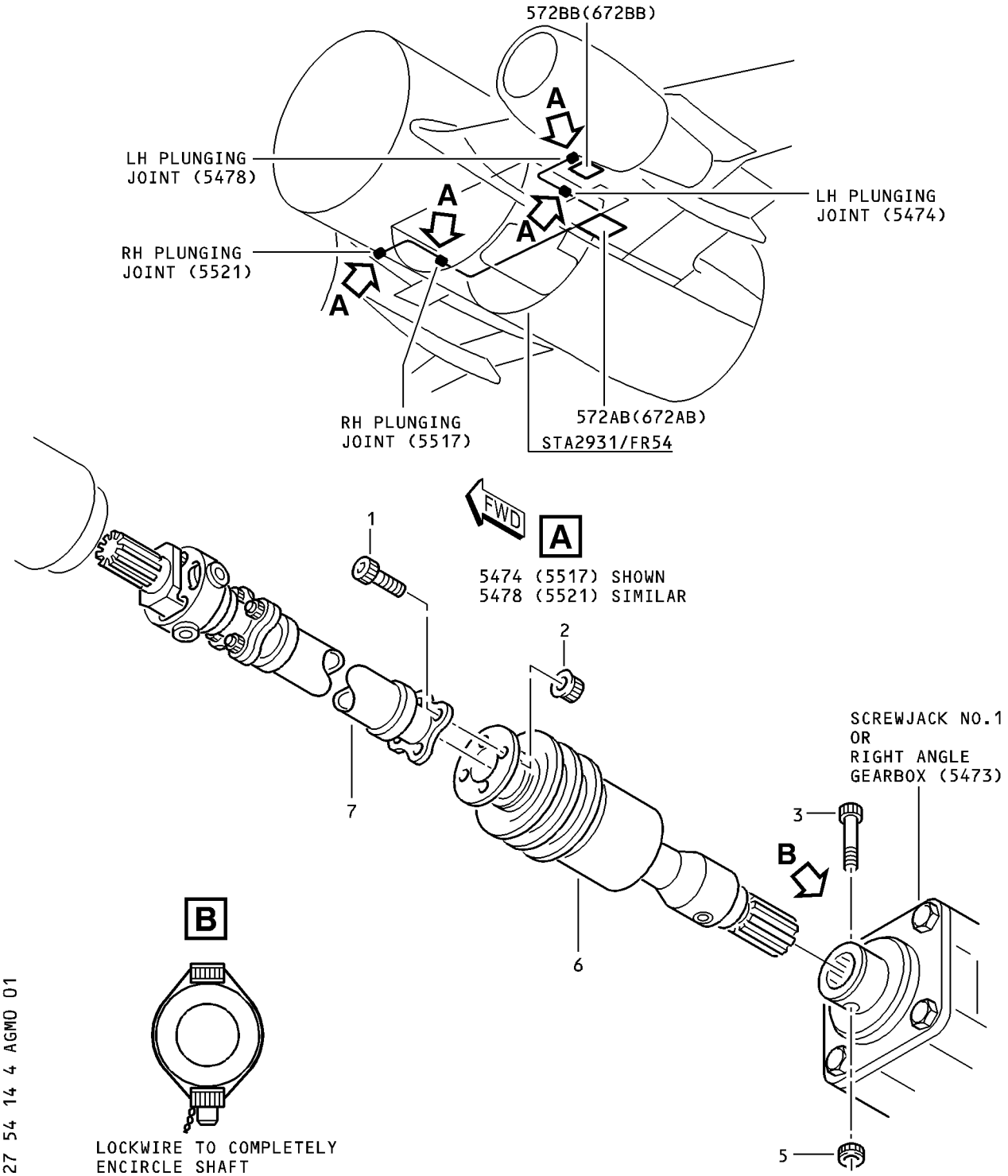
(1)Carry out operational test (Ref. 27-54-00, P. Block 501).

F. Close-Up

(1)Make sure that work area is clean and clear of tools and miscellaneous items of equipment.

(2)Close access doors.

(3)Remove access platform.



Plunging Joint
Figure 401

R

SLIDING BEARING 5480, 5482 (5523, 5525)
REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTRIL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C. 98A27508015000	Check Pin Set - Flap Neutral Setting
D. 98A27508050000	Turning Jig - Flap Drive Shaft
E. 98A27508060000	Locking Device - Flap Drive Shaft
F.	Torque Wrench, 7 - 9 Nm (65 - 80 lbf.in.)
G.	Torque Wrench, 10 - 12.5 Nm (90 - 110 lbf.in.)
H.	Circuit Breaker Safety Clips and Tags
I.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
J. Material No. 04-004	Common Greases (Ref. 20-31-00)
K. Material No. 05-005	Special Materials (Ref. 20-31-00)
L. Material No. 09-015	Sealants (Ref. 20-31-00)
Referenced Procedure	
- 27-50-00, P. Block 301	Flaps
R - 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission
R	(Flaps)

2. Procedure
(Ref. Fig. 401) (Sheet 1/2)
(Ref. Fig. 401) (Sheet 2/2)

A. Job Set-Up
(1)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
(2)Open safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/	10CV	335/R67

PANEL	SERVICE	IDENT.	LOCATION
	FLAPS/SYS 1		

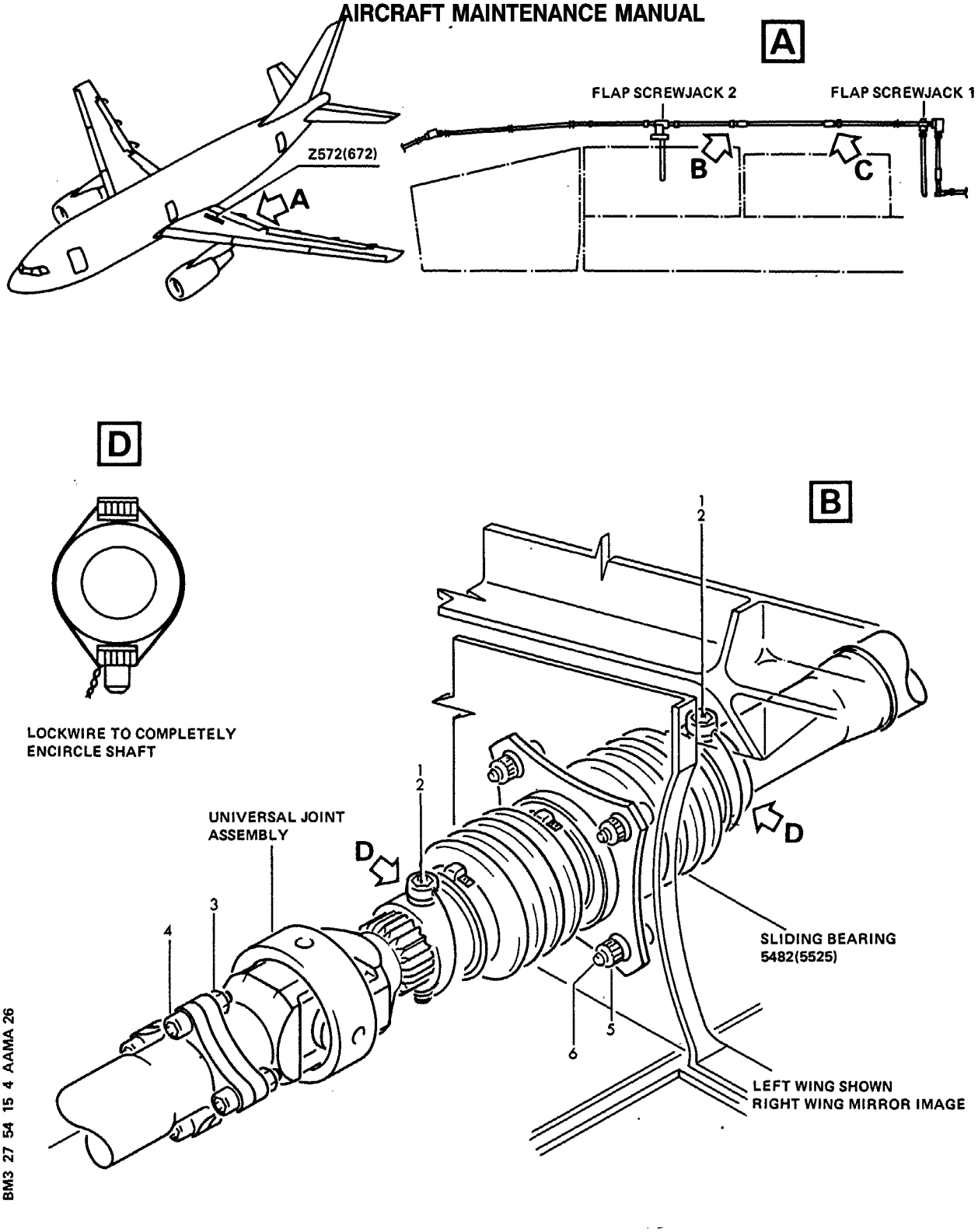
(3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)Position access platform.
(5)For sliding bearing 5482 (5525): Open access doors 572BB, 572CB (672BB, 672CB).
(6)For sliding bearing 5480 (5523): Open access doors 572BB (672BB).
(7)Install flap drive shaft locking device PN 98A27508060000 between a rib and flap transmission shaft outboard of the sliding bearing to be removed.

B. Removal of Sliding Bearing 5482 (5525)
R (1)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can
R move the transmission shafts with your hands.
R (2)Cut and discard lockwire and remove two nuts (1) and bolts (2) securing splined ends of sliding bearing.
R (3)Remove four nuts (3) and bolts (4) securing splitter flange halves.
R (4)Support outboard portion of drive shaft and remove universal joint assembly.
R (5)Remove four nuts (5) and bolts (6) securing sliding bearing assembly.
R (6)Support inboard portion of drive shaft and withdraw sliding bearing from aircraft.

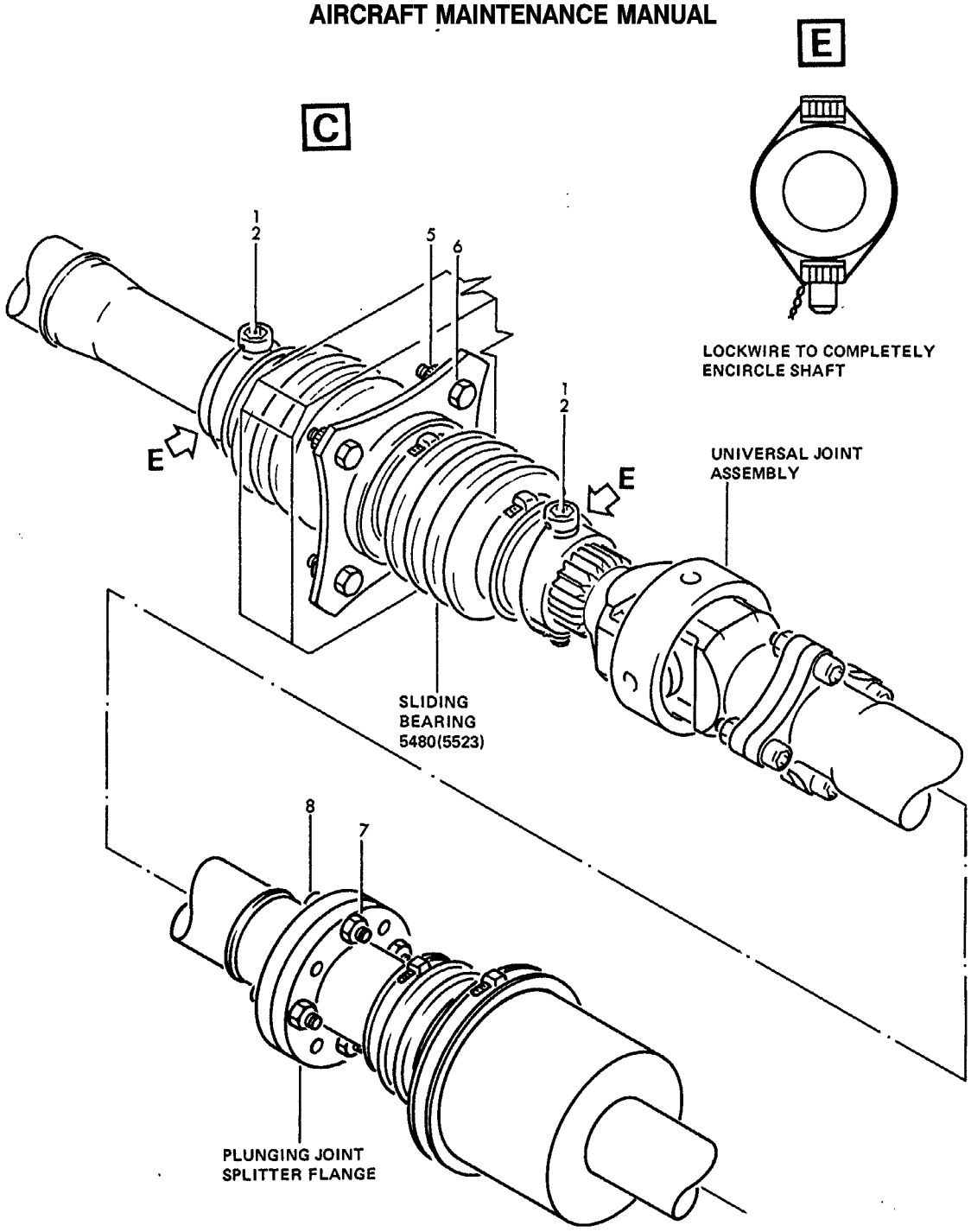
C. Removal of Sliding Bearing 5480 (5523)
R (1)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can
R move the transmission shafts with your hands.
R (2)Cut and discard lockwire and remove two nuts (1) and bolts (2) securing splinded ends of sliding bearing.
R (3)Remove four nuts (7) and bolts (8) securing special 8/12 hole splitter flange.
R (4)Remove drive shaft complete with universal joint assembly.
R (5)Remove four nuts (5) and bolts (6) securing sliding bearing assembly.
R (6)Support outboard portion of drive shaft and withdraw sliding bearing from aircraft.

D. Preparation for Installation
(1)Remove all traces of old sealant from bearing mounting on aircraft structure.

E. Installation of Sliding Bearing 5482 (5525)
(1)Apply grease (Material No. 04-004) to splined portions of sliding bearing and universal joint assemblies.
(2)Apply sealant (Material No. 09-015) to sliding bearing mounting on aircraft structure.
(3)Position sliding bearing assembly, making sure that bolt holes in



Flap Drive Shaft Sliding Bearing (Sheet 1 of 2)
Figure 401



Flap Drive Shaft Sliding Bearing (Sheet 2 of 2)
Figure 401

inboard spline sections are aligned and secure with bolts (6) and nuts (5).
(4)Make sure that bolt holes in splined sections are aligned and install outboard universal joint assembly.
(5)Install bolts (2) and nuts (1) thru splined sections.
(6)TORQUE nuts (1) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.)
(7)Safety with lockwire.
NOTE : Lockwire is to completely encircle shaft.
(8)Apply corrosion preventive (Material No. 05-005) to nuts (1) and bolts (2).
(9)Connect splitter flange halves and secure with bolts (4) and nuts (3).
(10)TORQUE nuts (3) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(11)Apply corrosion preventive (Material No. 05-005) to nuts (3) and bolts (4).
(12)If at operation (9) splitter flange holes are not aligned, proceed as follows:
(a)Remove four nuts (7) and bolts (8) securing special 8/12 hole splitter flange at outboard end of plunging joint outboard of screwjack No. 1.
(b)Carry out operations (9) thru (11).
(c)Using Flap Drive Shaft Turning Jig PN 98A27508050000 if necessary, rotate shaft outboard of plunging joint until holes in special splitter flange halves at plunging joint align.
(d)Connect special splitter flange halves and secure with bolts (8) and nuts (7).
(e)TORQUE nuts (7) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.)
(f)Apply corrosion preventive (Material No. 05-005) to nuts (7) and bolts (8).

F. Installation of Sliding Bearing 5480 (5523)
(1)Apply grease (Material No. 04-004) to splined portions of sliding bearing and universal joint assembly.
(2)Apply sealant (Material No. 09-015) to sliding bearing mounting on aircraft structure.
(3)Position sliding bearing assembly, making sure that bolt holes in outboard spline sections are aligned and secure with bolts (6) and nuts (5).
(4)Make sure that bolt holes in splined sections are aligned and install inboard universal joint assembly with drive shaft.
(5)Install bolts (2) and nuts (1) thru splined sections.
(6)TORQUE nuts (1) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.)
(7)Safety with lockwire.
NOTE : Lockwire is to completely encircle shaft.
(8)Apply corrosion preventive (Material No. 05-005) to nuts (1) and bolts (2).
(9)Align special 8/12 hole splitter flanges and install bolts (8) and nuts (7).
(10)TORQUE nuts (7) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(11)Apply corrosion preventive (Material No. 05-005) to nuts (7) and bolts (8).

G. Close-Up

(1)Remove drive shaft locking device PN 98A27508060000.
(2)Make sure that work area is clean and clear of tools and miscellaneous items of equipment.
(3)Close access doors 572BB, 572CB left wing, 672BB, 672CB right wing.
(4)Remove access platform.
(5)Remove safety clips and tags and close circuit breakers 10CV, 5CV, 6CV.
(6)Remove safety guard PN 98A27503003000 from flap/slat control lever quadrant.
(7)Retract flaps (Ref. 27-50-00, P. Block 301).
(8)Make sure that it is possible to insert check pin PN 98A27508015000 in carriage 2.
(9)Remove check pin from carriage 2.
(10)Do the operational test of the flap system (Ref. 27-54-00, P. Block 501).

SHORT STEADY BEARING (5486, 5529) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C. 98A27508015001	Check Pin Set - Flap Neutral Setting
D. 98A27508050000	Turning Jig - Flap Drive Shaft
E. 98A27508060000	Locking Device - Flap Drive Shaft
F. LL551A036	Alignment Plug
G.	Torque Wrench, 7 to 9 Nm (62 to 80 lbf.in.)
H.	Torque Wrench, 10 to 12.5 Nm (90 to 110 lbf.in.)
J.	Circuit Breaker Safety Clips and Tags
K.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
L.	Wiper Rings
M. Material No. 04-024	Common Greases (Ref. 20-31-00)
N. Material No. 05-005	Special Materials (Ref. 20-31-00)
P. Material No. 05-002	Special Materials (Ref. 20-31-00)
Q. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
Referenced Procedure	
- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)

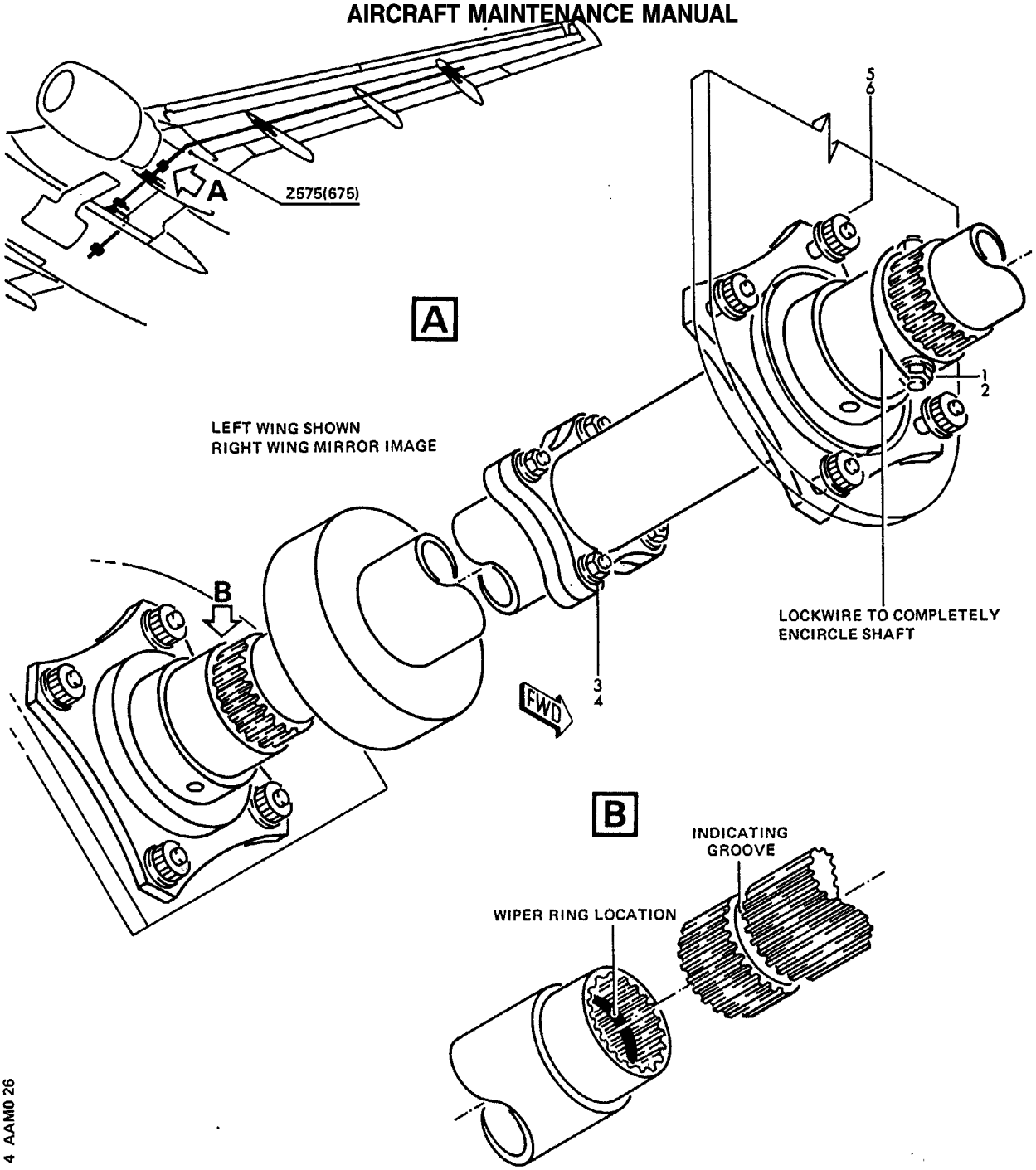
2. Procedure

(Ref. Fig. 401)

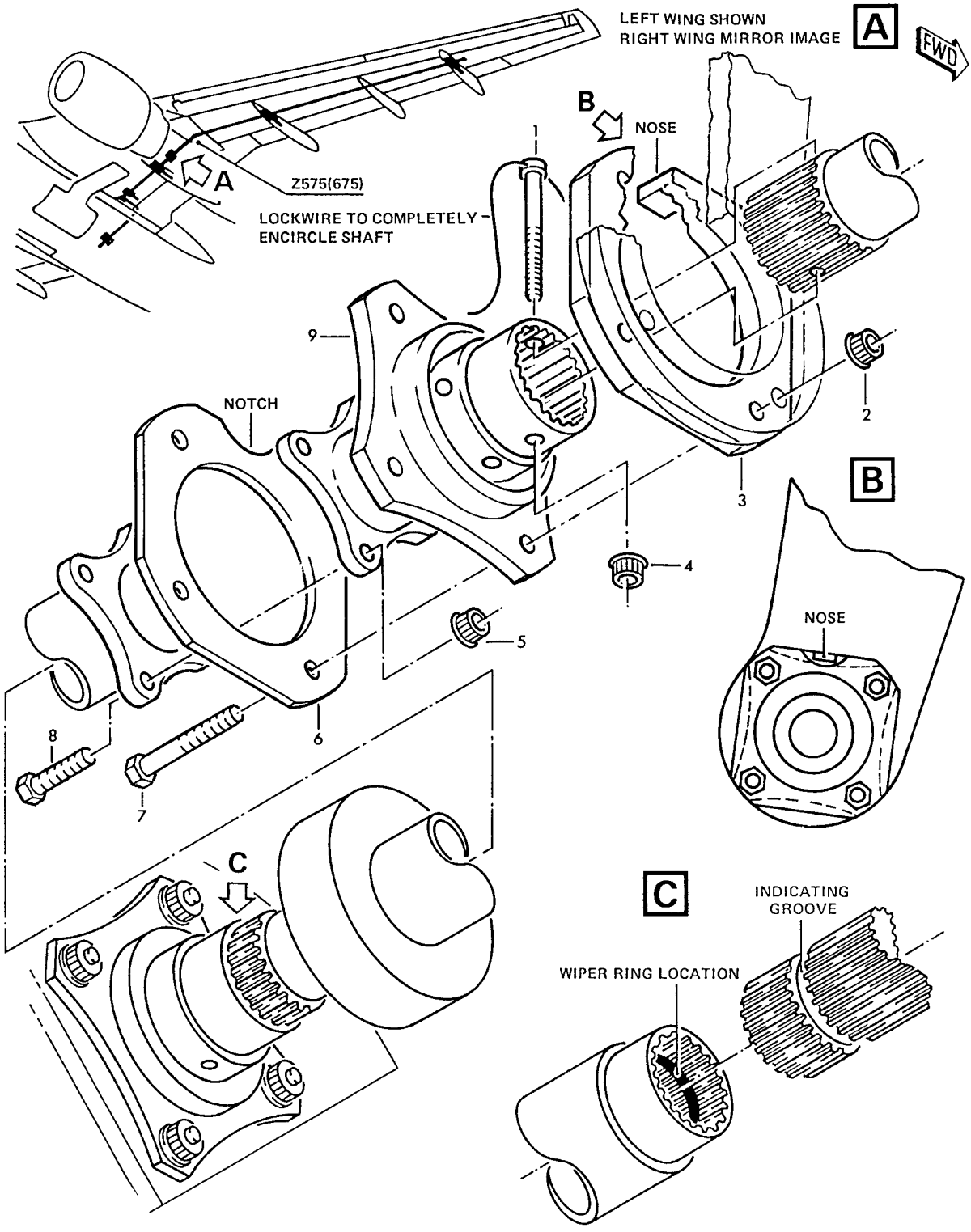
R **ON A/C 104-104, 106-200,

R Post SB 27-2074 For A/C 104-104,106-200,

(Ref. Fig. 402)



Flap Transmission Shaft Short Steady Bearing
Figure 401



Flap Transmission Shaft Short Steady Bearing
Figure 402

**ON A/C ALL

A. Job Set-Up
(1)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301)
(2)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)Position access platform.
(5)Open access doors 575CB, 575DB left wing, 675CB, 675DB right wing.
(6)Install flap drive shaft locking device PN 98A27508060000 between a rib and flap transmission shaft outboard of short steady bearing.

B. Removal
R (1)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can move the transmission shafts with your hands.
R (2)Cut and discard lockwire, and remove nut (1) and bolt (2) thru splined connection on inboard side of bearing.
R (3)Remove four nuts (3) and bolts (4) securing splitter flange outboard of bearing.
R (4)Without subjecting the crown spline joint to excessive deflection, remove drive shaft outboard of bearing, simultaneously disengaging splines at steady bearing. 5488 left wing, 5531 right wing.
R (5)Remove nuts (5) and bolts (6) securing steady bearing.
R (6)Support inboard section of drive shaft and withdraw steady bearing assembly from mounting.

C. Preparation for Installation
(1)Remove old anti corrosion compound from mating surface of steady bearing mounting.
(2)Remove and discard felt wiper from splined connection of steady bearing 5488 (5531).
(3)Clean splined surfaces of all separated connections using white spirit (Material No. 11-002)
(4)Install new felt wiper ring using alignment plug.

D. Installation
(1)Apply anti corrosion compound (Material No. 05-002) to mating surface of steady bearing mounting.
(2)Apply grease (Material No. 04-024) to male and female portions of inboard splined connection.

(3)Install steady bearing assembly, making sure that bolt holes thru inboard spline connection are aligned.
(4)Secure steady bearing with bolts (6) and nuts (5).
(5)Apply corrosion preventive (Material No. 05-005) to bolts (6) and nuts (5).
(6)Install bolt (2) and nut (1) thru inboard splined connection.
(7)TORQUE nut (1) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
(8)Safety with lockwire.
NOTE : Lockwire is to completely encircle shaft.
(9)Apply corrosion preventive (Material No. 05-005) to bolt (2) and nut (1).
(10)Install outboard section of drive shaft positioning splined connection such that splitter flange bolt holes line up, check that indicating groove on male half of splined connection is not visible, indicating correct engagement.
(11)If exact alignment of splitter flange holes cannot be attained, rotate drive shaft to suit, using drive shaft turning jig PN 98A27508050000 if necessary.
(12)Connect splitter flange halves, secure with bolts (4) and nuts (3).
(13)TORQUE nuts (3) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(14)Apply corrosion preventive (Material No. 05-005) to bolts (4) and nuts (3).

E. Close-Up
(1)Remove flap drive shaft locking device PN 98A27508060000.
(2)Make sure that work area is clean and clear of tools and miscellaneous items of equipment.
(3)Close access doors 575CB, 575DB left wing, 675CB, 675DB right wing.
(4)Remove access platform.
(5)Remove safety clips and tags and close circuit breakers 10CV, 5CV, 6CV.
(6)Remove safety guard from flap/slat control lever quadrant.
(7)Retract flaps (Ref. 27-50-00, P. Block 301).
(8)Make sure that rigging check pins PN 98A27508015001 can be freely inserted in carriages 2 and 3.
(9)Remove rigging check pins from carriages 2 and 3.
(10)Do the operational test of the flap system (Ref. 27-54-00, P. Block 501).

**ON A/C 104-104, 106-200,

Post SB 27-2074 For A/C 104-104,106-200,

(3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)Position access platform.
(5)Open access doors 575CB, 575DB left wing, 675CB, 675DB right wing.
(6)Install flap drive shaft locking device PN 98A27508060000 between a rib and flap transmission shaft outboard of short steady bearing.

B. Removal
R (1)Make sure that there is no torque load in the transmission system.

R NOTE : There is no torque load in the transmission system if you can
R move the transmission shafts with your hands.
R (2)Cut and discard lockwire, and remove nut (4) and bolt (1) thru splined connection on inboard side of bearing (9).
R (3)Remove four nuts (5) and bolts (8) securing splitter flange outboard of bearing (9).
R (4)Without subjecting the crown spline joint to excessive deflection, remove drive shaft outboard of bearing, simultaneously disengaging splines at steady bearing, 5488 left wing, 5531 right wing.
R (5)Remove nuts (2) and bolts (7) securing steady bearing (9) and spacers (6),(3).
R (6)Support inboard section of drive shaft and withdraw steady bearing assembly (9) with spacers (6),(3) from mounting.

C. Preparation for Installation
(1)Remove old anti corrosion compound from mating surface of steady bearing mounting and from spacers (6),(3).
(2)Remove and discard felt wiper from splined connection of steady bearing 5488 (5531).
(3)Clean splined surfaces of all separated connections using white spirit (Material No. 11-002).
(4)Install new felt wiper ring using alignment plug.

D. Installation
(1)Apply anti corrosion compound (Material No. 05-002) to mating surface of steady bearing mounting and spacers (6),(3).
(2)Apply grease (Material No. 04-024) to male and female portions of inboard splined connection.
(3)Install spacers (6),(3) and steady bearing assembly (9), making sure that bolt holes thru inboard spline connection are aligned.

NOTE : Make sure that the nose and the notch of the spacers (6),(3) show up.

(4)Secure spacers (6),(3) and steady bearing (9) with bolts (7) and nuts (2).
(5)Apply corrosion preventive (Material No. 05-005) to bolts (7) and nuts (2).
(6)Install bolt (1) and nut (4) thru inboard splined connection.
(7)TORQUE nut (4) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
(8)Safety with lockwire.

NOTE : Lockwire is to completely encircle shaft.

(9)Apply corrosion preventive (Material No. 05-005) to bolt (1) and nut (4).
(10)Install outboard section of drive shaft positioning splined connection such that splitter flange bolt holes line up, check that indicating groove on male half of splined connection is not visible, indicating correct engagement.
(11)If exact alignment of splitter flange holes cannot be attained, rotate drive shaft to suit, using drive shaft turning jig PN 98A27508050000

if necessary.
(12)Connect splitter flange halves, secure with bolts (8) and nuts (5).
(13)TORQUE nuts (5) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(14)Apply corrosion preventive (Material No. 05-005) to bolts (8) and nuts (5).

E. Close-Up
(1)Remove flap drive shaft locking device PN 98A27508060000.
(2)Make sure that work area is clean and clear of tools and miscellaneous items of equipment.
(3)Close access doors 575CB, 575DB left wing, 675CB, 675DB right wing.
(4)Remove access platform.
(5)Remove safety clips and tags and close circuit breakers 10CV, 5CV, 6CV.
(6)Remove safety guard from flap/slat control lever quadrant.
(7)Retract flaps (Ref. 27-50-00, P. Block 301).
(8)Make sure that rigging check pins PN 98A27508015001 can be freely inserted in carriages 2 and 3.
(9)Remove rigging check pins from carriages 2 and 3.
(10)Do the operational test of the flap system (Ref. 27-54-00, P. Block 501).

STEADY BEARINGS (5488, 5494, 5496, 5498, 5500, 5531, 5537, 5539, 5541, 5543) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON/OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipmentand Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3 to 5 m (9 to 15 ft.)
	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27508015000	Check Pin Set - Flap Neutral Setting
	D. 98A27508050000	Turning Jig - Flap Drive Shaft
	E. 98A27508060000	Locking Device - Flap Drive Shaft
	F. LL517A034	Alignment Plug
	G. LL550A017	Alignment Plug
	H. LL551A036	Alignment Plug
	I.	Torque Wrench, 7 to 9 Nm (62-80 lbf.in.)
	J.	Torque Wrench, 10 to 12.5 Nm (90-110 lbf.in.)
	K.	Circuit Breaker Safety Clips and Tags
	L.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	M.	Wiper Rings
	N. Material No. 04-004	Common Greases (Ref. 20-31-00)
R	O. Material No. 04-018	Common Greases (Ref. 20-31-00)
R	P. Material No. 05-005	Special Materials (Ref. 20-31-00)
R	Q. Material No. 09-015	Sealants (Ref. 20-31-00)
R	R. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

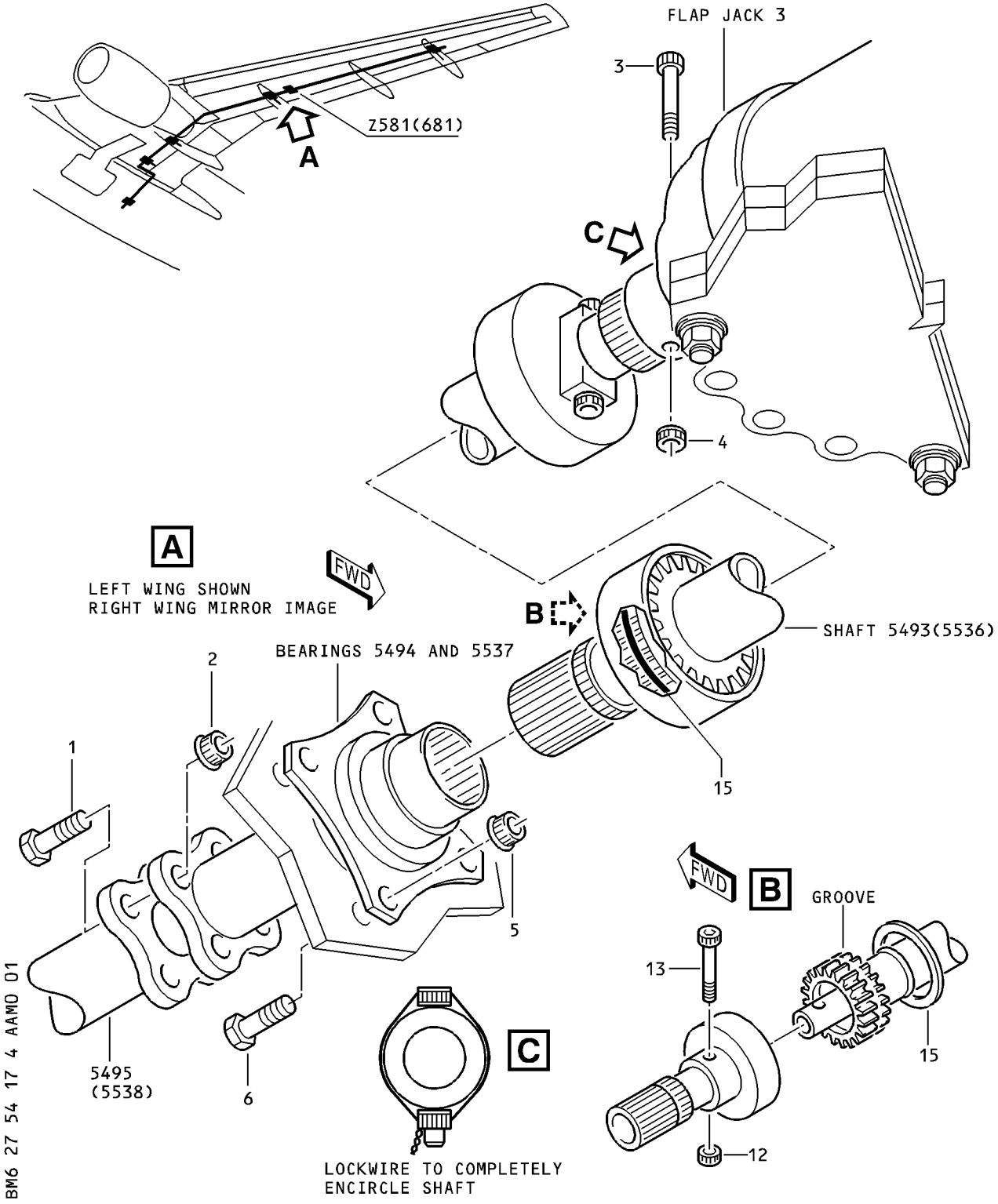
- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)

2. Procedure

(Ref. Fig. 401)
(Ref. Fig. 402)

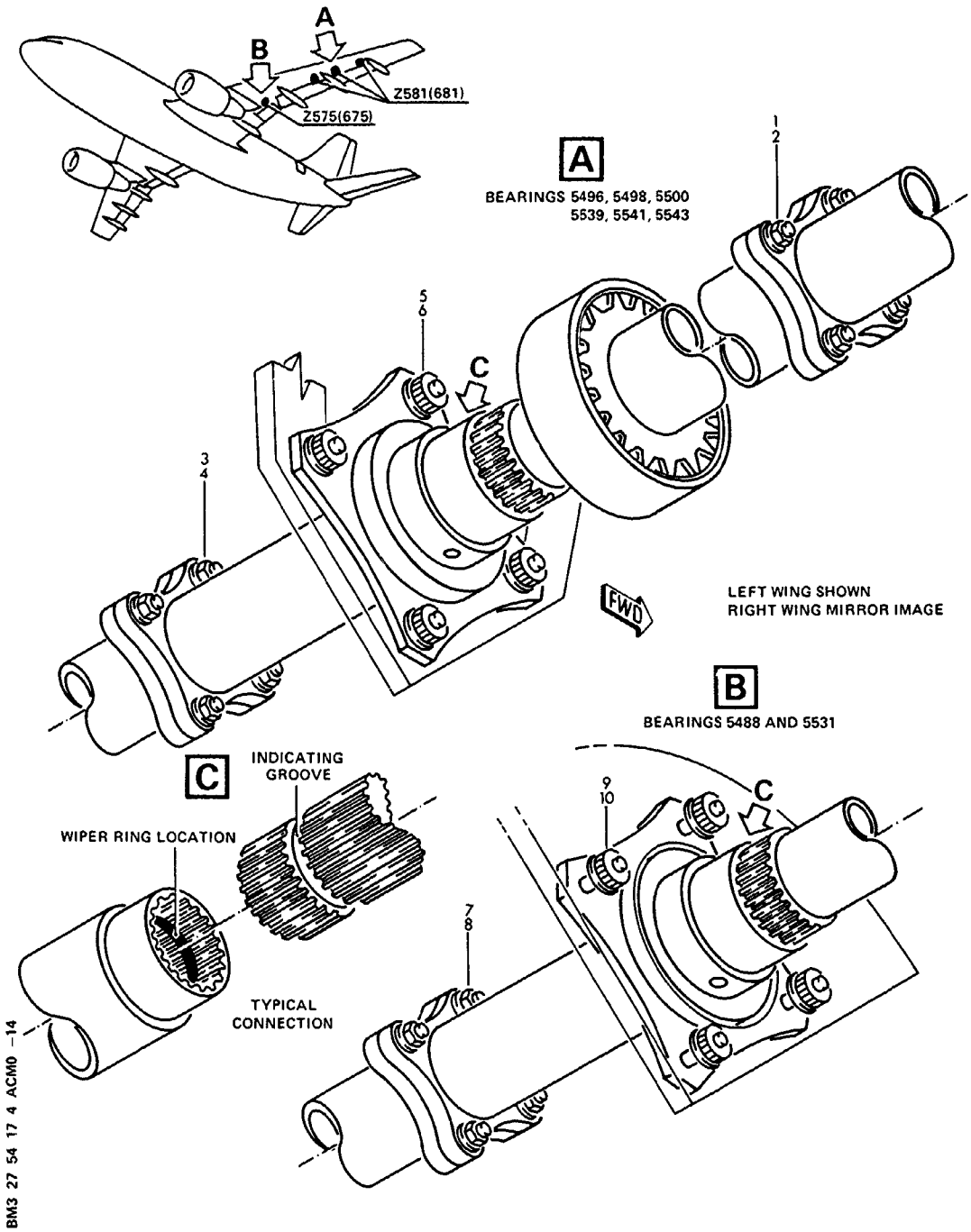
A. Job Set-Up

(1)Extend flaps to 40° position (Ref. 27-50-00,P. Block 301).



Flap Transmission Shaft Steady Bearings-1
Figure 401

R



Flap Transmission Shaft Steady Bearings-2
Figure 402

(2)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)Position access platform.
(5)Open access doors as follows:
(a)for left wing
bearing number 5488 door number 575CB, 575DB.
bearing number 5494 door number 581CB.
bearing number 5496 door number 581CB, 581DB.
bearing number 5498 door number 581FB.
bearing number 5500 door number 581FB, 581GB.
(b)for right wing
bearing number 5531 door number 675CB, 675DB.
bearing number 5537 door number 681CB.
bearing number 5539 door number 681CB, 681DB.
bearing number 5541 door number 681FB.
bearing number 5543 door number 681FB, 681GB.
(6)Install flap drive shaft locking device PN 98A27508060000 between a rib and flap transmission shaft outboard of steady bearing to be removed.

B. Removal

R (1)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can
R move the transmission shafts with your hands.
R (2)For steady bearings 5496, 5498, 5500, 5539, 5541 and 5543, proceed as follows:
(a)Remove four nuts (1) and bolts (2) securing splitter flange inboard of bearing being removed.
(b)Without subjecting crown spline joint to excessive deflection, withdraw drive shaft from bearing.
(c)Support drive shaft outboard of bearing and remove four nuts (3) and bolts (4) securing splitter flange outboard of bearing.
(d)Remove four nuts (5) and bolts (6) securing bearing.
(e)Withdraw bearing from mounting.
R (3)For steady bearings 5494 and 5537, proceed as follows:
(a)Mark both sections of crown spline joint at outboard end of shaft 5493 (5536) to facilitate correct re-assembly later.
(b)Support drive shaft 5495 (5538) outboard of bearing and remove four nuts (2) and bolts (1) securing splitter flange.
(c)Cut and discard lockwire, remove nut (4) and bolt (3) thru splined connection at inboard end of transmission shaft 5493 (5536).
(d)Cut and discard lockwire, remove nut (12) and bolt (13) thru crown spline joint at outboard end of shaft 5493 (5536).

(e)Push inboard section of shaft 5493 (5536) as far as possible into screwjack 3, simultaneously holding outer section of shaft as far outboard as possible so that crown spline joint halves become partially disengaged.
(f)Carefully pivot steady bearing in its housing so that its outer end is deflected upward, allowing full disengagement of crown spline joint halves (it should be possible to attain a 40 deg. deflection of steady bearing from its normal position).
NOTE : During disengagement of crown spline joint halves, take care not to damage wiper ring (15).
(g)Withdraw outer and inner sections of shaft 5493 (5536) from steady bearing and screwjack 3 respectively.
(h)Remove nuts (5) and bolts (6) securing steady bearing.
R (j)Remove steady bearing from aircraft.
R (k)Clean out grease from crown spline joint halves.
R (4)For steady bearings 5488 and 5531, proceed as follows:
(a)Remove four nuts (7) and bolts (8) securing splitter flange outboard of bearing.
(b)Lift drive shaft end clear and support on adjacent structure.
(c)Support inboard drive shaft.
(d)Remove four nuts (9) and bolts (10) and withdraw bearing from mounting.

C. Preparation for Installation
(1)Remove old sealant material from steady bearing mounting surfaces.
(2)In all locations where a sliding splined connection is employed, the female half of the connection incorporates a felt wiper ring. Whenever such a connection has been separated, proceed as follows:
(a)Remove and discard felt wiper ring.
(b)Clean all splined surfaces with white spirit (Material No. 11-002).
(c)Install new wiper ring using appropriate alignment plug.
(3)Clean all splined surfaces of separated drive connections with white spirit (Material No. 11-002).

D. Installation
(1)For steady bearings 5496, 5498, 5500, 5539, 5541 and 5543, proceed as follows:
(a)Apply sealant (Material No. 09-015) to bearing mounting surfaces.
(b)Install steady bearing, secure with bolts (6) and nuts (5).
(c)Apply corrosion preventive (Material No. 05-005) to bolts (6) nuts (5).
(d)Connect splitter flange outboard of bearing, secure with bolts (4) and nuts (3).
(e)TORQUE nuts (3) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(f)Apply corrosion preventive (Material No. 05-005) to bolts (4) and nuts (3).
(g)Apply grease (Material No. 04-018) to splined surfaces.
(h)Without subjecting crown spline joint to excessive deflection, install section of drive shaft inboard of bearing, engaging splined connection such that splitter flange bolt holes are aligned.
R (j)Ensure groove on male portion of splined connection is not visible, indicating adequate engagement.
R (k)If exact alignment of bolt holes cannot be obtained, rotate drive shaft

outboard using flap drive shaft turning jig PN 98A27508050000 as required.

R (l)Connect splitter flange inboard of bearing, secure with bolts (2) and nuts (1).

R (m)TORQUE nuts (1) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).

R (n)Apply corrosion preventive (Material No. 05-005) to bolts (2) and nuts (1).

(2)For steady bearings 5494 and 5537, proceed as follows:

(a)Apply sealant (Material No. 09-015) to steady bearing mounting surfaces.

(b)Install steady bearing, secure with bolts (6) and nuts (5).

(c)Pivot steady bearing in its housing as far as possible (approximately 40°) so that outboard end is tilted upward.

NOTE : Before proceeding with assembly of shaft and steady bearing, make sure that steady bearing is orientated such that bolt holes in splitter flange at its outboard end will align with those in corresponding flange on transmission shaft 5495 (5538) when assembly is complete.

(d)Apply grease (Material No. 04-018) to splined connections at both ends of transmission shaft 5493 (5536).

(e)Pack female half of crown spline joint of transmission shaft 5493 (5536) with grease (Material No. 04-004).

(f)Insert inboard section of transmission shaft as far as possible into screwjack 3 splined connection, making sure that bolt holes in both parts of spline connection are aligned.

(g)Insert outboard section of transmission shaft as far as possible into steady bearing, simultaneously engaging both halves of crown spline joint in each other, making sure that previously applied marks are aligned (it will be necessary to deflect outboard end of shaft downward).

(h)Carefully pivot steady bearing in its housing toward its normal position, simultaneously bringing both halves of the crown spline joint into complete engagement, making sure that wiper ring (15) is not displaced or damaged during engagement.

NOTE : If necessary align wiper ring (15) in its groove using a thin piece of wood.

R (j)Connect splitter flanges at outboard end of steady bearing, secure with bolts (1) and nuts (2).

R (k)TORQUE nuts (2) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).

R (l)Install bolt (13) thru crown spline joint and secure with nut (12).

R (m)TORQUE nut (12) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).

R (n)Install bolt (3) thru splined connection at inboard end of shaft 5493 (5536) and secure with nut (4).

R (p)TORQUE nut (4) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).

R (q)Safety bolts (13),(3) with lockwire.

NOTE : Lockwire must completely encircle shaft.

R (r)Apply corrosion preventive (Material No. 05-005) to bolts (1),(3),(6) and (13) and nuts (2),(4),(5) and (12).

(3)For steady bearings 5488 and 5531, proceed as follows:

(a)Apply sealant (Material No. 09-015) to bearing mounting surfaces.

(b)Apply grease (Material No. 04-018) to splined surfaces.

(c)Install steady bearing in mounting, engaging splined joint such that bolt holes in splitter flange joint outboard of bearing are aligned.
(d)Make sure that groove on male portion of splined connection is not visible, indicating adequate engagement.
(e)If exact alignment of splitter flange bolt holes cannot be obtained, rotate drive shaft outboard of bearing as required, using flap drive shaft turning jig PN 98A27508050000 if necessary.
(f)Secure steady bearing with bolts (10) and nuts (9).
(g)Apply corrosion preventive (Material No. 05-005) to bolts (10) and nuts (9).
(h)Connect splitter flange joint outboard of bearing, secure with bolts (8) and nuts (7).
R (j)TORQUE nuts (7) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
R (k)Apply corrosion preventive (Material No. 05-005) to bolts (8) and nuts (7).

E. Test
(1)Remove flap drive shaft locking device PN 98A27508060000.
(2)Remove safety clips and tags and close circuit breakers 10CV, 5CV and 6CV.
(3)Remove safety guard from flap/slat control lever quadrant.
(4)Perform an operational test of flap system (Ref. 27-54-00, P. Block 501).
(5)Make sure that rigging check pins PN 98A27508015000 can be inserted in flap carriages immediately inboard and outboard of word site.
(6)Remove rigging check pins from flap carriages.

F. Close-Up
(1)Make sure that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access doors as follows:
(a)for left wing:

bearing number 5488	door number 575CB, 575DB.
bearing number 5494	door number 581CB.
bearing number 5496	door number 581CB, 581DB.
bearing number 5498	door number 581FB.
bearing number 5500	door number 581FB, 581GB.

(b)for right wing:

bearing number 5531	door number 675CB, 675DB.
bearing number 5537	door number 681CB.
bearing number 5539	door number 681CB, 681DB.
bearing number 5541	door number 681FB.
bearing number 5543	door number 681FB, 681GB.

(3)Remove access platform.

KINK STEADY BEARING (5490, 5533) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3.5 m (11 ft.)
	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27508015000	Check Pin Set - Flap Neutral Setting
	D. 98A27508050000	Turning Jig - Flap Drive Shaft
	E. 98A27508060000	Locking Device - Flap Drive Shaft
	F. LL550A017	Alignment Plug
	G.	Torque Wrench, 10 to 12.5 Nm (90 to 110 lbf.in.)
	H.	Circuit Breaker Safety Clips and Tags
R	J.	Wiper Rings
R	K. Material No. 04-004	Common Greases (Ref. 20-31-00)
R	L. Material No. 05-005	Special Materials (Ref. 20-31-00)
R	M. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
	Referenced Procedure	
	- 27-50-00, P. Block 301	Flaps
R	- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission
R		(Flaps)

2. Procedure

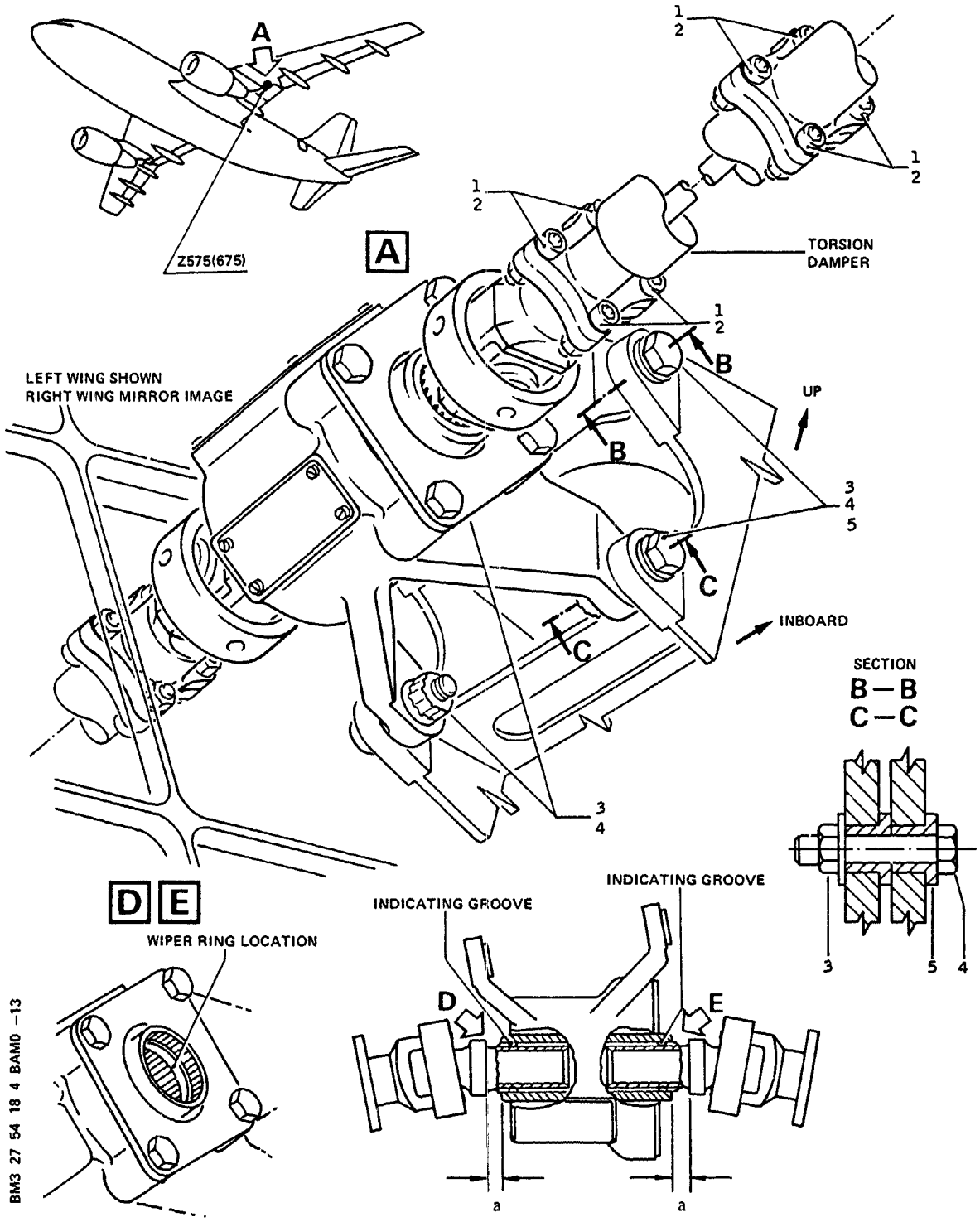
(Ref. Fig. 401)

A. Job Set-Up

(1)Fully extend flaps (Ref. 27-50-00, P. Block 301).

(2)Open safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67



Kink Steady Bearing
Figure 401

(3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)Position access platform.
(5)Open access doors 575DB and 581AB left wing, 675DB and 681AB right wing.
(6)Install flap drive shaft locking device PN 98A27508060000 between a rib and flap transmission shaft outboard of kink steady bearing.

B. Removal

R (1)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can move the transmission shafts with your hands.
R (2)Remove nuts (1) and bolts (2) from splitter flanges at both ends of torsion damper inboard of kink steady bearing.
R (3)Remove torsion damper.
R (4)Withdraw splined universal joint assembly from inboard side of kink steady bearing.
R (5)Support drive shaft outboard of kink steady bearing.
R (6)Support kink steady bearing and remove four nuts (3), bolts (4) and two bushes (5) from mounting bracket.
R (7)Carefully manoeuvre kink steady bearing clear of mountings then inboard to disengage from splines on outboard drive shaft.

C.Preparation for Installation.

(1)If same kink steady bearing is to be re-installed, remove and discard felt wiper rings from splined drive connections of kink steady bearing.
(2)Clean all splined surfaces of separated connections using white spirit (Material No. 11-002).
(3)Install new wiper rings in kink steady bearing using alignment plug PN LL550A017.

D. Installation

(1)Apply grease (Material No. 04-004) to splined surfaces.
(2)Engage splines on outboard side of kink steady bearing with splines on flap drive shaft and position bearing in mounting bracket.
(3)Support kink steady bearing and install two bushes (5) in inboard mounting bracket holes.
(4)Secure kink steady bearing with four bolts (4) and nuts (3) making sure that longer bolts are installed in inboard positions.
(5)Apply corrosion preventive (Material No. 05-005) to bolts (4) and nuts (3).
(6)Insert splined universal joint in inboard side of kink steady bearing such that when inboard section of flap drive shaft is installed, splitter flange holes at both ends will line up.
(7)If exact alignment of holes cannot be attained, rotate flap drive shaft outboard of kink steady bearing, using turning jig PN 98A27508050000 if necessary, until holes are in alignment.
CAUTION : TORSION DAMPER MUST BE INSTALLED WITH LARGE DIAMETER END OUTBOARD.
(8)Install torsion damper inboard of kink steady bearing and secure with bolts (2) and nuts (1).

(9)TORQUE nuts to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(10)Check dimension 'a' (Ref. Fig. 401) is not less than 5 mm (0.197 in.).
(11)Make certain that groove on male half of splined connections is inside female half of connections indicating adequate spline engagement.
(12)Apply corrosion preventive (Material No. 05-005) to bolts (2) and nuts (1).

E. Close-Up
(1)Remove flap drive shaft locking device PN 98A27508060000.
(2)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(3)Close access doors 575DB and 581AB left wing, 675DB and 581AB right wing.
(4)Remove access platform.
(5)Remove safety clips and tags and close circuit breakers 10CV, 6CV and 5CV.
(6)Remove safety guard from flap/slat control lever quadrant.
(7)Retract flaps (Ref. 27-50-00, P. Block 301).
(8)Make certain that it is possible to insert check pins PN 98A27508015000 in carriages 2 and 3.
(9)Remove check pins from carriages 2 and 3.
(10)Do the operational test of the flap system (Ref. 27-54-00, P. Block 501).

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Reason for the Job

A. Resetting of an activated flap screwjack torque limiter on a jammed flap transmission system.

B. Disconnection/connection of transmission shafts, which may become necessary during trouble shooting procedure.

2. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3.5 to 4.6 m (11 to 15 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27508015000	Check Pin Set - Flap Neutral Setting
	C.	Torque Wrench, 7.33 to 12.5 Nm (65 to 110 lbf.in.)
	D.	Safety Barriers
	E.	Circuit Breaker Safety Clips and Tags
	F.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	G. Material No. 04-018	Common Greases (Ref. 20-31-00)
	H. Material No. 05-005	Special Materials (Ref. 20-31-00)
	I. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

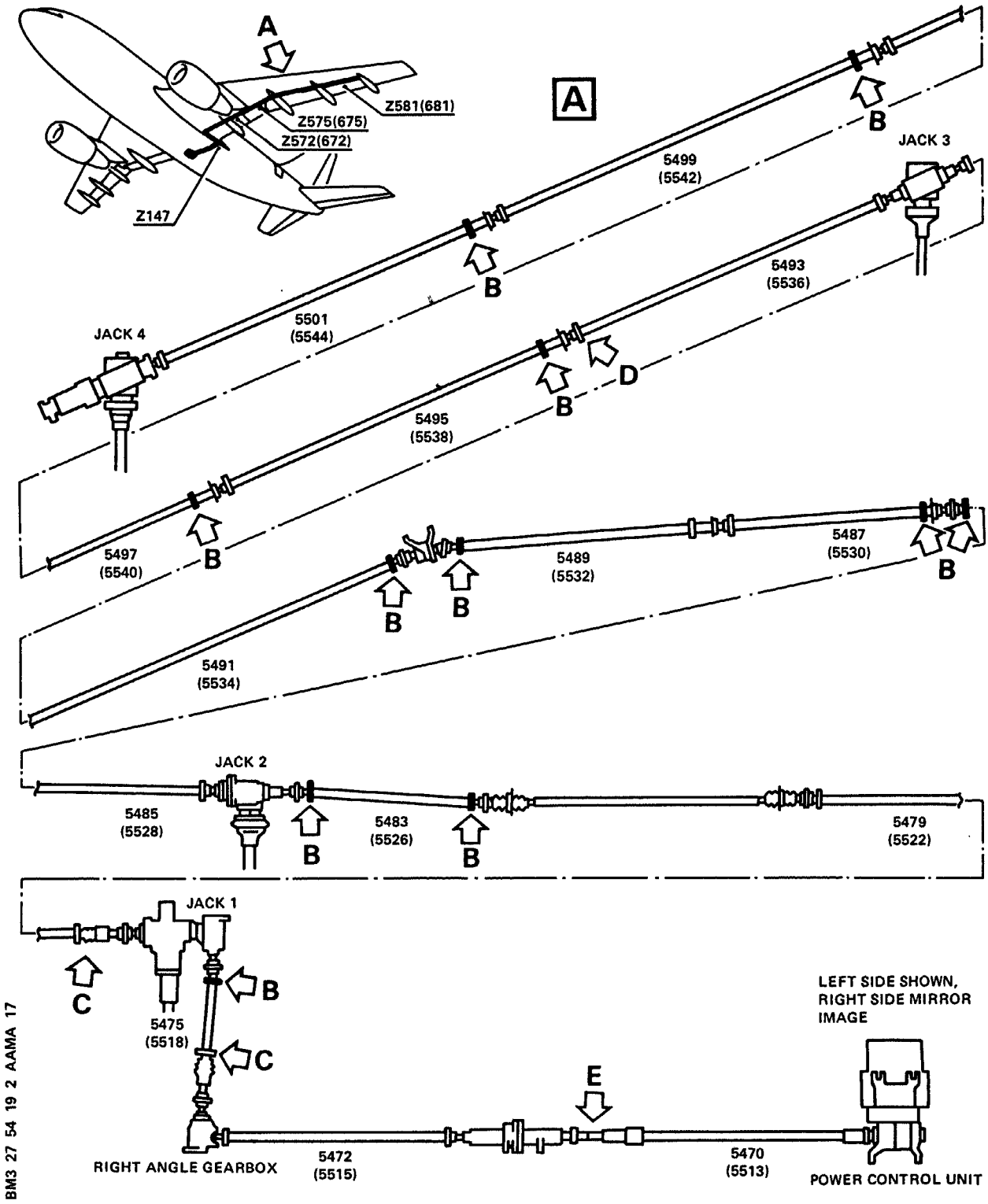
Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-50-00, P. Block 501	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

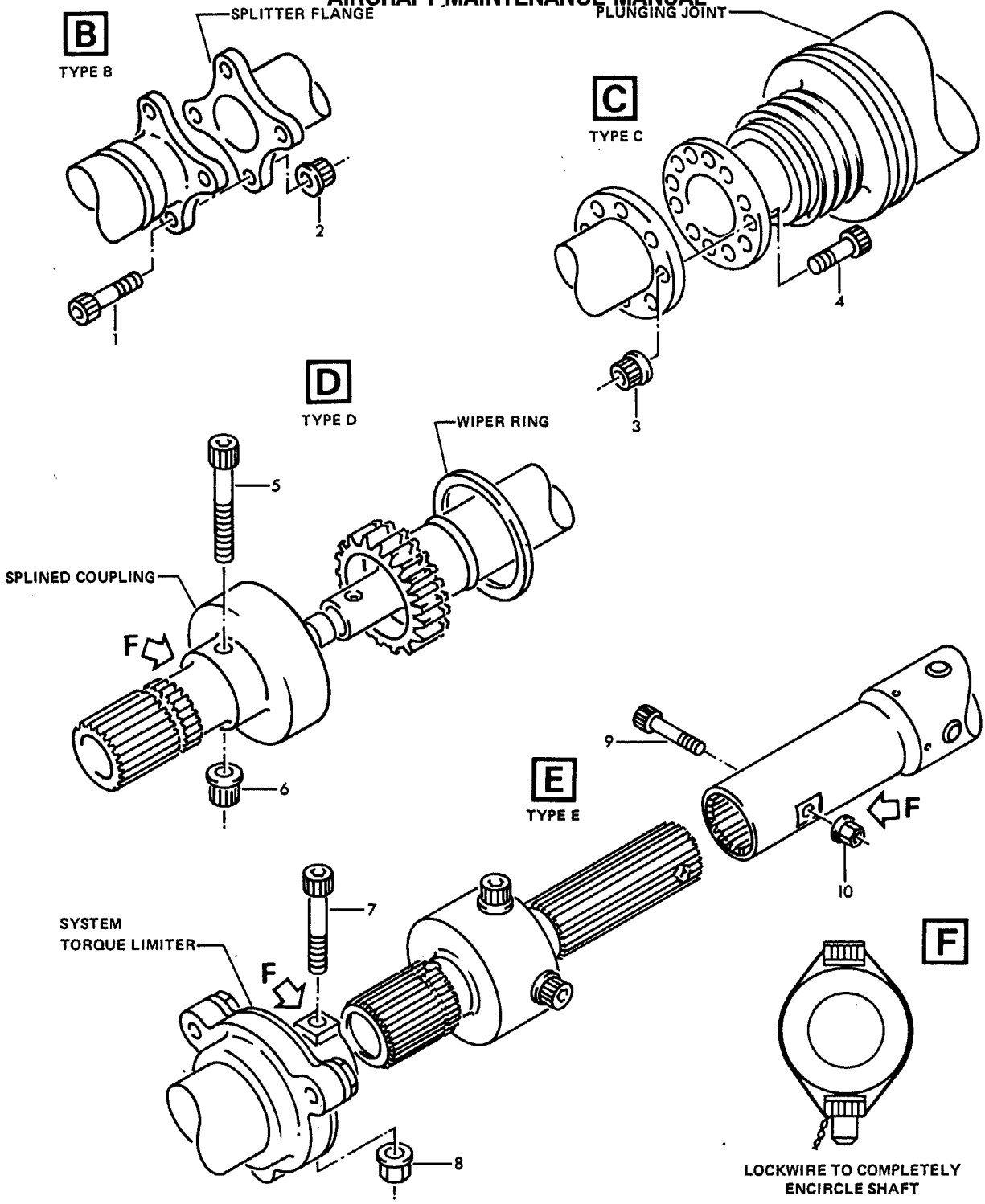
3. Procedure

(Ref. Fig. 201) (Sheet 1/2)
(Ref. Fig. 201) (Sheet 2/2)

NOTE : Disconnection/connection is described for the LH system.



Flap Drive Transmission Shafts Connections
(Sheet 1/2)
Figure 201



Flap Drive Transmission Shafts Connections
(Sheet 2/2)
Figure 201

Variations for the RH system are described in brackets.

A. Job Set-Up
(1)Position safety barriers.
(2)Open, safety and tag the following circuit breakers:

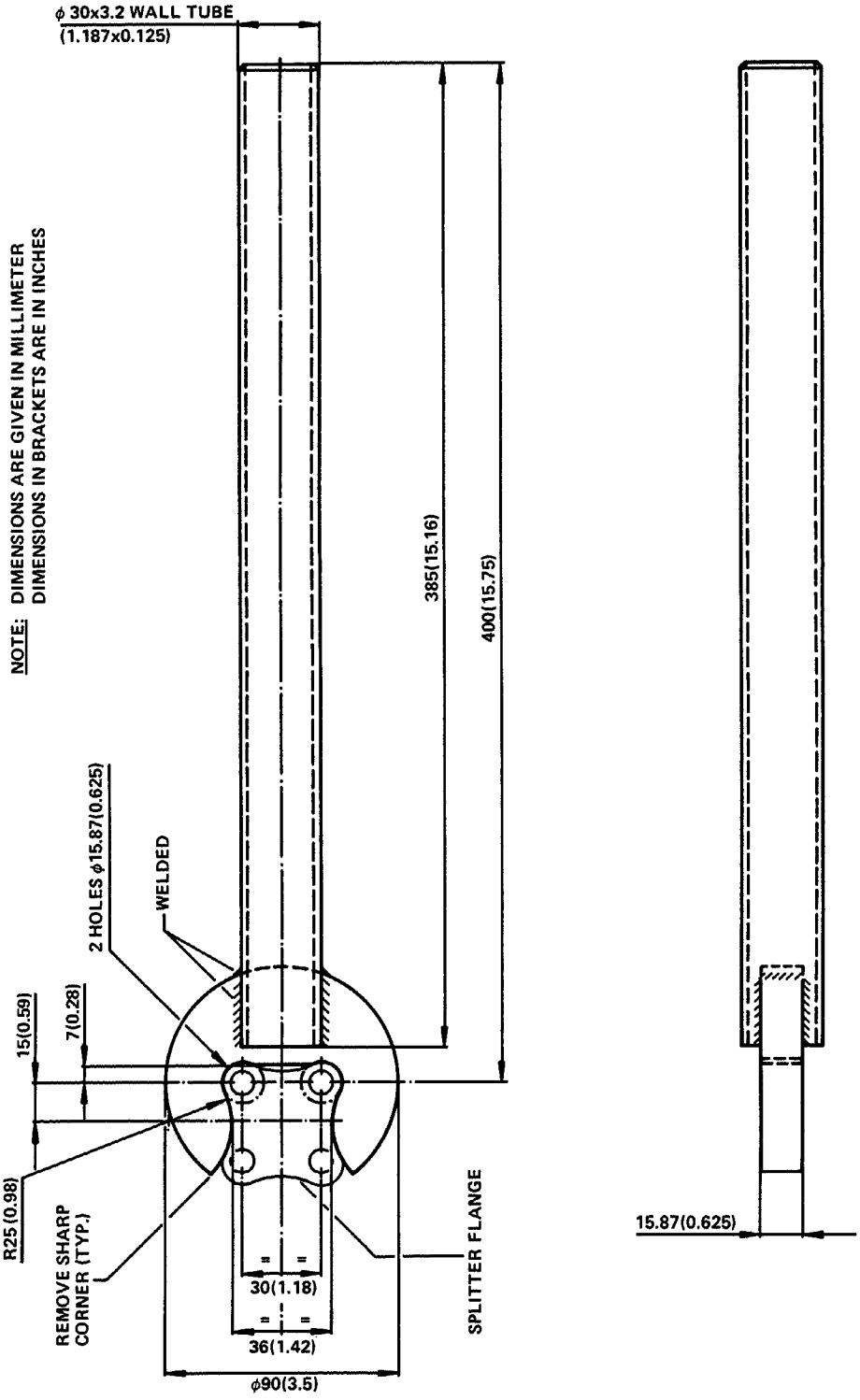
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)For transmission shaft connections on transmission shafts situated inboard of right angle gearbox, proceed as follows:
(a)Open LH (RH) main gear main door (Ref. 32-12-11, P. Block 301) to gain access to shaft 5470 (5513).
(5)For transmission shaft connections on transmission shafts situated outboard of right angle gearbox, proceed as follows:
(a)Position access platform.
(b)Open access doors necessary to gain access to shafts to be disconnected:
NOTE : If flaps are in a position other than 0°, it may not be necessary to open access doors.
shaft number 5501 (5544): access door 581GB (681GB)
shaft number 5499 (5542): access door 581FB (681FB)
shaft number 5497 (5540): access door 581DB (681DB)
shaft number 5495 (5538): access door 581CB (681CB)
shaft number 5493 (5536): access door 581CB (681CB)
shaft number 5491 (5534): access doors 581AB (681AB)
575DB (675DB)
torsion damper 5489 (5532): access door 575DB (675DB)
shaft number 5487 (5530): access door 572DB (672DB)
shaft number 5485 (5528): access door 572DB (672DB)
shaft number 5483 (5526): access door 572CB (672CB)
shaft number 5479 (5522): access doors 572AB (672AB)
572BB (672BB)
shaft number 5475 (5518): access door 577AB (677AB)

R WARNING : MAKE SURE THAT THE TRANSMISSION SYSTEM IS CLEAR OF PERSONS AND/OR
R EQUIPMENT. MOVEMENT OF THE TRANSMISSION SYSTEM CAN CAUSE
R INJURY AND/OR DAMAGE.

B. Resetting of an Activated Flap Screwjack Torque Limiter on a Jammed Flap Transmission System

(Ref. Fig. 202)
(1)Put one special spanner on the first splitter flange connection inboard (or outboard) of the affected screwjack.



BM3 27 54 19 2 ACM0 19

Special Spanner
Figure 202

(2)Turn the special spanner in the direction the flap screwjack torque limiter indicator shows to take the torque load.
(3)Hold the torque load and reset the flap screwjack torque limiter indicator.
(4)Release the torque load of the transmission system as far as the structure allows.
(5)If necessary put a second special spanner on the next possible connection of the splitter flanges and hold the torque load.
(6)Remove the first special spanner and release the torque load with the second special spanner.
(7)If necessary do the steps above again to release the complete torque load.

NOTE : The torque load is released after a maximum of 120 degrees.

(8)Make sure that all flap screwjack torque limiter indicators are resetted.
(9)Make sure that the system torque limiter lockout indicators are not popped out. Reset it, if necessary.

C. Disconnection/Connection of a Jammed Flap Transmission System

NOTE : The following procedure describes the restoration of a jammed flap transmission system after screwjack 2, 3 or 4 have locked out.

NOTE : The following procedure is not necessary if you do the procedure at step B. above.

(1)Select a type B splitter flange connection (inboard of the locked-out flap screwjack) where the disconnection will be performed.

NOTE : At least one splitter flange connection must be between the disconnection point and the locked-out flap screwjack.

(2)Make a reference mark on both sides of splitter flanges.
(3)Remove nuts (2) from splitter flanges.
(4)Use two special spanners as shown (Ref. Fig. 202) or suitable adjustable spanners and install on splitter flanges, one inboard and one outboard of the disconnection point.
(5)Carefully apply and maintain a torque on spanners in opposite direction to each other until bolts (1) in splitter flanges are loose.
(6)Remove bolts (1).
(7)Release torque progressively on both spanners.
(8)Reset appropriate flap screwjack torque limiter and system torque limiter indicator.
(9)Align splitter flanges using reference mark made in step (2), if necessary rotate flap transmission system outboard of the splitter flange connection.
(10)Install bolts (1) and nuts (2). Do not torque nuts (2) at this stage.
(11)To check flap neutral position outboard of the splitter flange connection proceed as follows:
(a)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(b)Remove appropriate fairing plug
532BR (632BL) - fairing 2
533BL (633BL) - fairing 3

535BL (635BL) - fairing 5

(c)Install appropriate check pin(s) from check pin set PN 98A27508015000 in track/carriage rigging holes.

(d)Remove check pin(s). If check pin(s) cannot be installed, adjust flap drive system (Ref. 27-50-00, P. Block 501).

(e)Install fairing plug removed at step (b) above.

(12)TORQUE nuts (2) to between 10 and 12.5 Nm (91 and 110 lbf.in.).

(13)Apply corrosion preventive (Material No. 05-005) to bolts (1) and nuts (2).

R WARNING : MAKE SURE THAT THE TRANSMISSION SYSTEM IS CLEAR OF PERSONS AND/OR
R EQUIPMENT. MOVEMENT OF THE TRANSMISSION SYSTEM CAN CAUSE
R INJURY AND/OR DAMAGE.

D. Disconnection/Connection of Individual Flap Transmission System Components

(1)Disconnection

NOTE : If shafts are to be rotated after disconnection, they must be suitably supported.

(a)Before any connection is disturbed, apply a mark on both sides to be separated, to facilitate re-connection in the same position.

(b)For connection type B, proceed as follows:

1 Remove nuts (2) and bolts (1) securing splitter flange.

2 Without subjecting crown spline joint to undue deflection, displace shaft sideways to separate splitter flanges.

(c)For connection type C, proceed as follows:

1 Remove nuts (3) and bolts (4) securing special flange connection at plunging joint.

2 Depress plunging joint to separate special flanges.

(d)For connection type D, proceed as follows:

1 Cut, remove and discard lockwire safetying bolts (5) and nut (6).

2 Remove nut (6) and bolt (5) thru splined coupling.

3 Move splined coupling in an outboard direction and separate halves of crown spline joint.

NOTE : Take care not to damage wiper ring.

(e)For connection type E, proceed as follows:

1 Cut, remove and discard lockwire safetying bolt (7) and nut (8).

2 Remove nut (8) and bolt (7) thru splined shaft connection.

3 Cut, remove and discard lockwire safetying bolt (9) and nut (10).

4 Remove nut (10) and bolt (9) securing telescopic section of shaft.

5 Collapse telescopic section of shaft and disengage splined connection at System Torque Limiter.

(2)Preparation for Connection

(a)Using white spirit (Material No. 11-002) clean all splined surfaces of connections which have been separated.

(b)For connection type D, proceed as follows:

1 Pack crown spline joint with grease (Material No. 04-018).

(c) For connection type E, proceed as follows:

1 Apply grease (Material No. 04-018) to splined surfaces.

(3)Connection

(a)For connection type B, proceed as follows:

1 Without subjecting crown spline joint to undue deflection, replace shaft sideways to re-align splitter flanges as previously marked

in C.(1)(a).
2 Secure splitter flange connection with bolts (1) and nuts (2).
3 TORQUE nuts (2) to between 10 and 12.5 Nm (91 and 110 lbf.in.).
4 Apply corrosion preventive (Material No. 05-005) to bolts (1) and nuts (2).

(b)For connection type C, proceed as follows:
1 Position special flange as previously marked in C.(1)(a).
2 Secure special flanges with bolts (4) and nuts (3).
3 TORQUE nuts (3) to between 10 and 12.5 Nm (91 and 110 lbf.in.).
4 Apply corrosion preventive (Material No. 05-005) to bolts (4) and nuts (3).

(c)For connection type D, proceed as follows:
1 Move splined coupling in an inboard direction and position halves of crown spline joint as previously marked in C.(1)(a).
2 Secure crown spline joint with bolt (5) and nut (6).
3 TORQUE nut (6) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
4 Safety bolt (5) with lockwire.
NOTE : Lockwire is to completely encircle shaft.

(d)For connection type E, proceed as follows:
1 Extend telescopic section of shaft and re-engage splined connection at system torque limiter as previously marked in C.(1)(a).
2 Secure splined shaft connection with bolt (7) and nut (8).
3 Secure telescopic section of shaft with bolt (9) and nut (10).
4 TORQUE nuts (8),(10) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
5 Safety bolts (7),(9) with lockwire.
NOTE : Lockwire is to completely encircle shaft.
6 Apply corrosion preventive (Material No. 05-005) to bolts (7),(9) and nuts (8),(10).

E. Test
(1)Remove safety guard from flap/slat control lever quadrant.
(2)Remove tags and safety clips and close circuit breakers 10CV, 5CV, 6CV.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGE OF SURFACES IS CLEAR.
(3)Carry out the operational test of the flap system (Ref. 27-54-00, P. Block 501).

F. Close-Up
(1)Make sure that work area is clean and clear of tools and miscellaneous items of equipment.
(2)For transmission shaft connections on transmission shafts situated inboard of right angle gearbox, proceed as follows:
(a)Close main gear main door (Ref. 32-12-11, P. Block 301).
(3)For transmission shaft connections on transmission shafts situated outboard of right angle gearbox, proceed as follows:
(a)Close access doors that were opened in A(4)(b).
(4)Remove access platform.
(5)Remove safety barriers.

TRANSMISSION SHAFTS (5470, 5472, 5475, 5479 THRU 5501 (ODD NOS. ONLY) 5513, 5515, 5518, 5522 THRU 5544 (EVEN NOS. ONLY)) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

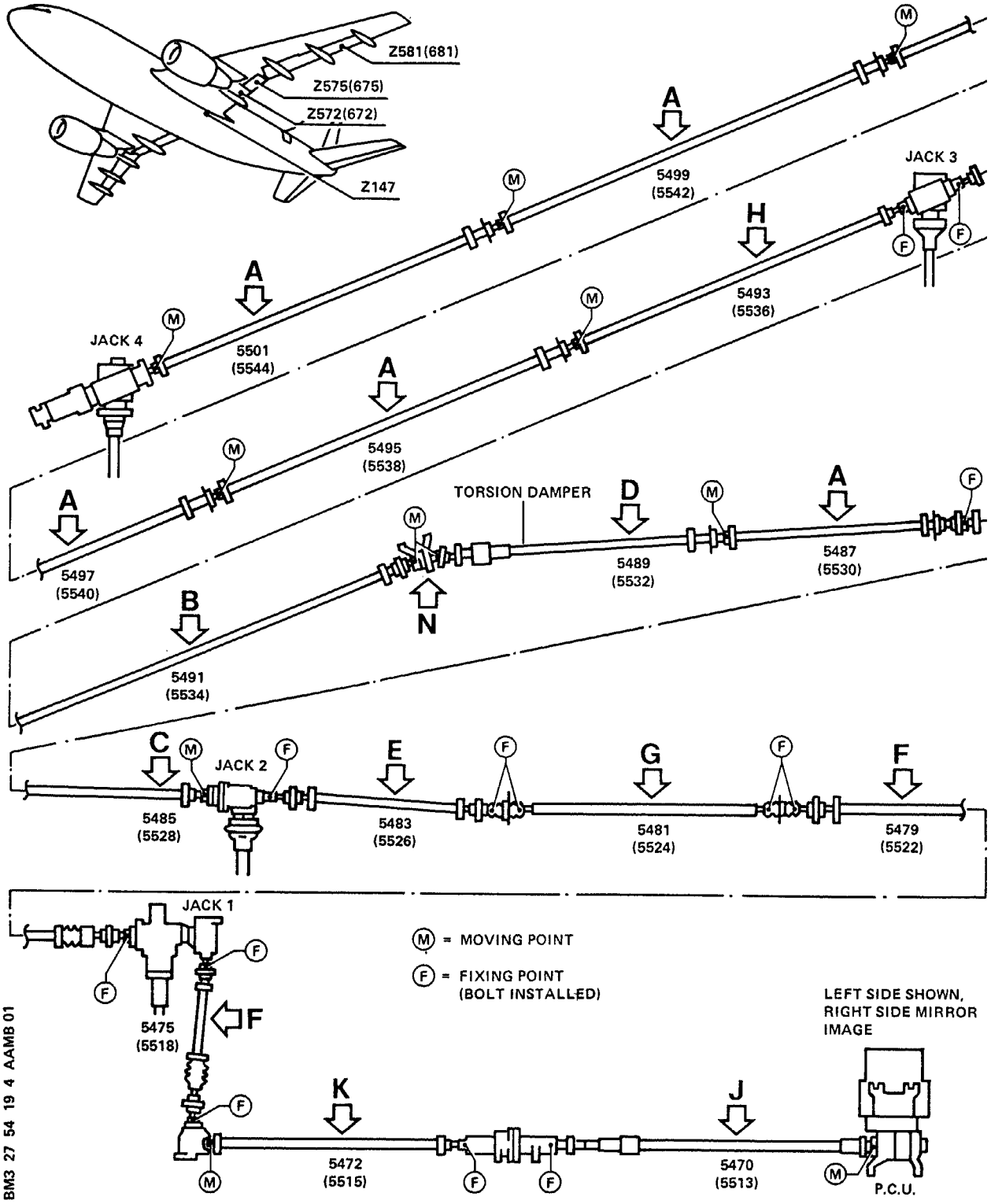
	ITEM	DESIGNATION
	A.	Access Platform, 3.5 to 4.6 m (11 to 15 ft.)
	B. 98A27508015000	Check Pin Set - Flap Neutral Setting
	C. 98A27508050000	Turning Jig - Flap Drive Shaft
	D. 98A27508060000	Locking Device - Flap Drive Shaft
	E. 55914S0000	Alignment Plug
	F. LL550A017	Alignment Plug
	G. LL551A036	Alignment Plug
	H.	Torque Wrench, 7.33 to 12.4 Nm (65 to 110 lbf.in.)
R	J.	Safety Barriers
R	K.	Circuit Breaker Safety Clips and Tags
R	L.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
R	M.	Wiper Rings
R	N. Material No. 04-018	Common Greases (Ref. 20-31-00)
R	P. Material No. 05-005	Special Materials (Ref. 20-31-00)
R	Q. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

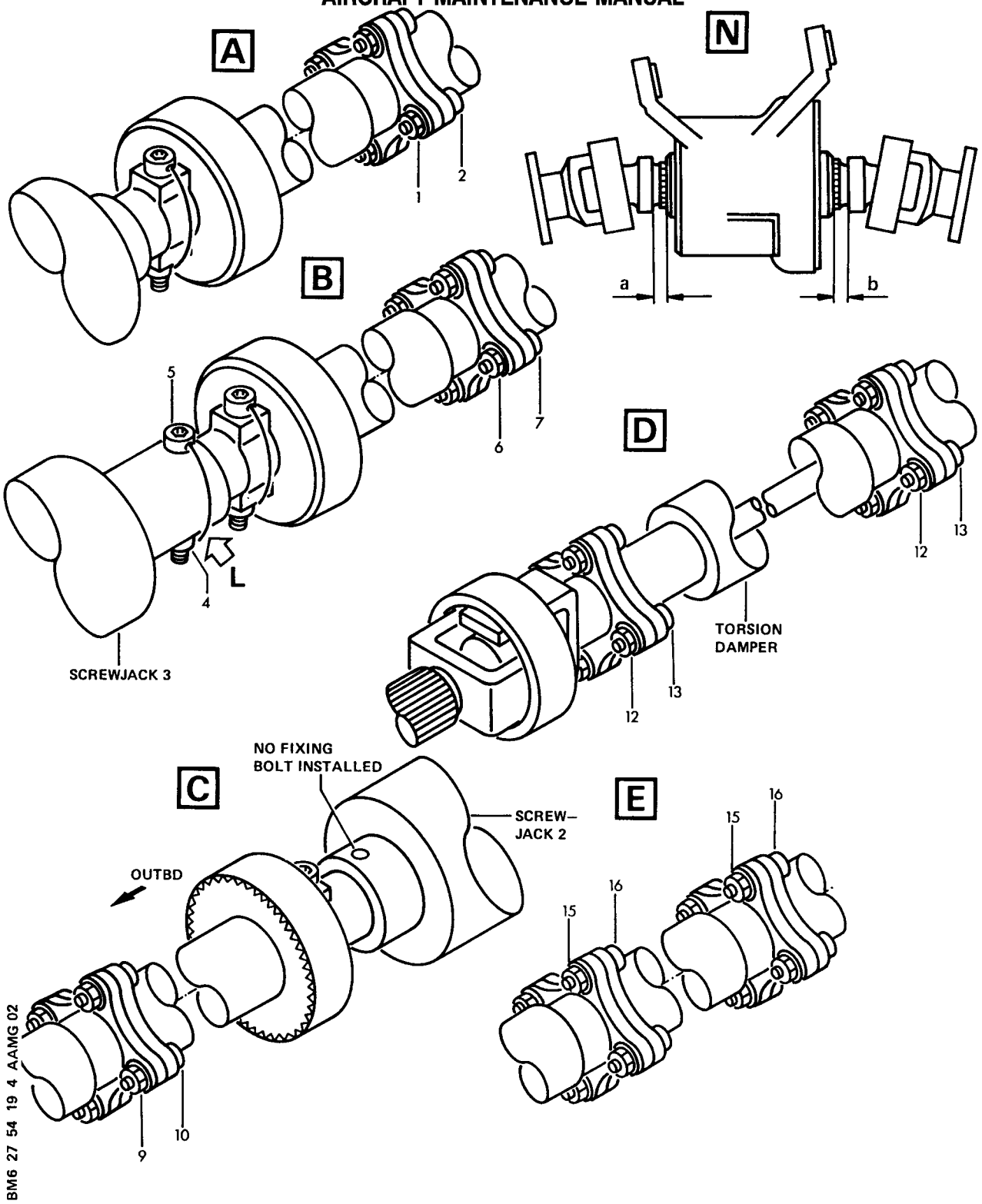
	- 27-50-00, P. Block 301	Flaps
R	- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission
R		(Flaps)
	- 27-54-12, P. Block 401	Torque Limiter
	- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401) (Sheet 1/4)
(Ref. Fig. 401) (Sheet 2/4)
(Ref. Fig. 401) (Sheet 3/4)
(Ref. Fig. 401) (Sheet 4/4)

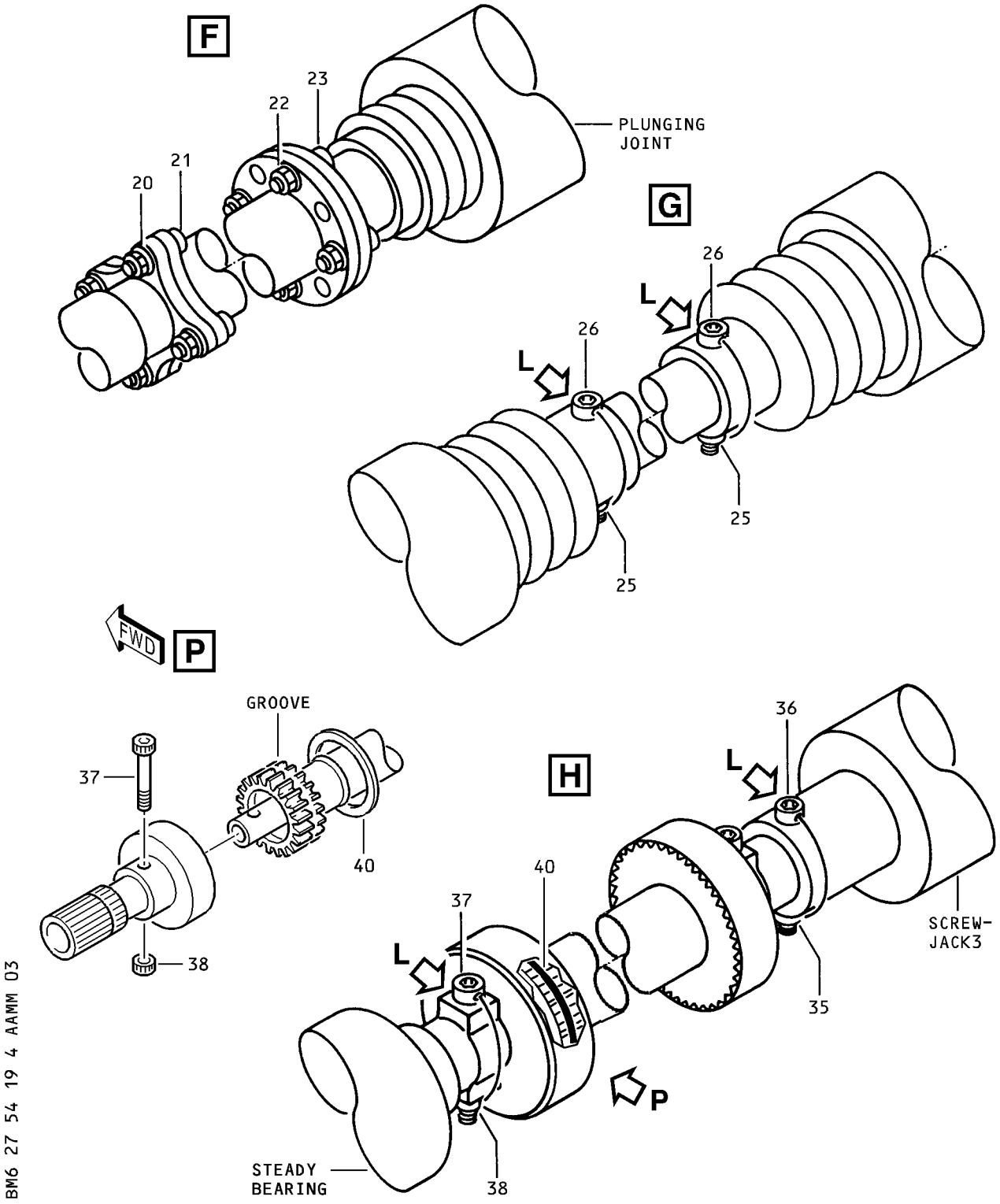


Flap Drive Transmission Shafts (Sheet 1/4)
Figure 401



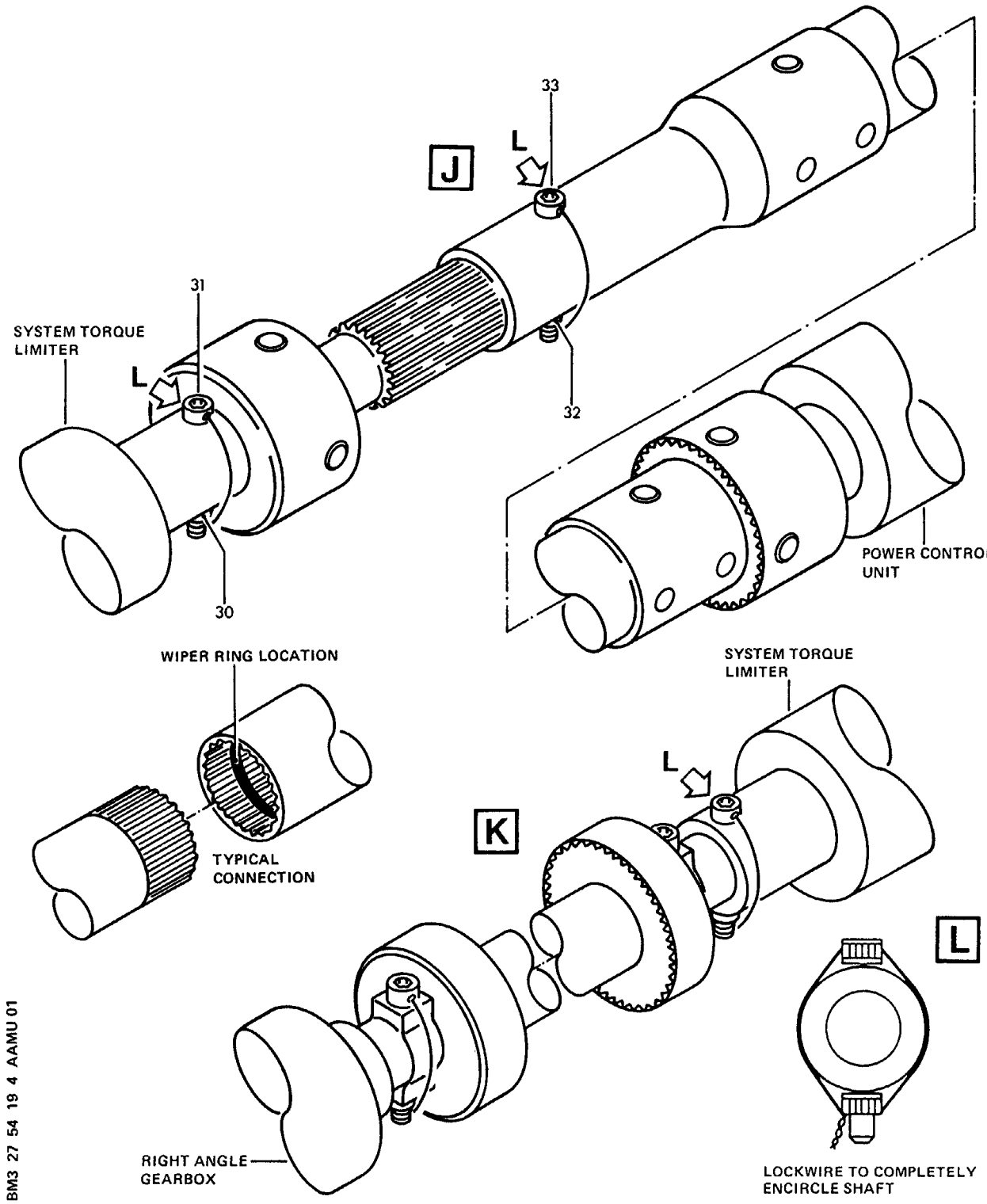
Flap Drive Transmission Shafts (Sheet 2/4)
Figure 401

R



Flap Drive Transmission Shafts (Sheet 3/4)
Figure 401

R



Flap Drive Transmission Shafts (Sheet 4/4)
Figure 401

A. Job Set-Up

(1)For transmission shafts situated outboard of screwjack 1, proceed as follows:

(a)Position safety barriers.

(b)Fully extend flaps (Ref. 27-50-00, P. Block 301).

(c)Position access platform.

(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(2)For transmission shafts located inboard of right angle gearbox, proceed as follows:

(a)Open main gear main doors (Ref. 32-12-11, P. Block 301).

(b)Position access platform.

(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(3)Open following access doors:

shaft number 5501: access doors 581GB, 581HB
shaft number 5544: access doors 681GB, 681HB
shaft number 5499: access doors 581FB, 581GB
shaft number 5542: access doors 681FB, 681GB
shaft number 5497: access doors 581DB, 581EB, 581FB
shaft number 5540: access doors 681DB, 681EB, 681FB
shaft number 5495: access doors 581CB, 581DB, 581EB
shaft number 5538: access doors 681CB, 681DB, 681EB
shaft number 5493: access doors 581CB, 581DB
shaft number 5536: access doors 681CB, 681DB
shaft number 5491: access doors 581AB, 581BB
shaft number 5534: access doors 681AB, 681BB
torsion damper 5489: access doors 575CB, 575DB
torsion damper 5532: access doors 675CB, 675DB
shaft number 5487: access doors 572DB, 575CB
shaft number 5530: access doors 672DB, 675CB
shaft number 5485: access door 572DB
shaft number 5528: access door 672DB
shaft number 5483: access doors 572AB, 572BB, 572CB
shaft number 5526: access doors 672AB, 672BB, 672CB
shaft number 5481: access doors 572BB, 572CB
shaft number 5524: access doors 672BB, 672CB

shaft number 5479: access doors 572AB, 572BB
shaft number 5522: access doors 672AB, 672BB

(4)For shaft numbers 5475 and 5518, proceed as follows:
(a)Position access platform.

(b)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(5)Applicable for all shafts:
Install the flap drive shaft locking device PN 98A27508060000 on the wing between a rib and shaft outboard of the shaft to be removed.

B. Removal

R (1)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can
R move the transmission shafts with your hands.
R (2)For transmission shafts 5501, 5499, 5497, 5495, 5487, 5544, 5542, 5540, 5538 and 5530, proceed as follows:
(a)Remove four nuts (1) and bolts (2) securing splitter flange at inboard end of shaft.
(b)Without subjecting crown spline joint to undue deflection, displace end of shaft until splitter flange halves are clear of each other and withdraw shaft from splined connection at outboard end.
(c)Remove shaft from aircraft.
R (3)For transmission shafts 5491 and 5534, proceed as follows:
(a)Cut and discard lockwire and remove nut (4) and bolt (5) thru splined connection at outboard end of shaft.
(b)Remove four nuts (6) and bolts (7) securing splitter flange at inboard end of shaft.
(c)Without subjecting crown spline joint to undue deflection, displace end of shaft until splitter flange halves are clear of each other and withdraw shaft from splined connection at outboard end.
(d)Withdraw universal joint assembly from kink steady bearing.
R (4)For transmission shafts 5485 and 5528, proceed as follows:
(a)Remove four nuts (9) and bolts (10) securing splitter flange at outboard end of shaft.
(b)Without subjecting crown spline joint to undue deflection, displace end of shaft until splitter flange halves are clear of each other and withdraw shaft from splined connection at inboard end.
(c)Remove shaft from aircraft.
(5)For torsion damper 5489 and 5532, proceed as follows:
(a)Remove four nuts (12) and bolts (13) securing splitter flanges at both ends of torsion damper.
(b)Remove torsion damper from aircraft.

(c)Withdraw universal joint assembly from kink steady bearing.

R (6)For transmission shafts 5483 and 5526, proceed as follows:
(a)Remove four nuts (15) and bolts (16) securing splitter flanges at both ends of shaft.
(b)Remove shaft from aircraft.

R (7)For transmission shafts 5475, 5479, 5518 and 5522, proceed as follows:
(a)Remove four nuts (20) and bolts (21) securing splitter flange.
(b)Remove four nuts (22) and bolts (23) securing special flange connection at plunging joint.
(c)Remove shaft from aircraft.

R (8)For shafts 5481 and 5524 proceed as follows:
(a)Cut and discard lockwire and remove nut (25) and bolt (26) securing shaft splined connection to sliding bearings at both ends of shaft.
(b)Slide shaft outboard as far as possible.
(c)Disengage splines at inboard end of shaft by compressing inboard sliding bearing assembly.
(d)Withdraw shaft from outboard sliding bearing assembly and remove shaft from aircraft.

R (9)For shafts 5470 and 5513, proceed as follows:
(a)Cut and discard lockwire. Remove nut (30) and bolt (31) thru splined connection at outboard end of shaft.
(b)Cut and discard lockwire. Remove nut (32) and bolt (33) securing telescopic section of shaft.
(c)Collapse telescopic section of shaft and disengage splined connections at both ends.
(d)Remove shaft from aircraft.

R (10)For shafts 5472 and 5515, proceed as follows:
(a)Remove shaft 5470 (left), or 5513 (right) (Ref. step (8) above).
(b)Remove system torque limiter (Ref. 27-54-12, P. Block 401).
(c)Disengage shaft splined connection at outboard end and withdraw shaft.

R (11)For shafts 5493 and 5536, proceed as follows:
(a)Remove shaft 5495 (left wing) or 5538 (right wing) (Ref. step (1).
(b)Cut and discard lockwire and remove nut (35) and bolt (36) thru splined connection at inboard end of shaft.
(c)Cut and discard lockwire and remove nut (38) and bolt (37) securing crown spline joint at outboard end of shaft.
(d)Separate halves of crown spline joint by rotating outboard end of steady bearing assembly upward, simultaneously rotating portion of shaft immediately inboard of crown spline joint downward.
NOTE : During disengagement of spline joint halves, take care not to damage wiper ring (40).
(e)Withdraw shaft from spline connection at inboard end (jack 3).
(f)Withdraw remaining portion of shaft assembly from inboard side of steady bearing.

C. Preparation for Installation
(1)In locations where a sliding splined connection is employed, the female half of the connection incorporates a felt wiper ring. Whenever such connections have been separated, the wiper ring must be removed and after cleaning the splined surfaces with white spirit (Material No. 11-002) a new wiper ring must be installed using the

appropriate alignment plug.

(2)For shafts 5493 and 5536, proceed as follows:

(a)Cut and discard lockwire and remove nut (38) and bolt (37) securing halves of crown spline joint at outboard end.

(b)Separate crown spline joint halves.

(c)Pack crown spline joint with grease (Material 04-018).

(3)For shafts 5470 and 5513, proceed as follows:

(a)Cut and discard lockwire and remove nut (32) and bolt (33) securing telescopic section of shaft.

(b)Fully collapse telescopic section of shaft.

(4)Clean all splined surfaces of connections which have been separated using white spirit (Material No. 11-002).

D. Installation

NOTE : Loosen the flap drive shaft locking device if the transmission system outboard of the installed drive shaft must be rotated for alignment and tighten it again after alignment.

(1)For transmission shafts 5501, 5499, 5497, 5495, 5487, 5544, 5542, 5540, 5538 and 5530, proceed as follows:

(a)Apply grease (Material No. 04-018) to splined surfaces.

(b)Without subjecting crown spline joint to undue deflection, insert outboard end of shaft into steady bearing, making sure that bolt holes in splitter flanges are aligned.

(c)If exact alignment of bolt holes cannot be attained, rotate drive shaft outboard the minimum amount necessary using turning jig PN 98A27508050000 if required.

(d)Secure splitter flange using bolts (2) and nuts (1).

(e)TORQUE nuts (1) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).

(f)Make sure that indicator groove on male portion of splined connection is not visible, indicating adequate engagement.

(g)Apply corrosion preventive (Material No. 05-005) to bolts (2) and nuts (1).

(2)For transmission shafts 5491 and 5534, proceed as follows:

(a)Apply grease (Material No. 04-018) to splined surfaces of universal joint assembly.

(b)Install universal joint assembly in kink steady bearing such that when transmission shaft is installed, splitter flange bolt holes will be aligned.

(c)If exact alignment cannot be attained, rotate transmission shaft inboard of kink steady bearing the minimum amount necessary using turning jig PN 98A27508050000 if required.

(d)Without subjecting crown spline joint to undue deflection, install drive shaft, making certain that bolt hole thru splined connection at outboard end is aligned in male and female sections.

(e)Secure splined connection at outboard end of shaft with bolt (5) and nut (4).

(f)TORQUE nut (4) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).

(g)Safety with lockwire.

NOTE : Lockwire is to completely encircle shaft.

(h)Apply corrosion preventive (Material No. 05-005) to bolt (5) and nut (4).

(j)Secure splitter flange with bolts (7) and nuts (6).
(k)TORQUE nuts (6) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(l)Apply corrosion preventive (Material No. 05-005) to bolts (7) and nuts (6).
(m)Make sure that indicator groove on male portion of splined connection of universal joint is not visible, indicating adequate engagement, and that dimension 'a' is not less than 5 mm.

(3)For transmission shafts 5485 and 5528, proceed as follows:
(a)Apply grease (Material No. 04-018) to splined surfaces.
(b)Without subjecting crown spline joint to undue deflection, insert inboard end of shaft into jack 2, making sure that bolt holes in splitter flanges are aligned.
(c)If exact alignment of bolt holes cannot be attained, rotate drive shaft outboard the miniumum amount necessary using turning jig PN 98A27508050000 if required.
(d)Secure splitter flanges with bolts (10) and nuts (9).
(e)TORQUE nuts (9) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(f)Make sure that indicator groove on male portion of splined connection is not visible, indicating adequate engagement.
(g)Apply corrosion preventive (Material No. 05-005) to bolts (10) and nuts (9).

(4)For torsion damper 5489 and 5532, proceed as follows:
CAUTION : TORSION DAMPER MUST BE INSTALLED WITH LARGE DIAMETER END OUTBOARD.
(a)Apply grease (Material No. 04-018) to splined surfaces of universal joint assembly.
(b)Install universal joint assembly in kink steady bearing such that when torsion damper is installed, splitter flange bolt holes will be aligned.
(c)If exact alignment cannot be attained, rotate transmission shaft outboard of kink steady bearing the minimum amount necessary using turning jig PN 98A27508050000 if required.
(d)Install torsion damper and secure with bolts (13) and nuts (12).
(e)TORQUE nuts (12) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(f)Make certain that indicator groove on male portion of splined connection of universal joint assembly is not visible, indicating adequate engagement, and that dimension 'b' is not less than 5 mm.
(g)Apply corrosion preventive (Material No. 05-005) to bolts (13) and nuts (12).

(5)For transmission shafts 5483 and 5526, proceed as follows:
(a)Position shaft, make certain that bolt holes in splitter flanges at both ends line up.
(b)If bolt holes do not line up, proceed as follows:
1 Remove four nuts (22) and bolts (23) securing special 8/12 hole flange connection at plunging joint.
2 Rotate isolated section of shaft until position is attained where bolt holes in all three disconnected flange joints line up.
3 Secure special 8/12 hole flange connection with bolts (23) and nuts (22).
4 TORQUE nuts (22) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
5 Apply corrosion preventive (Material No. 05-005) to bolts (23) and

nuts (22).
(c)Install transmission shaft and secure with bolts (16) and nuts (15).
(d)TORQUE nuts (15) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(e)Apply corrosion preventive (Material 05-005) to bolts (16) and nuts (15).

(6)For transmission shafts 5479, 5522, 5475 and 5518, proceed as follows:
(a)Position transmission shaft such that bolt holes in flanges at both ends line up.
(b)Secure special flange at plunging joint with bolts (23) and nuts (22).
(c)Secure splitter flange with bolts (21) and nuts (20).
(d)TORQUE nuts (20),(22) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(e)Apply corrosion preventive (Material No. 05-005) to bolts (21),(23) and nuts (20),(22).

(7)For transmission shafts 5481 and 5524, proceed as follows:
(a)Apply grease (Material No. 04-018) to splined surfaces of shaft.
(b)Insert shaft into sliding bearing at inboard end, making certain that bolt holes thru male and female portions are aligned.
(c)Push shaft fully inboard to collapse sliding bearing, collapse outboard sliding bearing and insert outboard end of shaft, making certain that bolt holes thru male and female portions are aligned.
(d)If bolt holes thru outboard connection are not aligned, proceed as follows:
1 Remove four bolts (23) and nuts (22) securing special 8/12 hole flange connection at plunging joint.
2 Rotate isolated section of shaft until bolt holes thru splined connection line up and insert outboard end into sliding bearing.
3 Rotate shaft minimum amount necessary to bring bolt holes thru special 8/12 hole flange connection into alignment.
4 Secure with bolts (23) and nuts (22).
5 TORQUE nuts (22) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
6 Apply corrosion preventive (Material No. 05-005) to bolts (23) and nuts (22).
(e)Secure splined connections with bolts (26) and nuts (25).
(f)TORQUE nuts (25) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
(g)Safety with lockwire.

NOTE : Lockwire is to completely encircle shaft.

(h)Apply corrosion preventive (Material No. 05-005) to bolts (26) and nuts (25).

(8)For transmission shafts 5470 and 5513, proceed as follows:
(a)Apply grease (Material No. 04-018) to splined surfaces of shaft.
(b)Insert outboard end of shaft into splined coupling making certain that bolt holes thru male and female portions are aligned.
(c)Secure outboard splined connection with bolt (31) and nut (30).
(d)TORQUE nut (30) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
(e)Safety with lockwire.

NOTE : Lockwire is to completely encircle shaft.

(f)Apply corrosion preventive (Material No. 05-005) to bolt (31) and nut (30).
(g)Extend telescopic section of shaft and insert inboard end of shaft into PCU connection.
(h)If splines at PCU connection are not aligned, rotate shaft the minimum amount necessary using turning jig PN 98A27508050000 if required.
(j)Carefully align holes in male and female portions of telescopic sections.

CAUTION : BY EXTENDING TELESCOPIC SECTION OF SHAFT TOO MUCH, IT IS POSSIBLE TO INSTALL THE BOLT BEHIND THE OUTBOARD SHAFT SECTION. MAKE SURE THAT HOLES IN BOTH SHAFT SECTIONS ARE CORRECTLY ALIGNED.

(k)Install securing bolt (33) and nut (32) thru telescopic section of shaft.
(l)TORQUE nut (32) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
(m)Safety with lockwire.

NOTE : Lockwire is to completely encircle shaft.

(n)Apply corrosion preventive (Material No. 05-005) to bolt (33) and nut (32).
(o)Make certain that indicator groove on male portion of inboard splined connection is not visible, indicating adequate engagement.
(9)For transmission shafts 5493 and 5536, proceed as follows:
(a)Make certain that outboard end of steady bearing assembly (5494 or 5537) is rotated fully upward.
(b)Apply grease (Material No. 04-018) to splined surfaces of both sections of shaft.
(c)Pack female halve of crown spline joint with grease (Material No. 04-018).
(d)Insert inboard end of shaft into coupling on jack 3, making certain that bolt holes thru male and female portions are lined up.
(e)Insert outboard end of shaft into steady bearing.
(f)Put wiper ring (40) in its position into the groove.
(g)Without subjecting crown spline joint to undue deflection rotate outboard end of inboard section of drive shaft downward to bring both sections of crown spline joint together.
(h)Turn outboard section of shaft to align securing bolt holes thru both sections of crown spline joint.
(j)Rotate outboard end of steady bearing downward, simultaneously lifting outboard end of inboard section of drive shaft so as to engage both halves of crown spline joint with each other.
(k)Make certain that shaft is straight and crown spline joint correctly assembled, and that wiper ring (40) is not displaced or damaged.
NOTE : If necessary align wiper ring (40) in its groove, using a thin piece of wood.

(l)Secure crown spline joint with bolt (37) and nut (38).
(m)TORQUE nut (38) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
(n)Safety with lockwire.

NOTE : Lockwire is to completely encircle shaft.

(p)Apply corrosion preventive (Material No. 05-005) to bolt (37) and nut (38).
(q)Secure inboard spline connection with bolt (36) and nut (35).
(r)TORQUE nut (35) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
(s)Safety with lockwire.

NOTE : Lockwire is to completely encircle shaft.

(t)Apply corrosion preventive (Material No. 05-005) to bolt (36) and nut (35).
(u)Install transmission shaft 5495 (left wing), 5538 (right wing), (Ref. D.(1) above).
(10)For transmission shafts 5472 and 5515, proceed as follows:
(a)Apply grease (Material 04-018) to splined surfaces at both ends.
(b)Insert outboard end of shaft into connection at bevel gearbox.
(c)Install system torque limiter (Ref. 27-54-12, P. Block 401).
(d)Install transmission shaft 5470 (left wing), 5513 (right wing), (Ref. D.(8) above).
(e)Make certain that indicator groove on male portion of outboard splined connection is not visible, indicating adequate engagement.
(11)Remove the flap drive shaft locking device PN 98A27508060000.
(12)For transmission shafts outboard of screwjack 1, proceed as follows:
(a)Remove tags and safety clips, close circuit breakers 10CV, 5CV and 6CV.

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGE OF SURFACES IS CLEAR.

(b)Retract flaps (Ref. 27-50-00 P. Block 301).
(c)Make certain that the appropriate flap carriage check pin from check pin set PN 98A27508015000 can be installed in carriages immediately inboard and outboard of work site.
(d)Remove flap carriage check pin.

E. Close-Up
(1)For transmission shafts inboard of bevel gearbox, proceed as follows:
(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove access platform.
(c)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(d)Remove tags and safety clips and close circuit breakers 10CV, 5CV, 6CV.
(2)For transmission shafts outboard of screwjack 1, proceed as follows:
(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(b)Close the following access doors:
shaft number 5501: access doors 581GB, 581HB

shaft number 5544: access doors 681GB, 681HB
shaft number 5499: access doors 581FB, 581GB
shaft number 5542: access doors 681FB, 681GB
shaft number 5497: access doors 581DB, 581EB, 581FB
shaft number 5540: access doors 681DB, 681EB, 681FB
shaft number 5495: access doors 581CB, 581DB, 581EB
shaft number 5538: access doors 681CB, 681DB, 681EB
shaft number 5493: access doors 581CB, 581DB
shaft number 5536: access doors 681CB, 681DB
shaft number 5491: access doors 581AB, 581BB
shaft number 5534: access doors 681AB, 681BB
torsion damper 5489: access doors 575CB, 575DB
torsion damper 5532: access doors 675CB, 675DB
shaft number 5487: access doors 572DB, 575CB
shaft number 5530: access doors 672DB, 675CB
shaft number 5485: access door 572DB
shaft number 5528: access door 672DB
shaft number 5483: access doors 572AB, 572BB, 572CB
shaft number 5526: access doors 672AB, 672BB, 672CB
shaft number 5481: access doors 572BB, 572CB
shaft number 5524: access doors 672BB, 672CB
shaft number 5479: access doors 572AB, 572BB
shaft number 5522: access doors 672AB, 672BB

(c)Remove access platform.
(d)Remove safety barriers.

(3)For transmission shafts 5475 and 5518, proceed as follows:
(a)Remove access platform.
(b)Remove tags and safety clips and close circuit breakers 10CV, 6CV, 5CV.

(4)Do the operational test of the flap system (Ref. 27-54-00, P. Block 501).

TRANSMISSION SHAFTS (5470, 5472, 5475, 5479 THRU 5501 (ODD NUMBERS ONLY) 5513, 5515, 5518, 5522 THRU 5544 (EVEN NUMBERS ONLY)) - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Flap Drive Transmission Shafts - General Check

A. Reason for the Job

(1)General visual inspection of transmission shafts.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 3 to 5 m (10 to 16 ft.)
	(2)	Safety Barriers
	(3)	Circuit Breaker Safety Clips and Tags
	(4)	Notice Prohibiting Pressurization of Hydraulic Systems
R	(5)98A27503003000	Guard-Safety, Flap/Slat Ctl Lever

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure

(1)Job Set-Up

(a)Position safety barriers.

(b)Fully extend flaps (Ref. 27-50-00, P. Block 301).

R (c)Install safety guard PN 98A27503003000 on flap/slat control lever
R quadrant.

R (d)Open main gear main doors (Ref. 32-12-11, P. Block 301).

R (e)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

R (f)Position access platform.
R (g)Open access doors 575CB, 575DB, 675CB, 675DB.
R (h)Open all lower flap shroud panels in zones 572 and 581 (672 and 681).

(2)Inspection/Check

R (a)Inspect flap drive shafts, make sure that there is no corrosion, cracks, bending or other damage.
R (b)Make sure that there is adequate clearance between flap drive shafts and aircraft structure, components, cables and pipes.
R (c)Make sure that all nuts and bolts are secured and that all safety devices are intact.
R (d)Make sure that wiper rings in crown spline joints of flap drive shafts are not damaged or missing.
R (e)Make sure that wiper rings in crown spline joints are correctly installed in their related grooves.

(3)Close-Up

(a)Close access doors 575CB, 575DB, 675CB, 675DB.
(b)Close all lower flap shroud panels in zones 572 and 581 (672 and 681).
(c)Remove access platform.
(d)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(e)Remove tags and safety clips and close circuit breakers 10CV, 5CV, 6CV.
R (f)Remove safety guard from flap/slat control lever quadrant.
R (g)Fully retract flaps (Ref. 27-50-00, P. Block 301).
R (h)Remove safety barriers.

2. Flap Half System Operation Torque Check

A. Reason for the Job
(1)To assess the half system operation torques, under no-load conditions, during trouble shooting operations.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 3 to 5 m (10 to 16 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)98A27508061000	Driving Tool
	(4)98A27508015000	Check Pin Set - Flap Neutral Setting
	(5)98A27508003000	Rigging Pin Set - Flap Adjustment
	(6)	Torque Wrench, 0 to 13.2 Nm (0 to 116.83 lbf.in.)
	(7)	Safety Barriers

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-54-19, P. Block 401	Transmission Shafts
- 27-56-11, P. Block 401	Asymmetry Position Pick-Off Unit
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure
NOTE : The procedure is described for the LH half system. Deviations for the RH half system are shown in brackets.
(1)Job Set-Up
(a)Position safety barriers.
(b)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(d)Open LH (RH) main gear main door (Ref. 32-12-11, P. Block 301).
(e)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(f)Position access platform.
(g)Remove plug 532BR (632BL) from flap track fairing 2 to gain access to rigging pin hole.
(h)Install check pin PN 98A27508015201 from check pin set PN 98A27508015000, in carriage 2/track 2.
(i)Remove LH (RH) asymmetry position pick-off unit (Ref. 27-56-11,

P. Block 401).
(j)Remove transmission shaft 5470 (5513) inboard of system torque limiter (Ref. 27-54-19, P. Block 401).

(2)Torque Check
(Ref. Fig. 601)
(Ref. Fig. 602)
(a)Connect driving tool PN 98A27508061000 to the input of system torque limiter.
(b)Remove check pin from carriage 2/track 2.
(c)Connect torque wrench to driving tool PN 98A27508061000.
(d)Fully extend flaps. Check torque/revolution characteristics (Ref. Fig. 601).
(e)Fully retract flaps. Check torque/revolution characteristics (Ref. Fig. 602).
(f)If the torque/revolution characteristics are not achieved, then the flap half system is not serviceable (Refer to Trouble Shooting Manual 27-50).

(3)Close-Up
(a)Rotate flap half system to align rigging pin holes in carriage 2/track 2 and install rigging pin PN 98A27508003201 from rigging pin set PN 98A27508003000.
(b)Remove torque wrench and driving tool from torque limiter input.
(c)Install transmission shaft 5470 (5513) (Ref. 27-54-19, P. Block 401).
(d)Install LH (RH) asymmetry position pick-off unit (Ref. 27-56-11, P. Block 401).
(e)Remove rigging pin from carriage 2/track 2.
(f)Install plug 532BR (632BL) in flap track fairing 2.
(g)Remove access platform.
(h)Remove safety guard from flap/slat control lever quadrant.
(i)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(j)Carry out operational test of flap system (Ref. 27-54-00, P. Block 501).
(k)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(l)Close main gear main door (Ref. 32-12-11, P. Block 301).
(m)Remove safety barriers.

R 3. Inspection of Splined Coupling, Sliding Bearing and Plunging Joint

R A. Reason for the Job
R (1)Detailed visual inspection of the flap transmission shaft joint
R assemblies.

R B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3 to 5 m (10 to 16 ft.)
(2)	Safety Barriers
(3)	Circuit Breaker Safety Clips and Tags
(4)	Notice Prohibiting Pressurization of

ITEM	DESIGNATION
	Hydraulic Systems
(5)98A27503003000	Guard-Safety, Flap/Slat Ctl Lever

Referenced Procedures

	- 27-50-00, P. Block 301	Flaps
R	- 27-54-14, P. Block 401	Plunging Joint - Removal/Installation
R	- 27-54-15, P. Block 401	Sliding Bearing - Removal/Installation
	- 27-54-19, P. Block 401	Transmission Shafts - Removal/Installation
	- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure

(1)Job Set-Up

(a)Position safety barriers.

(b)Fully extend flaps (Ref. 27-50-00, P. Block 301).

(c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(d)Open main gear main doors (Ref. 32-12-11, P. Block 301).

(e)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(f)Position access platform.

(g)Open access doors 575CB, 575DB, 675CB, 675DB.

(h)Open all lower flap shroud panels in zones 572 and 581 (672 and 681).

(2)Inspection/Check

R (Ref. Fig. 603) (Sheet 1/3)

(a)Inspect the wiper rings in the splined couplings of the flap transmission shafts.

1 Make sure that the wiper rings in the crown spline joints of the
R flap drive shafts are not damaged, protruding or missing (Ref. Fig. 603) (Sheet 2/3).

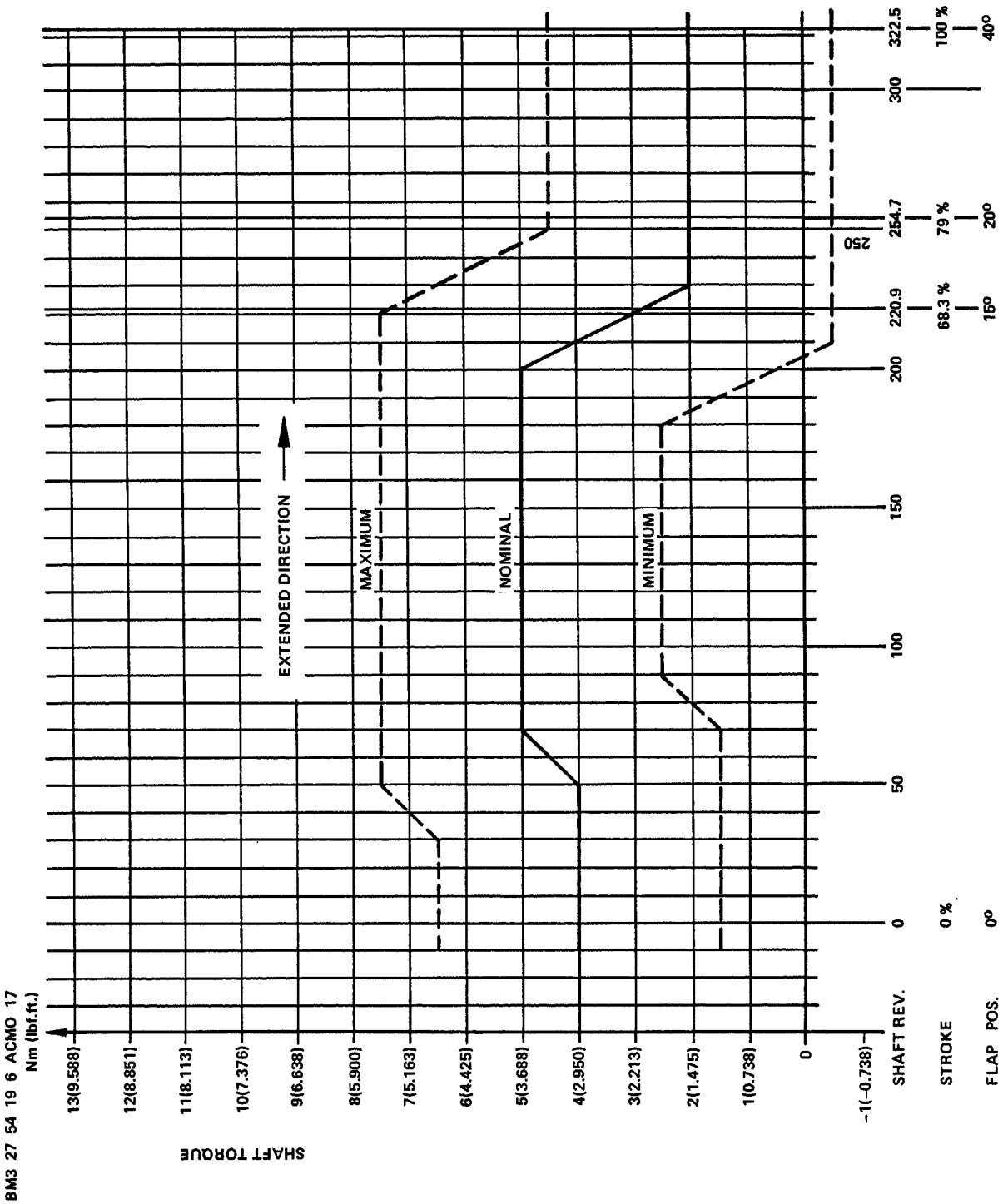
2 Make sure that the wiper rings in the crown spline joints are correctly installed in their related grooves (Ref. Fig. 603) (Sheet 2/3).

(b)Inspect the rubber gaiters on the sliding bearing/plunging joints of the flap transmission.

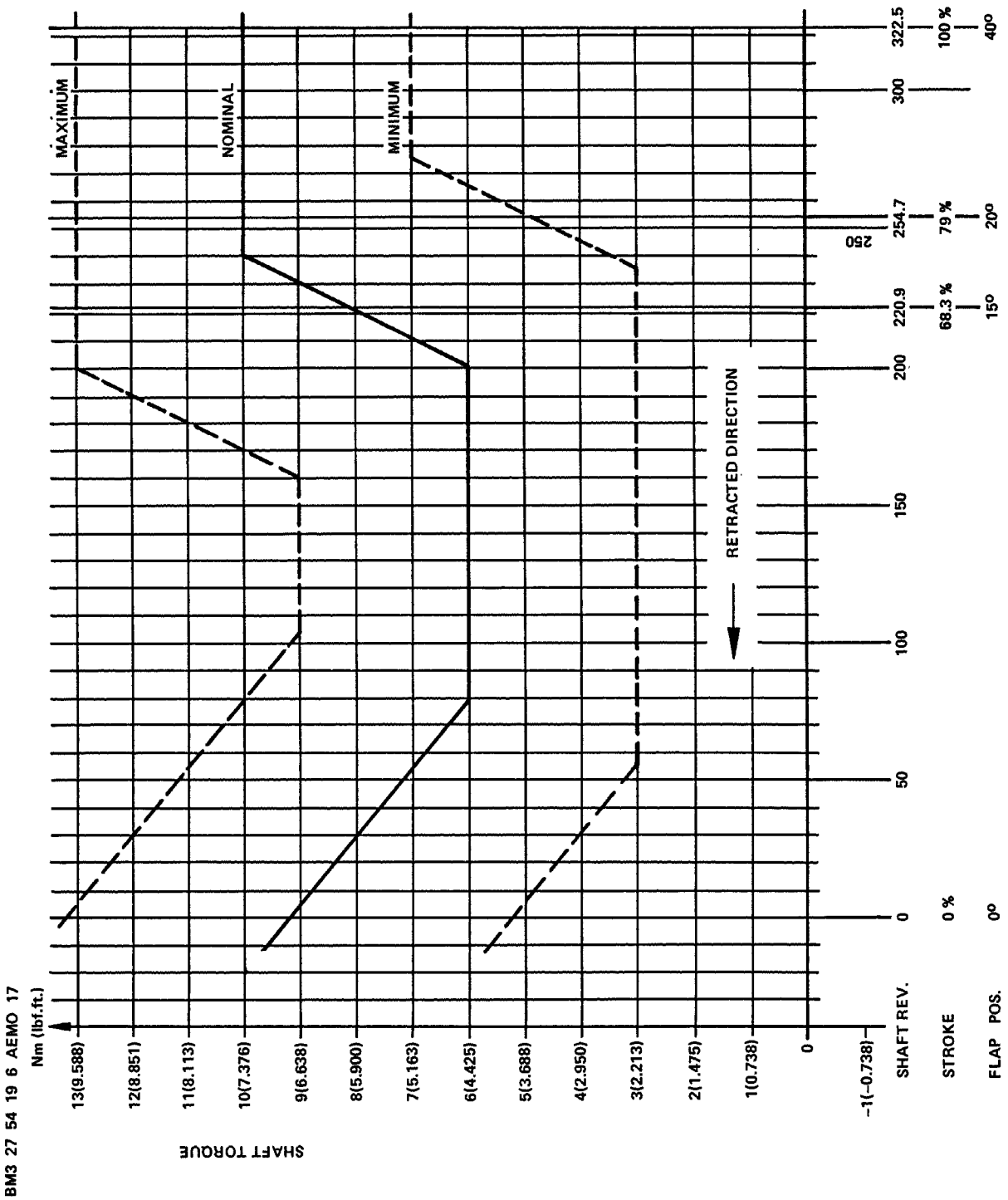
1 Make sure that the gaiters and straps are not damaged or missing (Ref. Fig. 603) (Sheet 3/3).

2 Make sure that the gaiters are properly secured by their straps and that the gaiters are correctly installed (Ref. Fig. 603) (Sheet 3/3).

R (c)If any damage, missing or incorrect installation is found on the
R wiper rings and rubber gaiters, remove the applicable components as



Flap Operating Torques - Extended Direction
Figure 601



Flap Operating Torques - Retracted Direction
Figure 602

follows:

1 Remove the flap transmission shafts (Ref. 27-54-19, P. Block 401) for workshop inspection/check in accordance with the relevant component maintenance manual.

2 Remove the sliding bearings (Ref. 27-54-15, P. Block 401) for workshop inspection/check in accordance with the relevant component maintenance manual.

3 Remove the plunging joints (Ref. 27-54-14, P. Block 401) for workshop inspection/check in accordance with the relevant component maintenance manual.

(d)Install components if removed as follows:

1 Install the flap transmission shafts (Ref. 27-54-19, P. Block 401).

2 Install the sliding bearings (Ref. 27-54-15, P. Block 401).

3 Install the plunging joints (Ref. 27-54-14, P. Block 401).

(3)Close-Up

(a)Close access doors 575CB, 575DB, 675CB, 675DB.

(b)Close all lower flap shroud panels in zones 572 and 581 (672 and 681).

(c)Remove access platform.

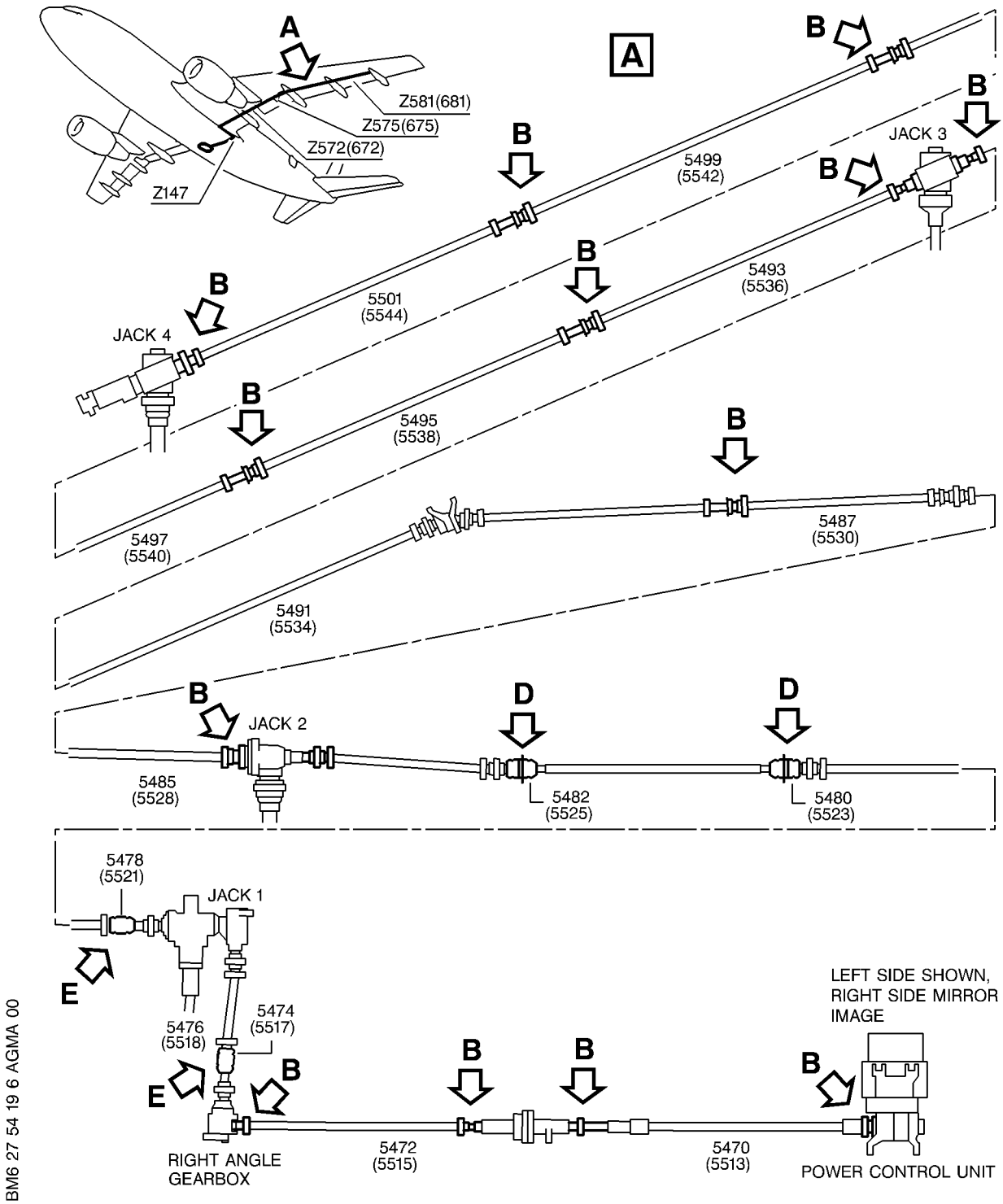
(d)Close main gear main doors (Ref. 32-12-11, P. Block 301).

(e)Remove tags and safety clips and close circuit breakers 10CV, 5CV, 6CV.

(f)Remove safety guard from flap/slat control lever quadrant.

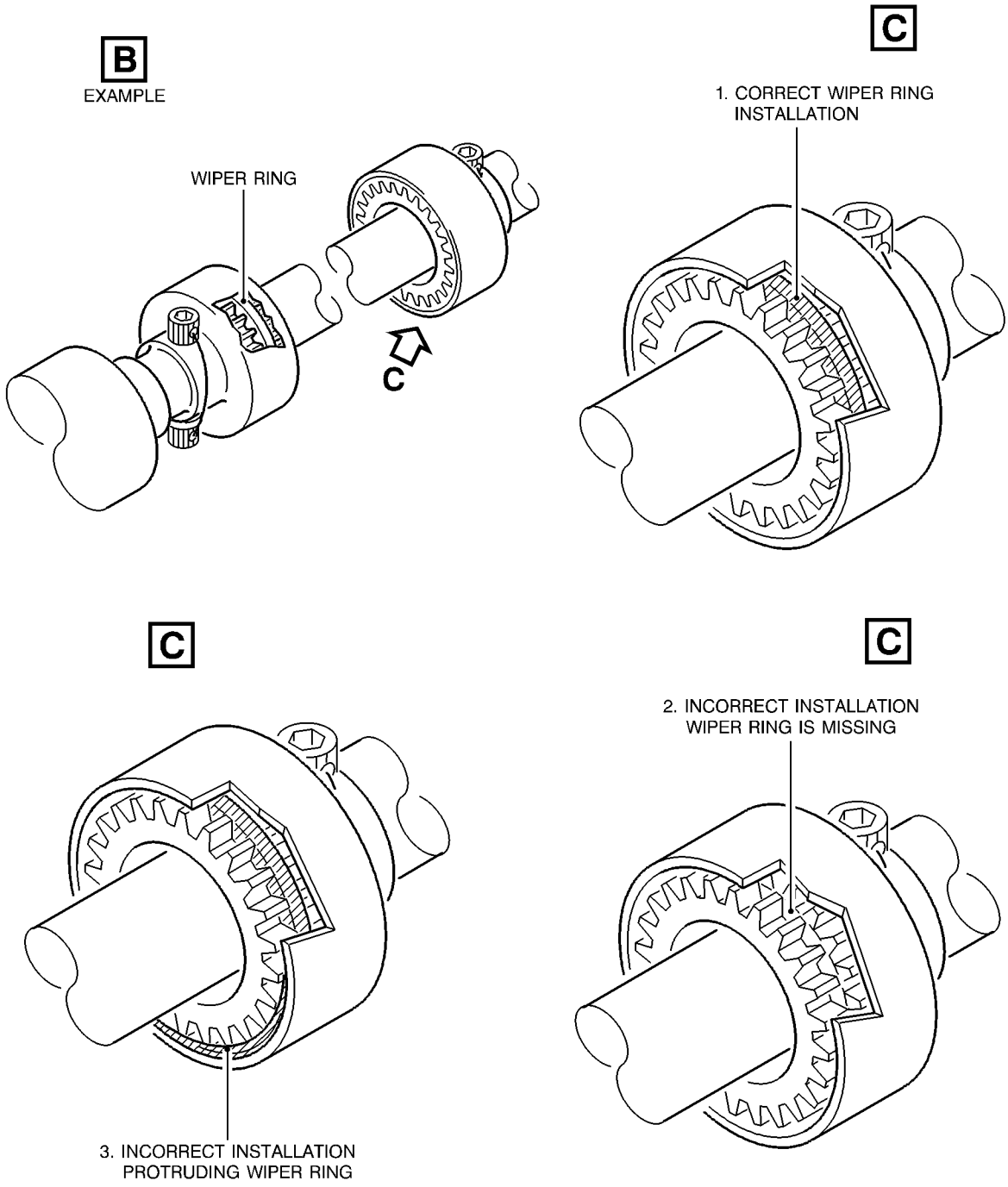
(g)Fully retract flaps (Ref. 27-50-00, P. Block 301).

(h)Remove safety barriers.



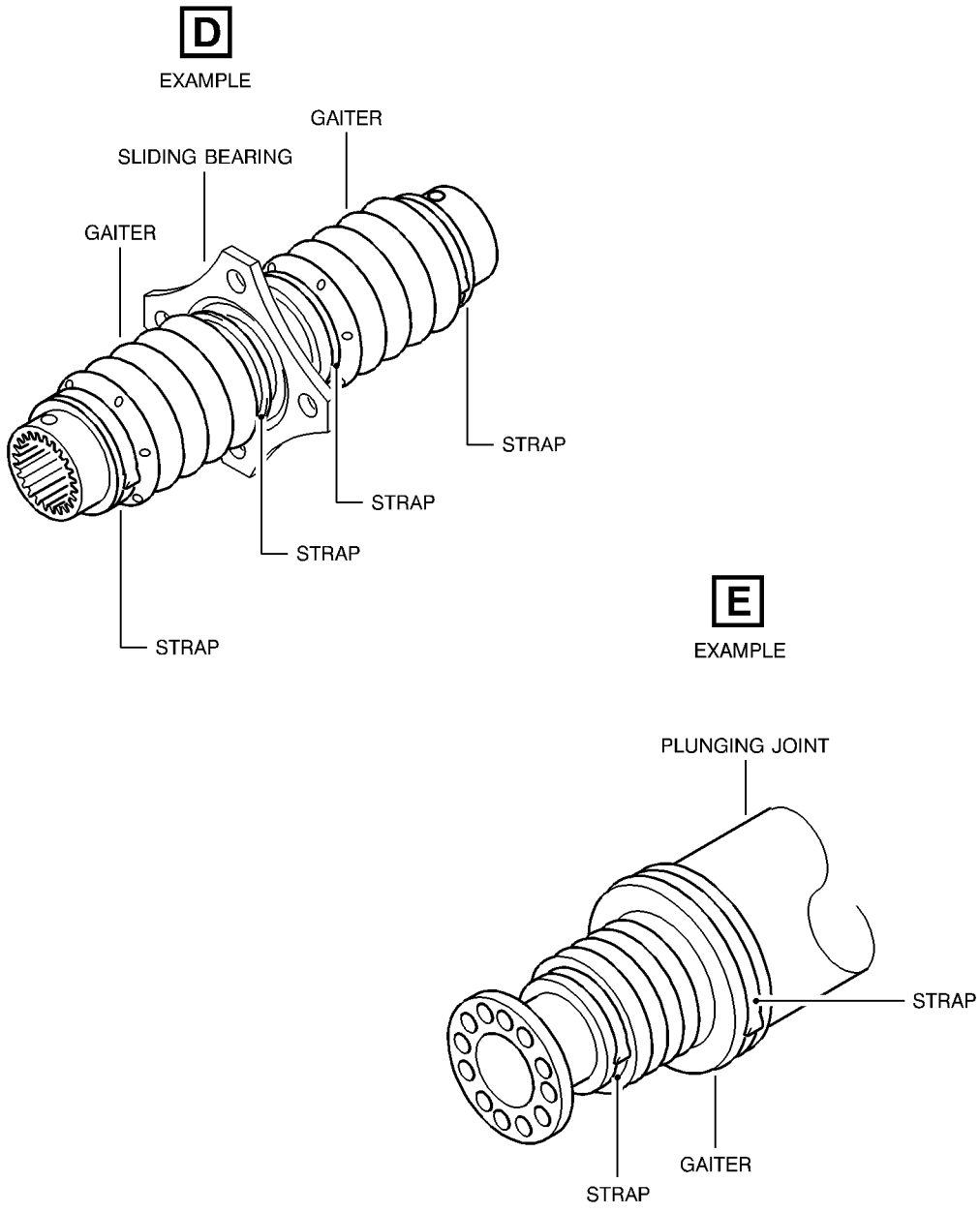
Flap Transmission Inspection
(Sheet 1/3)
Figure 603

R



Flap Transmission Inspection
(Sheet 2/3)
Figure 603

R



BM6 27 54 19 6 AGMS 00

Flap Transmission Inspection
(Sheet 3/3)
Figure 603

R

**ON A/C ALL

Post SB 27-2092 For A/C ALL

4. Inspection of Flap Transmission Shaft Assemblies for Cracks

A. Reason for the Job
To inspect the flap transmission shaft assemblies, numbers 5513 and 5470, for cracks.

R NOTE : Do the inspection only on aircrafts with post SB27-2092 and
R pre SB 27-2095.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.5 to 4.5 m (11 to 14 ft.)
(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
(3)	Safety Barriers
(4)	Circuit Breaker Safety Clips and Tags
(5)	Mirror

Referenced Procedures

- 27-54-19, P. Block 401	Transmission Shafts
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure
(1)Job Set-Up
(a)Open main gear main doors (Ref. 32-12-11, P. Block 301).
(b)Position access platform.
(c)Install safety guard P/N 98A27503003000 on flap/slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers;

**ON A/C ALL

Post SB 27-2092 For A/C ALL

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

**ON A/C ALL

Post SB 27-2092 For A/C ALL

(2)Inspection of the Flap Transmission Shaft Assemblies, numbers 5513 and 5470 for cracks.

**ON A/C ALL

Post SB 27-2092 For A/C ALL

(Ref. Fig. 604)

**ON A/C ALL

Post SB 27-2092 For A/C ALL

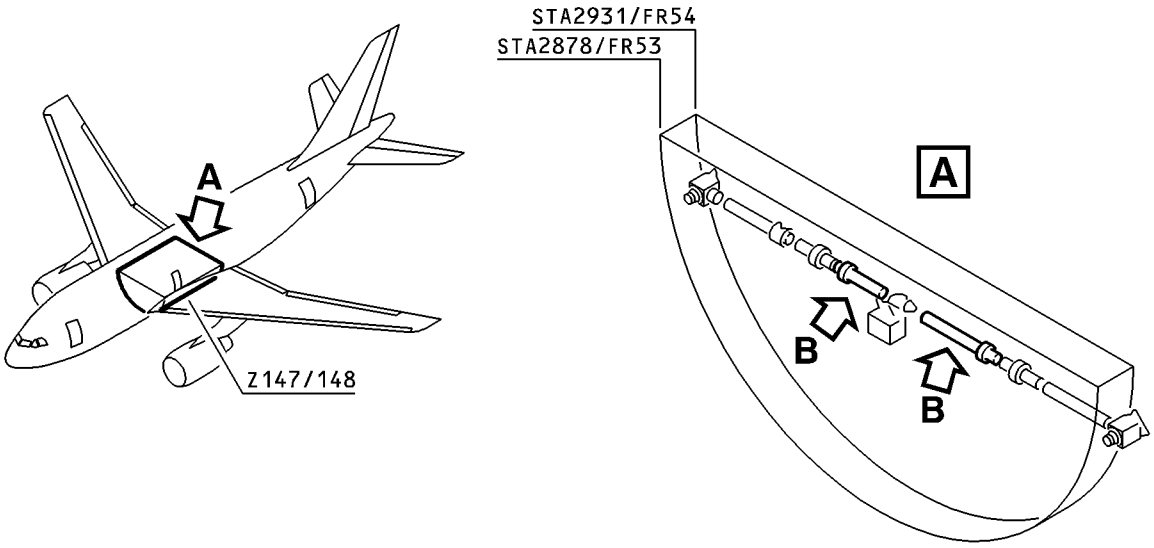
(a)Clean transmission shaft assemblies with a lint-free cloth.
(b)Visually inspect transmission shaft assemblies for cracks. If necessary, use a mirror to fully inspect transmission shaft assemblies.
(c)If you find cracks, proceed as follows:
- if length of any single crack is greater than 120 mm (4.72 in.), replace shaft before next flight (Ref. 27-54-19, P. Block 401)
R - if length of any single crack is less than 120 mm (4.72 in.),
R but greater than 80 mm (3.15 in.), replace shaft within next
R 250FH/350FC/50days (Ref. 27-54-19, P. Block 401)
R - if length of any single crack is less than 80 mm (3.15 in.),
R replace shaft within next 500FH/700FC/100days (Ref. 27-54-19,
R P. Block 401).

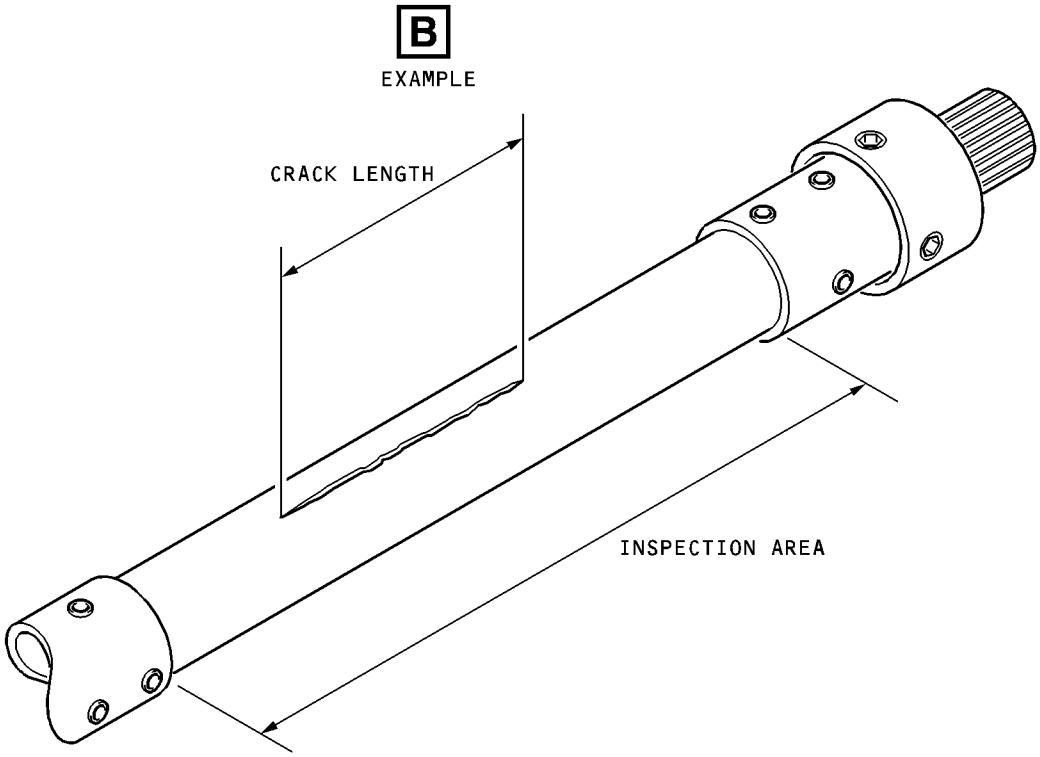
(3)Close-Up
(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove access platform.
(c)Close main gear doors (Ref. 32-12-11, P. Block 301).
(d)Remove tags and safety clips and close circuit breakers 10CV, 5CV and 6CV.
(e)Remove safety guard from flap/slat control lever quadrant.

**ON A/C 001-104, 106-200,

5. Overhaul of Flap Transmission Shaft Assembly Universal Joints with Rose Bushes

A. Reason for the Job





BM6 27 54 19 6 AQM0 00

Location and Check of Transmission Shaft Assemblies
Figure 604

Overhaul of the flap transmission shaft assembly universal joints with Rose bushes in an authorized workshop.

B. Referenced Procedures

- 27-54-19, P. Block 401 Transmission Shafts
- Vendor CMM
- Vendor SB

C. Procedure

(Ref. Fig. 605)

(1)Job Set-Up

(a)Remove the transmission shafts (Ref. 27-54-19, P. Block 401) 5475 thru 5491 and 5518 thru 5534.

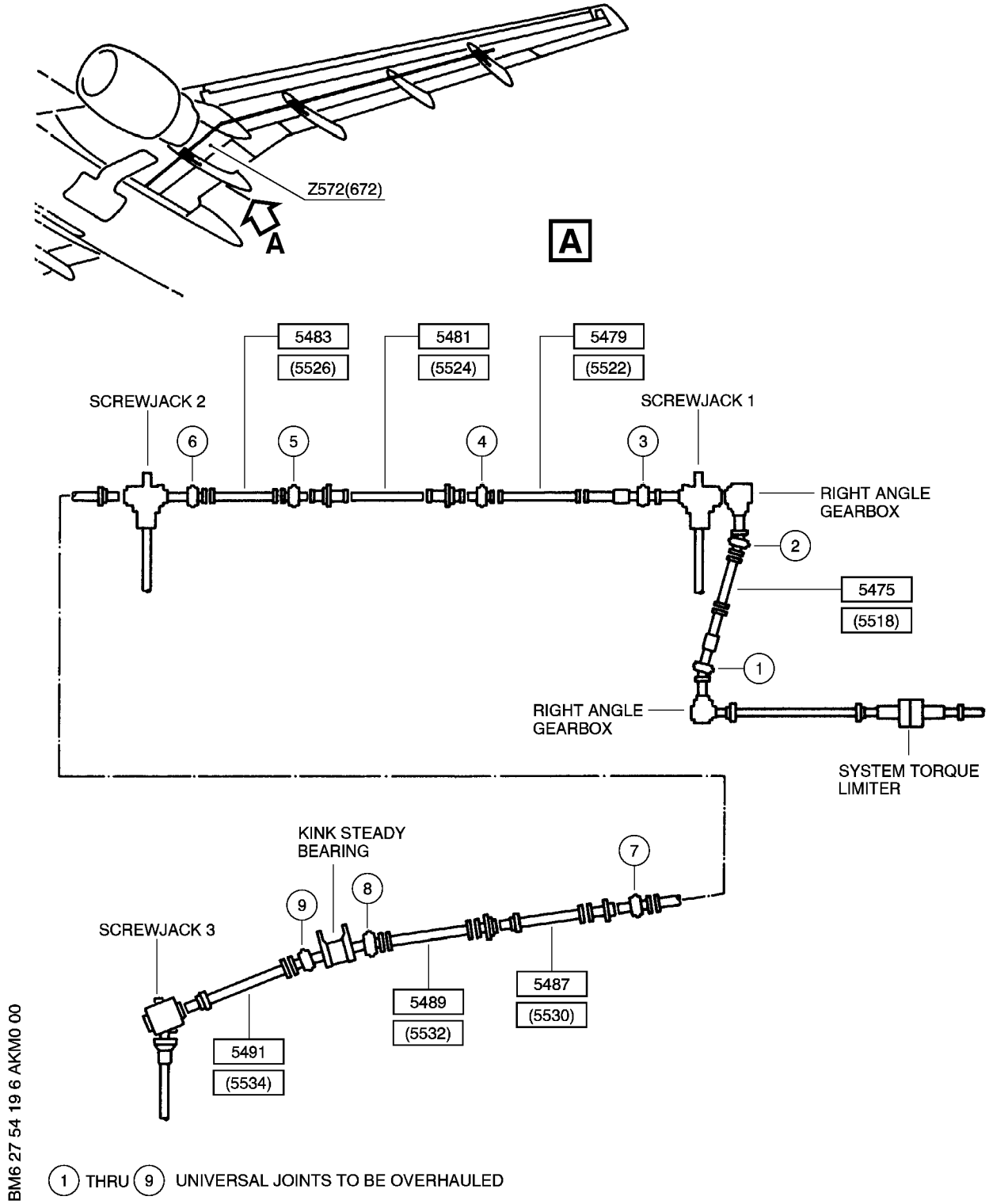
(2)Overhaul of the universal joints.

(a)Overhaul the transmission shaft assembly universal joints with Rose bushes in workshop (Ref. Vendor CMM, Vendor SB).

(b)Install the transmission shafts (Ref. 27-54-19, P. Block 401).

(3)Close Up

(a)Make sure that the work area is clean and clear of all tools and other items of equipment.



Location of Universal Joints
Figure 605

R

SCREWJACK 1 (5477, 5520) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

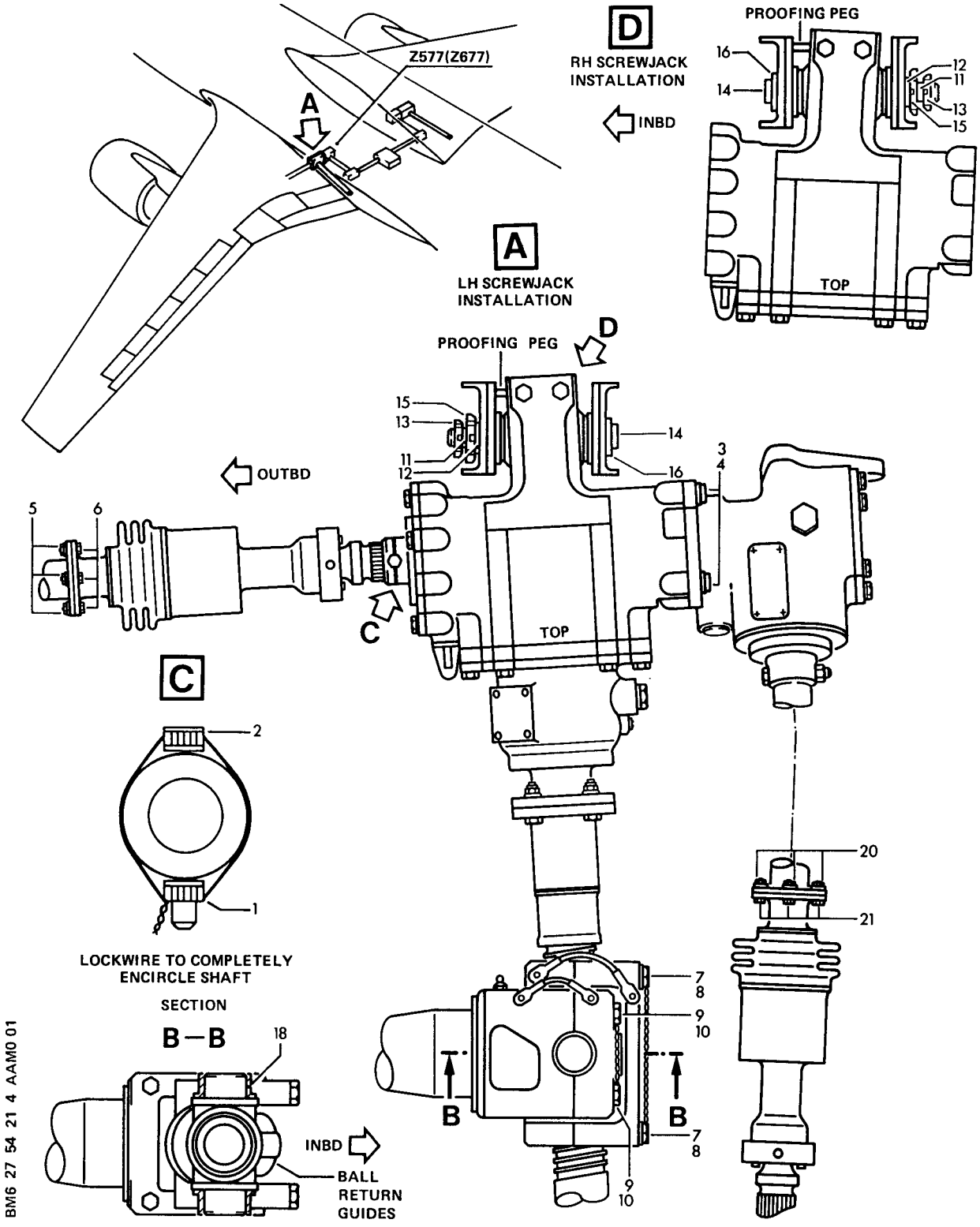
	ITEM	DESIGNATION
	A.	Access Platform, 3.5 m (11 ft.)
	B. 98A27501501000	Socket Set - Flap Screwjack No. 1
R	C. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	D. 98A27508015000	Check Pin Set - Flap Neutral Setting
	E. 98A27508026000	Support Cradle - Flap Spindle
	F. 98A27508050000	Turning Jig - Flap Drive Shaft
	G. 98A27508059000	Locking Device Set - Flap Carriage
	H.	Torque Wrench, 0.3 to 0.4 m.daN 26.6 to 35.4 lbf.in.).
	I.	Torque Wrench, 0.73 to 1.25 m.daN (65 to 110 lbf.in.)
	J.	Torque Wrench, 35 to 36 Nm (25.8 to 26.6 lbf.ft.)
	K.	Torque Wrench, 8.7 Nm (6.4 lbf.ft.)
	L.	Safety Barriers
	M.	Circuit Breaker Safety Clips and Tags
	N.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	O.	Cotter Pin
	P.	Locking Washers
	Q. Material No. 04-004	Common Greases (Ref. 20-31-00)
	R. Material No. 05-005	Special Materials (Ref. 20-31-00)
	S. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 12-13-27, P. Block 1	Flight Controls Replenishing
- 12-22-27, P. Block 1	Flight Controls Lubrication
- 27-50-00, P. Block 301	Flaps

2. Procedure

A. Screwjack 1 Complete
(Ref. Fig. 401)



Flap Screwjack 1
Figure 401

R

(1)Job Set-Up
(a)Position safety barriers.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGES OF THE SURFACES ARE CLEAR.
(b)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(d)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(e)Position access platform.
(f)Remove access panels 577AB, 577BB, (677AB, 677BB).
(g)Using carriage locking devices, lock carriages 1 and 2.
(h)Install support cradle on flap track 1.
(2)Removal
R (a)Make sure that there is no torque load in the transmission system.
NOTE : There is no torque load in the transmission system if you can move the transmission shafts with your hands.
R (b)Cut and discard lockwire, remove nut (1) and bolt (2) securing splined connection on outboard side of screwjack.
R (c)Remove bolts (4) and washers (3) attaching right angle gearbox to screwjack, swing gearbox clear of screwjack and support on adjacent structure.
R (d)Extract quill shaft from between screwjack and gearbox.
R (e)Remove nuts (5) and bolts (6) securing splitter flange outboard of plunging joint.
R (f)Compress plunging joint to disengage from screwjack at outboard splined connection and remove plunging joint/universal joint assembly.
R (g)Cut and discard lockwire and remove bolts (7) and washers (8) securing fail-safe trunnion bearing half housing.
R (h)Cut and discard lockwire and remove bolts (9) and washers (10) securing primary trunnion bearing half housing.
R (j)Support screwjack spindle on cradle.
R (k)Straighten locking tabs on lockwashers (11), (12).
R (l)Using special socket, remove nut (13), discard lockwasher (11) and remove bolt (14).

WARNING : SCREWJACK WEIGHS 19 kg (42 lbs.). DURING REMOVAL TAKE CARE TO AVOID INJURY OR DAMAGE.

R (m)Using special socket, remove nut (15), discard lockwasher (12).
R (n)Support screwjack and remove hollow bolt (16).
R (p)Remove screwjack from aircraft.
(3)Preparation for Installation
(a)Examine bushes (18) for excessive wear and general condition, replace

if necessary.
(b)Using white spirit (Material No. 11-002), clean splined surfaces of plunging joint/universal joint assembly, quill shaft, and internal splines of right angle gearbox output.
(c)Apply grease (Material No. 04-004) to splined surfaces of universal joint and quill shaft.
(d)Apply grease (Material No. 04-004) to bolts (14),(16).

(4)Installation
(a)Support screwjack spindle on cradle.
(b)Position screwjack head trunnion in structure supports and insert hollow bolt (16).

NOTE : A proofing peg is installed on screwjack head trunnion to avoid incorrect installation.

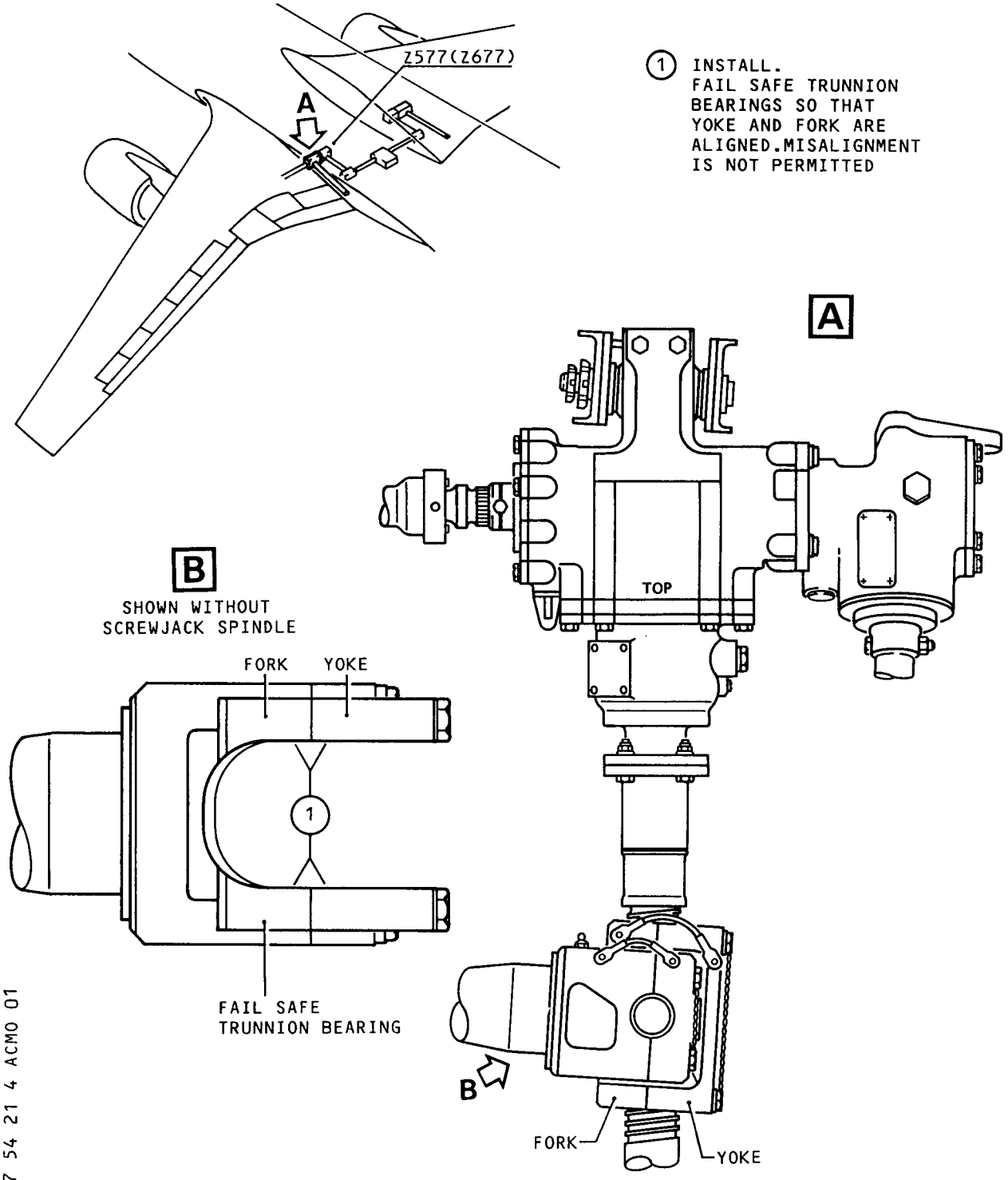
(c)Install lockwasher (12) and nut (15).
(d)TORQUE nut (15) to between 0.3 and 0.4 m.daN (26.6 and 35.4 lbf.in.).
(e)Safety nut (15) with lockwasher (12).
(f)Install bolt (14), lockwasher (11) and nut (13).
(g)TORQUE nut (13) to between 0.3 and 0.4 m.daN (26.6 and 35.4 lbf.in.).
(h)Safety nut (13) with lockwasher (11).

CAUTION : TO PREVENT DAMAGE TO THE BALLSCREW NUT DURING OPERATION, MAKE SURE THAT THE BALL RETURN GUIDES SHOW TO INBOARD.

(j)Manually rotate screwjack spindle (using wrench on end hexagon if necessary) until ballscrew nut is correctly positioned in relation to flap trunnion attachment.
(k)Install primary trunnion bearing half housing and secure with washers (10) and bolts (9).
(l)TORQUE bolts (9) to between 35 and 36 Nm (25.8 and 26.6 lbf.ft.).
(m)Safety bolts (9) with lockwire and apply corrosion-preventive (Material No. 05-005).
(n)Install fail-safe trunnion bearing half housing and secure with washers (8) and bolts (7).
(p)Make sure that fork and yoke of fail-safe trunnion bearings are aligned (Ref. Fig. 402).

NOTE : Misalignment of fork and yoke is not permitted.

(q)TORQUE bolts (7) to between 35 and 36 Nm (25.8 and 26.6 lbf.ft.).
(r)Safety bolts (7) with lockwire.
(s)Install quill shaft in screwjack input side.
(t)Connect right angle gearbox to screwjack, make certain that quill shaft is correctly engaged in gearbox output, and install washers (3) and bolts (4).
(u)TORQUE bolts (4) to between 0.8 and 0.95 m.daN (70.8 and 84.1 lbf.in.).
(v)Compress plunging joint and insert male splined connection in screwjack output, making certain that bolt holes thru connection are aligned.
(w)Install bolt (2) and nut (1).



Inspection of Fail-Safe Trunnion Bearings
Figure 402

R

(x)TORQUE nut (1) to between 0.73 and 0.9 m.daN (65 and 79 lbf.in.).
(y)Safety bolt (2) with lockwire.
(z)Connect plunging joint splitter flange using bolts (6) and nuts (5).

NOTE : If bolts (6) cannot be inserted due to misalignment of the holes in the splitter flanges, rotate the drive shaft outboard of the plunging joint the minimum amount necessary using turning jig if required.

(aa)TORQUE nuts (5) to between 1.0 and 1.25 m.daN (91 and 110 lbf.in.).
(ab)Check that screwjack oil level is correct (Ref. 12-13-27, P. Block 1).
(ac)Lubricate ballnut and flap trunnion (Ref. 12-22-27, P. Block 1).

NOTE : Charge the ballnut with the applicable grease through the lubrication nipple until clean grease emerges from the vent hole. Remove ejected grease.

(ad)Remove screwjack support cradle from track 1.
(ae)Remove locking devices from carriages 1 and 2.
(af)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(ag)Remove safety guard from flap/slat control lever quadrant.

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGES OF THE SURFACES ARE CLEAR.

(ah)Retract flaps (Ref. 27-50-00, P. Block 301).
(aj)Make certain that check pins can be inserted in carriages 1 and 2.
(ak)If check pins cannot be installed in carriages 1 and/or 2, proceed as follows:
1 Remove nuts (5) bolts (6) securing 8/12 hole splitter flange at plunging joint outboard of screwjack 1.
2 Rotate transmission outboard of plunging joint until check pin can be installed in carriage 2.
3 Adjust position of carriage 1 if necessary as detailed below:
a Remove nuts (20) bolts (21) securing 8/12 hole splitter flange at plunging joint inboard of screwjack 1.
b Rotate transmission inboard of screwjack 1 until carriage reaches a position where check pin may be installed.
c Install check pin in carriage 1.
d Connect 8/12 hole splitter flange at plunging joint inboard of screwjack 1, secure with bolts (21) nuts (20).
e TORQUE nuts (20) to between 1 and 1.25 m.daN (91 and 110 lbf.in.).
4 Connect 8/12 hole splitter flange at plunging joint outboard of screwjack 1, secure with bolts (6) nuts (5).
5 TORQUE nuts (5) to between 1 and 1.25 m.daN (91 and 110 lbf.in.).
(al)Apply corrosion-preventive (Material No. 05-005) to all disturbed bolts and nuts.
(am)Remove check pins from carriages 1 and 2.
(an)Extend flaps (Ref. 27-50-00, P. Block 301).
(5)Close-Up

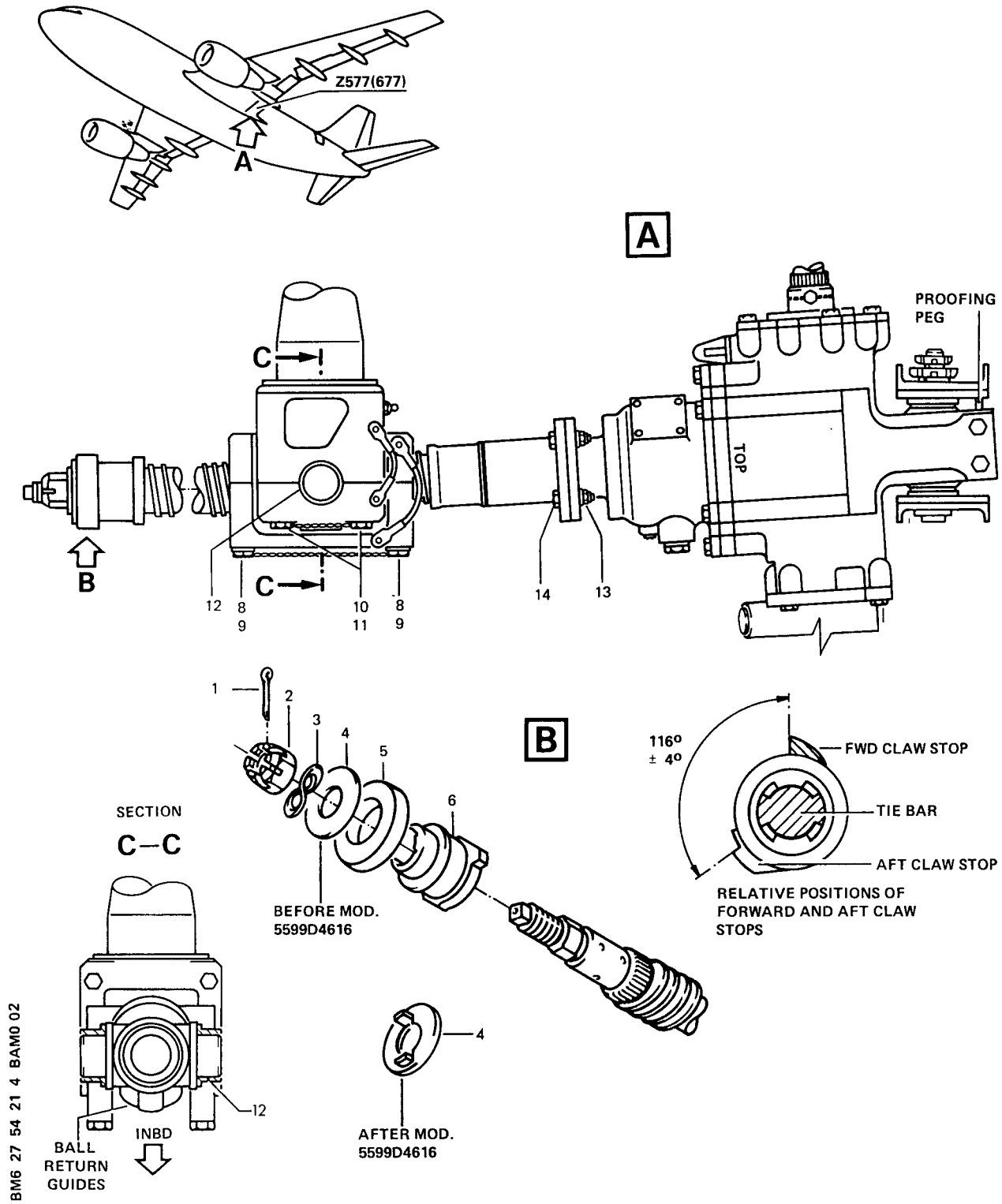
(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(b)Install access panels 577AB, 577BB (677AB, 677BB).
(c)Retract flaps (Ref. 27-50-00, P. Block 301).
(d)Remove access platform.
(e)Remove safety barriers.

B. Screwjack Spindle/Ballnut
(Ref. Fig. 403)
(1)Job Set-Up
(a)Position safety barriers.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGES OF THE SURFACES ARE CLEAR.
(b)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(d)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(e)Position access platform.
(f)Remove access panels 577AB, 577BB, (677AB, 677BB).
(g)Using carriage locking device, lock carriage 1.
(h)Install support cradle on flap track 1.
(2)Removal of Spindle/Ballnut
(a)Note and record angular position of forward claw stop relative to screwjack body to facilitate correct installation of replacement component.
(b)Remove and discard cotter pin (1)
(c)Remove nut (2), wavy washer (3), anti-rotation washer (4), roller (5) and aft claw stop (6).
(d)Cut and discard lockwire and remove four bolts (8) and washers (9) securing fail-safe trunnion bearing half housing.
(e)Separate fail-safe trunnion bearing housing halves, cut and discard lockwire and remove four bolts (10) and washers (11) securing primary trunnion bearing housing halves.
(f)Separate primary trunnion bearing housing halves, lower screwjack spindle until ballscrew nut is clear of trunnion.
(g)Remove bushes (12) from ballscrew nut.
(h)Remove four nuts (13) and bolts (14) securing screwjack spindle to screwjack primary output.
(j)Slide screwjack spindle complete with ballscrew nut aft along secondary drive tie bar and remove from aircraft.

NOTE : Do not remove ballscrew nut from screwjack spindle.



Screwjack Spindle/Ballnut Removal
Figure 403

(3)Preparation for Installation of Spindle/Ballnut
(a)Examine bushes (12) for excessive wear and general condition, replace if neccessary.
(b)Using white spirit (Material No. 11-002), clean aft end of secondary drive tie bar and clean nut (2), washers (3),(4), roller (5) and aft claw stop (6).
(c)Clean preservative from replacement spindle and from ballscrew nut.
(4)Installation of Spindle/Ballnut
(a)Place spindle complete with ballnut in position on screwjack, making certain that forward claw stop is similarly orientated relative to screwjack body as was removed item.
(b)Connect spindle to screwjack primary output, secure with bolts (14) and nuts (13).
(c)TORQUE nuts (13) to between 7.9 and 9.5 Nm. (5.8 and 7.0 lbf.ft.).
(d)Move ballnut along spindle until it is correctly positioned relative to flap trunnion.
(e)Smear inner and outer surfaces of bushes (12) with grease (Material No. 04-004) and install bushes (12) on ballnut.
(f)Raise spindle and ballnut, positioning ballnut connection in primary trunnion bearing housing.

CAUTION : TO PREVENT DAMAGE TO THE BALLSCREW NUT DURING OPERATION, MAKE SURE THAT THE BALL RETURN GUIDES SHOW TO INBOARD.

(g)Install primary trunnion bearing housing halves, securing with washers (11) and bolts (10).

NOTE : If a badly worn spindle has been replaced with a new component, it may be impossible to obtain exact alignment between the ballnut and flap trunnion, a misalignment of 2 mm (0.08 in.) approximately being possible. In this case it will be necessary to slacken the carriage locking device the minimum amount required in order to allow the flap to be repositioned manually such that the ballnut locates correctly in the trunnion housing. Care must be taken to prevent damage to bushes (12) due to inadvertent contact with machined edges of trunnion bearing housing.

(h)TORQUE bolts (10) to between 35 and 36 Nm (25.8 and 26.6 lbf.ft.).
(j)Safety bolts (10) with lockwire and apply corrosion-preventive (Material No. 05-005) to bolt heads.
(k)Install fail-safe trunnion bearing half housing, securing with washers (9) and bolts (8).
(l)Make sure that fork and yoke of fail-safe trunnion bearings are aligned (***//ACM0//***).

NOTE: Misalignment of fork and yoke is note permitted.

(m)TORQUE bolts (8) to between 35 and 36 Nm (25.8 and 26.6 lbf.ft.).
(n)Safety bolts (8) with lockwire and apply corrosion-preventive (Material No. 05-005) to bolt heads.

(p)Smear inner surfaces of aft claw stop (6) and roller (5) with grease (Material No. 04-004).
(q)Install aft claw stop (6) on primary spindle splines, making certain it is correctly positioned relative to tie bar dogs and forward claw stop.
(r)Install roller (5), anti-rotation washer (4), wavy washer (3) and nut (2).
(s)Tighten nut (2) only sufficiently to trap wavy washer (3) with no significant load. If necessary tighten nut (2) further only until first available alignment with cotter pin hole.
(t)Safety nut (2) with cotter pin (1).
(u)Lubricate ballnut and flap trunnion (Ref. 12-22-27, P. Block 1).

NOTE : Charge the ballnut with the applicable grease through the lubrication nipple until clean grease emerges from the vent hole. Remove ejected grease.

(v)Remove support cradle from track 1.
(w)Remove locking device from track 1.
(x)Install access panels 577AB, 577BB (677AB, 677BB).
(y)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(z)Remove safety guard from flap/slat control lever quadrant.

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGES OF THE SURFACES ARE CLEAR.

(aa)Retract Flaps (Ref. 27-50-00, P. Block 301).
(ab)Make certain that check pin can be inserted in carriage 1.
(ac)Remove check pin from carriage 1.
(ad)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
(5)Close-Up
(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(b)Retract flaps (Ref. 27-50-00, P. Block 301).
(c)Remove access platform.
(d)Remove safety barriers.

SCREWJACK 2 (5484, 5527) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

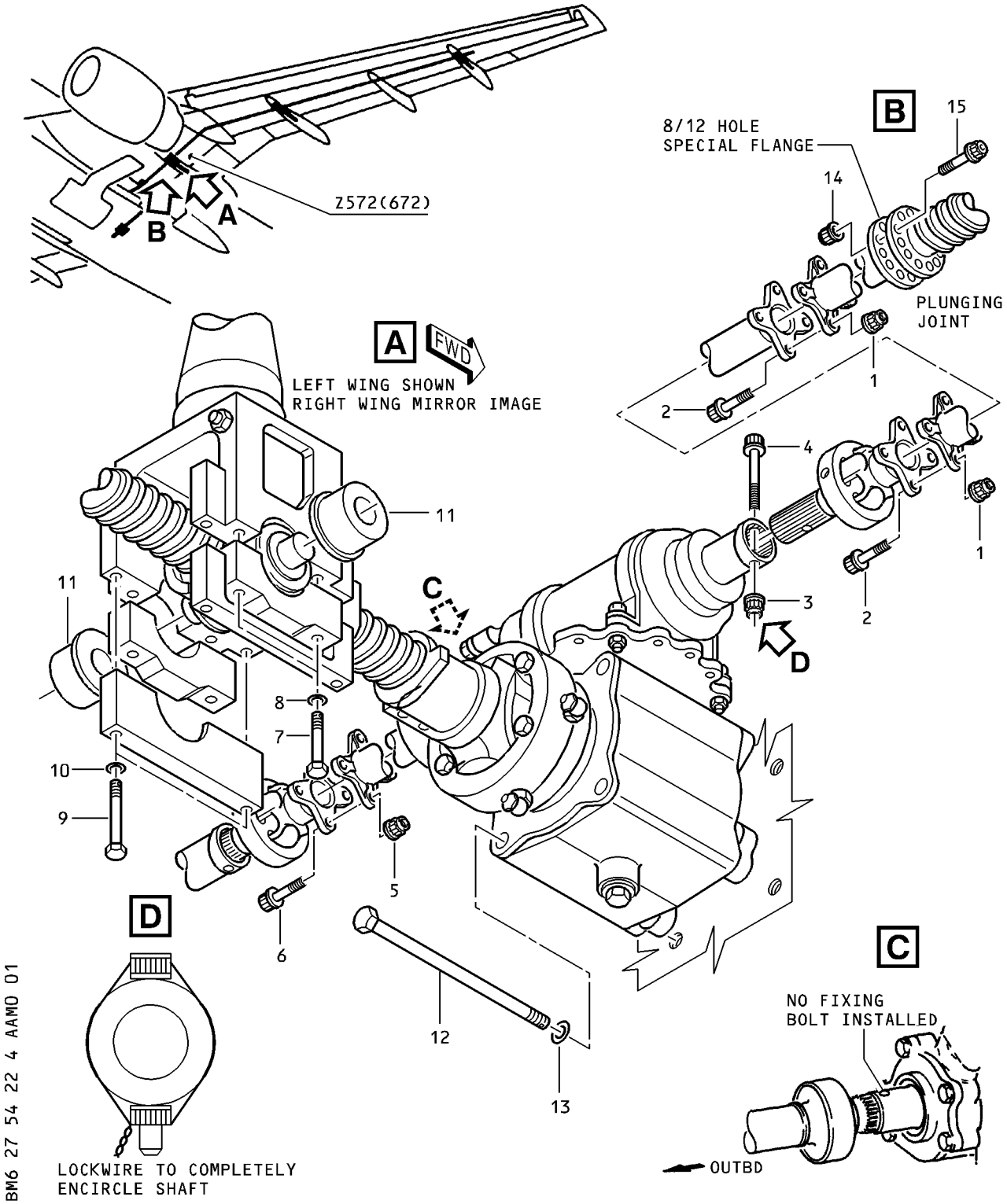
	ITEM	DESIGNATION
	A.	Access Platform, 3.5 m (11 ft.)
R	B. 98A27503003000	Guard - Safety, Flap Slat Ctl Lever
	C. 98A27508015000	Check Pin Set - Flap Neutral Setting
	D. 98A27508026000	Support Cradle - Flap Spindle
	E. 98A27508050000	Turning Jig - Flap Drive Shaft
	F. 98A27508059000	Locking Device Set - Flap Carriage
	G.	Torque Wrench, 7 to 9.5 Nm (65 to 84 lbf.in.)
	H.	Torque Wrench, 10 to 12.5 Nm (90 to 10 lbf.in.)
	I.	Torque Wrench, 35 to 36 Nm (310 to 318 lbf.in.)
	J.	Torque Wrench, 45 to 49 Nm (400 to 430 lbf.in.)
	K.	Safety Barriers
	L.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	M.	Circuit Breaker Safety Clips and Tags
	N. Material No. 04-004	Common Greases (Ref. 20-31-00)
	O. Material No. 05-002	Special Materials (Ref. 20-31-00)
	P. Material No. 05-005	Special Materials (Ref. 20-31-00)
	Q. Material No. 05-039	Special Materials (Ref. 20-31-00)
	R. Material No. 06-002	Lubricants (Ref. 20-31-00)
	S. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 12-13-27, P. Block 1	Flight Controls Replenishing
- 12-22-27, P. Block 1	Flight Controls Lubrication
- 27-50-00, P. Block 301	Flaps
- 27-50-21, P. Block 401	Flap Track Fairings

2. Procedure

A. Screwjack 2 Complete
(Ref. Fig. 401)



Flap Screwjack 2
Figure 401

R

(1)Job Set-Up
(a)Position safety barriers.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.
(b)Extend flaps to 40° (Ref. 27-50-00, P. Block 301).
(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(d)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(e)Position access platform.
(f)Open access panels 572CB, DB (672CB, DB).
(g)Remove flap track 2 fairing (Ref. 27-50-21, P. Block 401).
(h)Install flap carriage locking devices on carriages 2 and 3.
(2)Removal
R (a)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can move the transmission shafts with your hands.
R (b)Remove nuts (1) and bolts (2) from splitter flanges at both ends of section of drive shaft inboard of screwjack 2.
R (c)Extract section of drive shaft.
R (d)Cut and discard lockwire and remove nut (3) and bolt (4) thru splined connection at inboard side of screwjack 2.
R (e)Remove universal joint assembly complete from inboard side of screwjack.
WARNING : TO PREVENT MISMATCH OF INBOARD AND OUTBOARD FLAP POSITIONS, DO NOT ROTATE DRIVE SHAFT WHEN SCREWJACK 2 IS DISCONNECTED FROM SYSTEM.
R (f)Remove nuts (5) and bolts (6) from splitter flange on section of drive shaft outboard of screwjack 2.
R (g)Without subjecting crown spline joint to undue deflection, withdraw section of drive shaft outboard of screwjack 2 from screwjack connection.
R (h)Install screwjack support cradle on screwjack 2.
R (j)Cut and discard lockwire and remove four bolts (9) and washers (10) securing trunnion fail-safe bearing half housing.
R (k)Cut and discard lockwire and remove four bolts (7) and washers (8) securing trunnion primary bearing half housing.
R (l)Remove bushes (11) from screw nut trunnion attachment.
R (m)Support screwjack at forward end.
WARNING : SCREWJACK WEIGHS 35.5 kg (78 lbs.). DURING REMOVAL TAKE CARE TO AVOID INJURY OR DAMAGE.
R (n)Cut and discard lockwire and remove four bolts (12) and washers (13) securing screwjack.
R (p)Remove screwjack from aircraft.

(3)Preparation for Installation
(a)Remove sealant from screwjack mounting.
(b)Examine bushes (11) for excessive wear or damage.
(c)Clean splined surfaces of separated drive connections using white spirit (Material No. 11-002).
(4)Installation
WARNING : SCREWJACK WEIGHS 35.5 kg (78 lbs.). DURING INSTALLATION TAKE CARE TO AVOID INJURY OR DAMAGE.
(a)Apply anti-corrosion compound (Material No. 05-002) to mating face of screwjack mounting.
(b)Position screwjack, secure with washers (13) and bolts (12).
(c)TORQUE bolts (12) to between 45 and 49 Nm (400 and 430 lbf.in.).
(d)Safety with lockwire.
(e)Apply corrosion-preventive (Material No. 05-005) to bolts.
(f)Install bushes (11) on screwjack nut trunnion attachment.
(g)Rotate screwjack spindle until ballnut is correctly aligned with flap trunnion connection.
(h)Apply lubricant (Material No. 06-002) to threads of bolts (7).
R (j)Install primary trunnion bearing half housing and secure with washers (8) and bolts (7).
R (k)TORQUE bolts (7) to between 35 and 36 Nm (310 and 318 lbf.in.).
R (l)Safety with lockwire.
R (m)Apply lubricant (Material No. 06-002) to threads of bolts (9).
R (n)Install screwjack attachment on fail-safe trunnion bearing housing.
R (p)Secure with washers (10) and bolts (9).
R (q)TORQUE bolts (9) to between 35 and 36 Nm (310 and 318 lbf.in.).
R (r)Safety with lockwire.
R (s)Remove screwjack support cradle.
R (t)Apply corrosion-preventive (Material No. 05-005) to heads of bolts (7,9).
R (u)Apply grease (Material No. 04-004) to splined surfaces of drive shaft connection outboard of screwjack 2.
R (v)Without subjecting crown spline joint to undue deflection, install section of driveshaft outboard of screwjack 2 such that bolt holes in splitter flange at outboard end are aligned.
R (w)Secure splitter flange with bolts (6) and nuts (5).
R (x)TORQUE nuts (5) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
R (y)Apply corrosion-preventive (Material No. 05-005) to bolts (6) and nuts (5).
R (z)Apply grease (Material No. 04-004) to splines on universal joint assembly of inboard section of driveshaft.
R (aa)Install universal joint assembly on inboard connection of screwjack, making sure that bolt holes thru male and female portions are aligned.
R (ab)Secure with bolt (4) and nut (3).
R (ac)TORQUE nut (3) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
R (ad)Safety with lockwire.
NOTE: Lockwire is to completely encircle shaft.
R (ae)Apply corrosion-preventive (Material 05-005) to bolt (4) and nut (3).
R (af)Install section of driveshaft inboard of screwjack, secure with bolts (2) and nuts (1) at outboard splitter flange only.

R (ag)Check that bolt holes in splitter flanges at inboard end of drive shaft are aligned.

R (ah)If holes are aligned, proceed as follows:

1 Secure splitter flange at inboard end of drive shaft with bolts (2) and nuts (1).

2 TORQUE nuts (1) at splitter flanges on both ends of drive shaft to between 10.2 and 12.4 Nm (91 and 110 lbf. in.).

3 Apply corrosion-preventive (Material No. 05-005) to bolts (2) and nuts (1).

R (aj)If holes do not align, proceed as follows:

1 Open access door 572AB left wing (672AB right wing).

2 Remove nuts (14) and bolts (15) from special 8/12 hole splitter flange outboard of plunging joint outboard of screwjack 1.

3 Rotate shaft outboard of screwjack 1 until splitter flange holes on shaft inboard of screwjack 2 are aligned.

4 Secure splitter flange with bolts (2) and nuts (1).

5 TORQUE nuts (1) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).

6 Apply corrosion-preventive (Material No. 05-005) to bolts (2) and nuts (1).

7 Check that bolt holes in special 8/12 hole splitter flange are aligned, if not, rotate shaft using turning jig if necessary until bolt holes align.

8 Secure special splitter flange with bolts (15) and nuts (14).

9 TORQUE nuts (14) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).

10 Apply corrosion-preventive (Material No. 05-005) to bolts (15) and nuts (14).

11 Close access door 572AB left wing (672AB right wing).

R (ak)Remove flap carriage locking devices from carriages 2 and 3.

R (al)Lubricate trunnion bearing (Ref. 12-22-27, P. Block 1).

R (am)Lubricate jack ballnut (Ref. 12-22-27, P. Block 1).

NOTE : Charge the ballnut with applicable grease through the lubrication nipple until clean grease emerges from the vent hole. Remove ejected grease.

R (an)Lubricate screwjack universal coupling (Ref. 12-22-27, P. Block 1).

R (ap)Check that screwjack oil levels are correct (Ref. 12-13-27, P. Block 1).

R (aq)Remove safety clips and tags and close circuit breakers 5CV, 6CV, and 10CV.

R (ar)Remove safety guard from flap/slat control lever quadrant.

WARNING : BEFORE OPERATING FLAPS, MAKE SURE THAT TOOLS AND EQUIPMENT ARE CLEAR OF TRAVEL RANGES OF SURFACES.

R (as)Fully retract flaps (Ref. 27-50-00, P. Block 301)

R (at)Open, safety and tag circuit breakers 5CV, 6CV, 10CV.

R (au)Make sure that rigging check pin can be inserted in carriage 2.

R (av)If rigging check pin cannot be inserted, proceed as follows:

1 Install rigging check pin in carriage 1.

R 2 Repeat steps 2(f) and 2(g).

3 Remove nuts (14) and bolts (15) from special 8/12 hole splitter flange outboard of plunging joint outboard of screwjack 1.

4 Rotate screwjack screw shaft as required until check pin can be inserted in carriage 2.

R 5 Repeat steps 4(u) thru 4(y).
6 Install bolts (15) and nuts (14) in special 8/12 hole splitter flange.
7 TORQUE nuts (14) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
8 Apply corrosion-preventive (Material No. 05-039) to nuts (14) and bolts (15).

R (aw)Make sure that rigging check pins are removed from carriages 1 and 2.

R (ax)Remove safety clips and tags and close circuit breakers 5CV, 6CV, 10CV.

R (ay)Fully extend flaps (Ref. 27-50-00, P. Block 301).

(4)Close-Up

(a)Make sure that work area is clean and clear of tools and miscellaneous items of equipment.

(b)Close access panels 572CB, DB, (672CB, DB).

(c)Retract flaps (Ref. 27-50-00, P. Block 301).

(d)Install flap track 2 fairing (Ref. 27-50-21, P. Block 401).

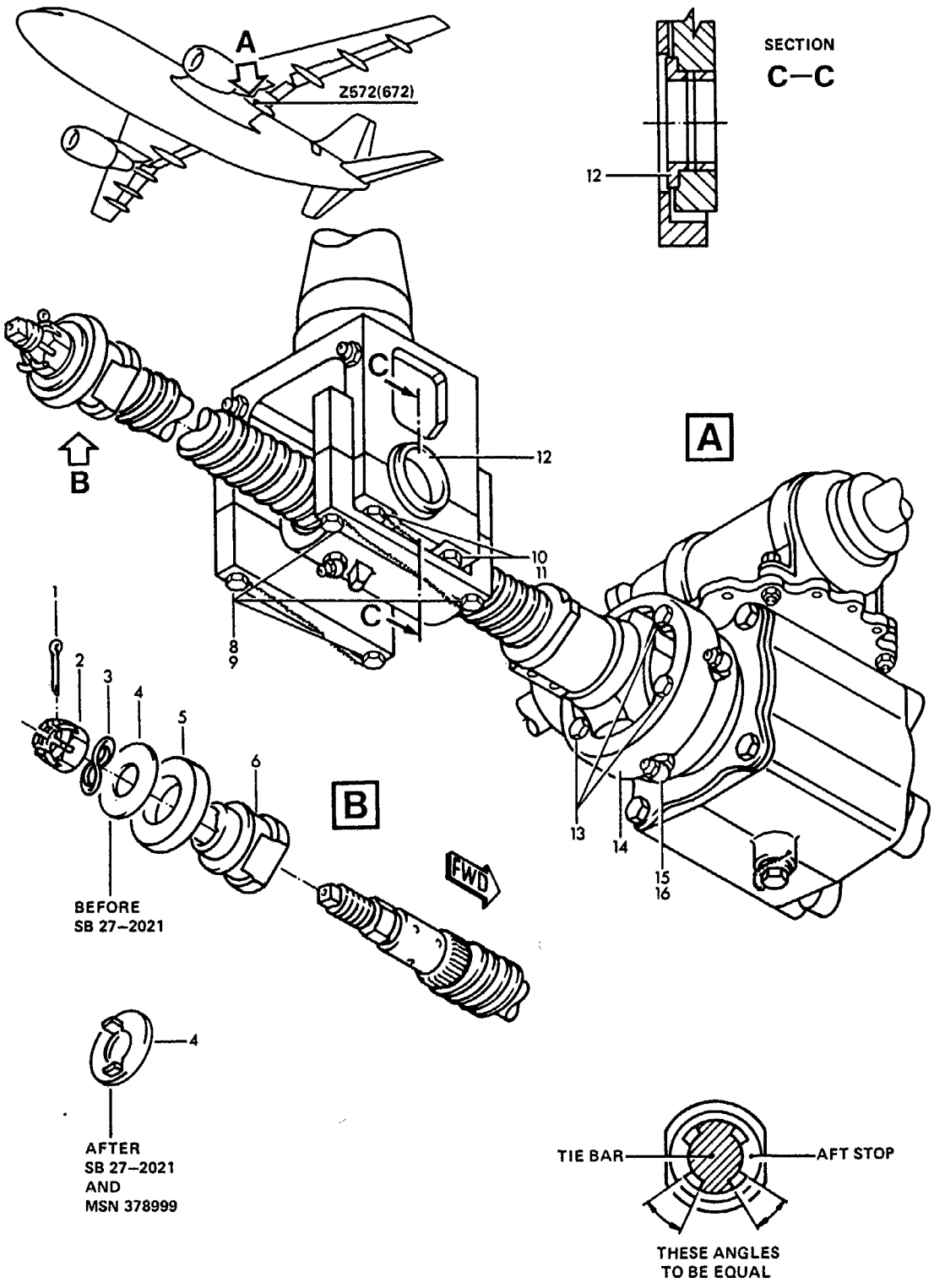
(e)Remove access platform.

(f)Remove safety barriers.

B. Screwjack Spindle/Ballnut
(Ref. Fig. 402)
(1)Job Set-Up
(a)Position safety barriers.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGES OF THE SURFACES ARE CLEAR.
(b)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

R (d)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(e)Position access platform.
(f)Remove flap track 2 fairing (Ref. 27-50-21, P. Block 401).
(g)Using carriage locking device, lock carriage 2.
(h)Install support cradle on flap track 2.
(2)Removal
(a)Note and record angular position of forward claw stop relative to screwjack body to facilitate correct installation of replacement component.
(b)Remove and discard cotter pin (1)
(c)Remove nut (2), wavy washer (3), anti-rotation washer (4), roller (5) and aft stop (6).
(d)Cut and discard lockwire, remove four bolts (8) and washers (9) securing fail-safe trunnion bearing half housing.
(e)Separate primary trunnion bearing housing halves, cut and discard lockwire and remove four bolts (10) and washers (11) securing primary trunnion bearing half housing.
(f)Separate primary bearing housing halves, lower screwjack spindle until ballnut is clear of trunnion.
(g)Remove bushes (12) from ballnut.
(h)Remove four bolts (13) securing retainer (14) to screwjack.
(i)Slide retainer aft to gain access to drive pins (16).
(j)Extract drive pins (16) complete with grease nipples (15) from primary fork.
NOTE : Make certain that the correct two drive pins are removed, not the ones securing the secondary drive tie bar.
NOTE : If difficulty is encountered in extracting drive pins, remove grease nipples (15) and insert a suitably threaded bolt to aid extraction.
(k)Slide screwjack spindle complete with ballnut aft along secondary drive tie bar and remove from aircraft.
NOTE : Do not remove ballnut from screwjack spindle.
(3)Preparation for Installation
(a)Examine bushes (12) for excessive wear and general condition, replace



Screwjack Spindle/Ballnut Removal
Figure 402

if neccessary.

(b)Using white spirit (Material No. 11-002) clean aft end of secondary drive tie bar, and clean nut (2), washers (3),(4), roller (5) and aft stop (6).

R (c)Clean preservative from replacement spindle, and from ballnut.

(d)Transfer retainer (14) to replacement spindle.

(4)Installation

(a)Place spindle complete with ballnut in position on screwjack, making certain that forward claw stop is similarly orientated relative to screwjack body as was removed item.

(b)Connect spindle to screwjack primary output, install drive pins (16) and grease nipples (15).

(c)Install retainer (14) and secure with bolts (13).

(d)TORQUE bolts (13) to between 7.9 and 9.5 Nm. (5.8 and 7.0 lbf.ft.).

(e)Move ballnut along spindle until it is correctly positioned relative to flap trunnion.

(f)Smear inner and outer surfaces of bushes (12) with grease (Material No. 04-004).

(g)Raise spindle and ballnut, positioning ballnut connection in primary trunnion bearing housing.

(h)Install primary trunnion bearing half housing, securing with washers (11) bolts (10).

NOTE : If a badly worn spindle has been replaced with a new component it may be impossible to obtain exact alignment between the ballnut and flap trunnion, a misalignment of 2 mm (0.08 in.) approximately being possible. In this case it will be necessary to slacken the carriage locking device the minimum amount required in order to allow the flaps to be repositioned manually such that the ballnut locates correctly in the trunnion housing. Care must be taken to prevent damage to bushes (12) due to inadvertent contact with machined edges of trunnion bearing housing.

(i)TORQUE bolts (10) to between 35 and 36 Nm (25.8 and 26.6) lbf.ft.).

(j)Safety bolts (10) with lockwire and apply corrosion-preventive (Material No. 05-005) to bolt heads.

(k)Install fail-safe trunnion bearing half housing, securing with washers (9) and bolts (8).

(l)TORQUE bolts (8) to between 35 and 36 Nm (25.8 and 26.6 lbf.ft.).

(m)Safety bolts (8) with lockwire and apply corrosion-preventive (Material No. 05-005) to bolt heads.

(n)Smear inner surfaces of aft stop (6) and roller (5) with grease (Material No. 04-004).

(o)Install aft stop on primary spindle splines, making certain it is correctly positioned relative to tie bar dogs and forward claw stop.

(p)Install roller (5), anti-rotation washer (4), wavy washer (3) and nut (2).

(q)Tighten nut (2) only sufficiently to trap wavy washer (3) with no significant load. If necessary tighten nut (2) further only until first available alignment with cotter pin hole.

(r)Safety nut (2) with cotter pin (1).

(s)Lubricate ballnut and flap trunnion (Ref. 12-22-27, P. Block 1).

R NOTE : Charge the ballnut with applicable grease through the
R lubrication nipple until clean grease emerges from the vent
R hole. Remove ejected grease.

(t)Remove support cradle from track 2.
(u)Remove locking device from track 2.
(v)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(w)Remove safety guard from flap/slat control lever quadrant.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGES OF THE SURFACES ARE CLEAR.
(x)Retract flaps (Ref. 27-50-00, P. Block 301).
(y)Make certain that check pin can be inserted in carriage 2.
(z)Remove check pin from carriage 2.
(aa)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).

(5)Close-Up
(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(b)Retract flaps (Ref. 27-50-00, P. Block 301).
(c)Install flap track 2 fairing (Ref. 27-50-21, P. Block 401).
(d)Remove access platform.
(e)Remove safety barriers.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 4 m (13 ft.)
	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27508015000	Check Pin Set - Flap Neutral Setting
	D. 98A27508026000	Support Cradle - Flap Spindle
	E. 98A27508050000	Turning Jig - Flap Drive Shaft
	F. 98A27508059000	Locking Device Set - Flap Carriage
	G.	Torque Wrench, 7 to 9 Nm (65 to 80 lbf.in.)
	H.	Torque Wrench, 10 to 12.5 Nm (90 to 110 lbf.in.)
	I.	Torque Wrench, 35 Nm (310 lbf.in.)
	J.	Torque Wrench, 45 to 49 Nm (400 to 430 lbf.in.)
R	K.	Torque Wrench, 60 to 65 Nm (531 to 575 lbf.in.)
	L.	Torque Wrench, 16 Nm (142 lbf.in.)
	M.	Safety Barriers
	N.	Cotter Pins
	O.	Spacers
	P.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	Q.	Circuit Breaker Safety Clips and Tags
	R. Material No. 04-004	Common Greases (Ref. 20-31-00)
	S. Material No. 05-002	Special Materials (Ref. 20-31-00)
	T. Material No. 05-005	Special Materials (Ref. 20-31-00)
	U. Material No. 06-002	Lubricants (Ref. 20-31-00)
	V. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

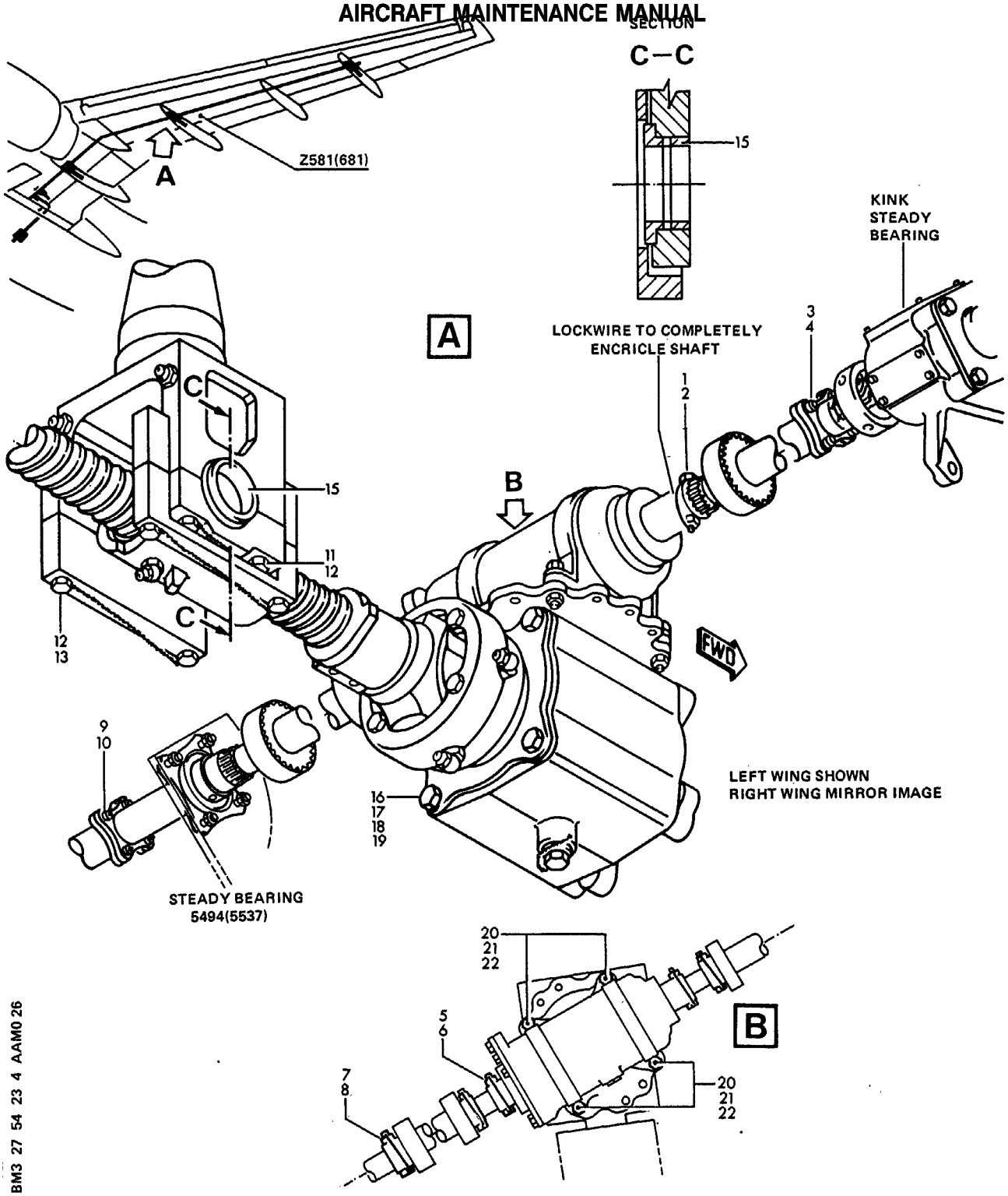
	- 12-13-27, P. Block 1	Flight Controls Replenishing
	- 12-22-27, P. Block 1	Flight Controls Lubrication
	- 27-50-00, P. Block 301	Flaps
	- 27-50-21, P. Block 401	Flap Track Fairings
	- 27-54-19, P. Block 401	Transmission Shafts

2. Procedure

A. Screwjack 3 Complete
(Ref. Fig. 401)
(1)Job Set-Up
(a)Position safety barriers.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.
(b)Extend flaps to 40° (Ref. 27-50-00, P. Block 301).
(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(d)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(e)Position access platform.
(f)Open access panels 575CB, 581BB, CB (675CB, 681BB, CB).
(g)Remove flap track 3 fairing (Ref. 27-50-21, P. Block 401).
(h)Install flap carriage locking devices on carriages 3 and 5.
(2)Removal
(a)Make sure that there is no torque load in the transmission system.
NOTE : There is no torque load in the transmission system if you can move the transmission shafts with your hands.
(b)Cut and discard lockwire and remove nut (1) and bolt (2) thru splined drive shaft connection at inboard side of screwjack 3.
(c)Remove four nuts (3) and bolts (4) and securing drive shaft splitter flange outboard of kink steady bearing.
(d)Without subjecting crown spline joint to undue deflection, separate splitter flange halves and manoeuvre drive shaft inboard to withdraw splined connection from screwjack.
(e)Remove section of drive shaft inboard of screwjack from aircraft.
(f)Withdraw universal joint/splined connection assembly from outboard side of kink steady bearing.
(g)Cut and discard lockwire and remove nut (5) and bolt (6) thru splined drive shaft connection at outboard side of screwjack 3.
(h)Cut and discard lockwire and remove nut (7) and bolt (8) thru crown spline joint at outboard end of drive shaft outboard of screwjack 3.
(j)Mark both halves of crown spline joint to aid correct re-assembly later.
(k)Remove nuts (9) and bolts (10) securing splitter flange outboard of steady bearing 5494 (5537).
(l)Slide section of drive shaft outboard of steady bearing 5494 (5537) as far outboard as possible, then without subjecting crown spline joint to undue deflection, remove section of shaft from aircraft.
(m)Slide section of drive shaft inboard of steady bearing 5494 (5537) as far inboard as possible.



Flap Screwjack 3
Figure 401

(n)While keeping drive shaft held inboard, separate crown spline joint by sliding outboard half into steady bearing.
NOTE : During disengagement of crown spline halves, take care not to damage wiper ring.
(p)Rotate outboard section of crown joint downward (steady bearing will swivel in its housing) and withdraw from steady bearing.
(q)Carefully withdraw section of drive shaft from screwjack 3, and remove from aircraft.
(r)Install screwjack support cradle on track 3.
(s)Cut and discard lockwire and remove four bolts (13) and washers (14), securing flap trunnion fail safe bearing housing.
(t)Cut and discard lockwire and remove four bolts (11) and washers (12), securing flap trunnion primary bearing housing.
(u)Remove two bushes (15).
(v)Remove and discard cotter pins (16) and slacken nuts (17) securing screwjack to mounting.
WARNING : SCREWJACK WEIGHS 23.4 kg (52 lbs.) TAKE CARE DURING REMOVAL TO AVOID INJURY OR DAMAGE.
(w)Support screwjack and remove nuts (17), washers (18) and bolts (19) and securing screwjack to mounting.
NOTE : Quantity and position of washers may vary to facilitate alignment of cotter pin holes, but there must be at least one washer positioned under each nut.
(x)Remove screwjack from aircraft.

(3)Preparation for Installation
(a)Remove old sealant from screwjack mounting bracket.
(b)Examine bushes (15) for excessive wear or damage.
(c)Make sure that screwjack to be installed is set correctly for LH wing or RH wing as applicable, if not, proceed as follows:
1 Remove four nuts (20), remove washers (21) and bolts (22).
2 Rotate screwjack input housing until arrow is aligned with "RH" or "LH" indication as applicable.
3 Install washers (21), bolts (22) and nuts (20).
4 TORQUE nuts (20) to 16.6 Nm (147 lbf.in.).

(4)Installation.
(a)Apply anti-corrosion compound (Material No. 05-002) to mating face of screwjack mounting.
(b)Position screwjack and secure with bolts (19), washers (18) and nuts (17).
R (c)TORQUE nuts (17) to between 60 and 65 Nm (531 and 575 lbf.in.).
(d)Safety with cotter pins (16).
NOTE : In order to make torque of nut coincident with alignment of cotter pin hole, it may be necessary to vary the quantity of washers installed from 1 to 3 at each bolt position. If more than one washer is installed, one must be installed under bolt head.
(e)Apply corrosion preventive (Material No. 05-005) to bolts (19) and nuts (17).
(f)Install bushes (15) on screwjack nut trunnion attachment.
(g)Rotate screwjack spindle until ballnut is correctly aligned with flap trunnion.

(h)Apply lubricant (Material No. 06-002) to threads of bolts (11).
(j)Install screwjack attachment in primary trunnion bearing housing.
(k)Install primary trunnion bearing half housing, secure with washers (12) and bolts (11).
(l)TORQUE bolts (11) to betweem 35 and 36 Nm (310 and 318 lbf.in.).
(m)Safety with lockwire.
(n)Apply lubricant (Material No. 06-002) to threads of bolts (13).
(p)Install fail-safe trunnion bearing half housing, secure with washers (14) and bolts (13).
(q)TORQUE bolts (13) to betweem 35 and 36 Nm (310 and 318 lbf.in.).
(r)Safety with lockwire.
(s)Remove screwjack support cradle.
(t)Apply corrosion preventive (Material No. 05-005) to heads of bolts (11) (13).
(u)Apply grease (Material No. 04-004) to splined surfaces of removed drive shafting.
(v)Insert section of drive shaft into outboard side of screwjack, making certain that bolt holes thru male and female sections of spline are aligned.
(w)Pack female section of crown spline joint with grease (Material No. 04-004).
(x)Insert spline section into steady bearing 5494 (5537), such that when crown spline joint is connected, bolt hole thru both halves and previously applied marks will be aligned.
NOTE : Carry out installation of crown spline joint in accordance with installation of transmission shaft 5493 (5536) (Ref. 27-54-19, P. Block 401).
(y)Make sure that drive shaft is positioned fully inboard and that splines are engaged as far as possible in steady bearing 5494 (5537), then rotate section of crown spline joint engaged in steady bearing upward to align with other half of crown spline joint.
(z)Carefully bring two halves of crown spline joint together, until bolt hole is correctly aligned.
(aa)Install bolt (8) thru crown spline joint and secure with nut (7).
(ab)TORQUE nut (7) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
(ac)Safety with lockwire.
NOTE : Lockwire is to completely encircle shaft.
(ad)Apply corrosion preventive (Material No. 05-005) to bolt (8) and nut (7).
(ae)Install bolt (5) thru spline connection at outboard side of screw-jack and secure with nut (6).
(af)TORQUE nut (6) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).
(ag)Safety with lockwire.
NOTE : Lockwire is to completely encircle shaft.
(ah)Apply corrosion preventive (Material No. 05-005) to bolt (5) and nut (6).
(aj)Without subjecting crown spline joint to undue deflection insert splined connection of drive shaft into steady bearing 5496 (5539), such that splitter flange bolt holes are aligned.
NOTE : If exact alignment of holes cannot be attained, rotate drive shaft outboard of steady bearing 5496 (5539) as required

using turning jig if necessary.

(ak)Install bolts (10) connecting splitter flange halves and secure with nuts (9).

(al)TORQUE nuts (9) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).

(am)Apply corrosion preventive (Material No. 05-005) to bolts (10) and nuts (9).

(an)Apply grease (Material No. 04-004) to splined surfaces of universal joint assembly.

(ap)Insert splined portion of universal joint assembly into kink steady bearing, such that when section of drive shaft is installed, bolt holes thru splitter flanges and thru splined connection at inboard side of screwjack are aligned.

NOTE : If exact alignment cannot be attained, rotate drive shaft inboard of kink steady bearing as necessary using turning jig.

(aq)Install section of drive shaft inboard of screwjack making sure that bolt holes in splitter flanges and splined connection are aligned.

(ar)Secure splitter flange with bolts (4) and nuts (3).

(as)TORQUE nuts (3) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).

(at)Apply corrosion preventive (Material No. 05-005) to bolts (4) and nuts (3).

(au)Install bolt (2) and nut (1) thru splined connection at inboard side of screwjack.

(av)TORQUE nut (1) to between 7.33 and 8.95 Nm (65 and 79 lbf.in.).

(aw)Safety with lockwire.

NOTE : Lockwire is to completely encircle shaft.

(ax)Apply corrosion preventive (Material 05-005) to bolt (2) and nut (1).

(ay)Check that indicating grooves on male portion of splined joints at steady bearing and kink steady bearing are not visible, confirming adequate engagement.

(az)Remove carriage locking devices from tracks 3 and 5.

(ba)Lubricate trunnion bearing (Ref. 12-22-27, P. Block 1).

(bb)Lubricate ballnut (Ref. 12-22-27, P. Block 1).

NOTE : Charge the ballnut with applicable grease through the lubrication nipple, until grease emerges from vent hole. Remove ejected grease.

(bc)Lubricate screwjack universal coupling (Ref. 12-22-27, P. Block 1).

(bd)Check that screwjack oil levels are correct (Ref. 12-13-27, P. Block 1).

(be)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.

(bf)Remove safety guard from flap/slat control lever quadrant.

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TOOLS AND EQUIPMENT ARE CLEAR OF TRAVEL RANGES OF SURFACES.

(bg)Fully retract flaps (Ref. 27-50-00, P. Block 301).

(bh)Open, safety and tag circuit breakers 5CV, 6CV and 10CV.

(bj)Make certain that rigging check pin can be inserted in carriage 3.

(bk)If rigging check pin cannot be inserted, proceed as follows:

1 Install rigging check pin in carriage 5.

2 Repeat steps (2)(b) thru (2)(f).

3 Repeat steps (2)(j), (2)(k).

4 Rotate screwjack screw shaft as required until check pin can be inserted in carriage 3.
5 Repeat steps (4)(aj) thru (4)(am).
6 Repeat steps (4)(aq) thru (4)(ay).
7 Apply corrosion preventive (Material No. 05-005) to nuts (1,3,9) and bolts (2,4,10).

(bl)Make sure that rigging check pins are removed from carriages 3 and 5.
(bm)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(bn)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(bp)Fully retract flaps (Ref. 27-50-00, P. Block 301).

(5)Close-Up
(a)Make sure that work area is clean and clear of tools and miscellaneous items of equipment.
(b)Close access panels 575CB, 581BB, CB (675CB, 681BB, CB).
(c)Retract flaps (Ref. 27-50-00, P. Block 301).
(d)Install flap track 3 fairing (Ref. 27-50-21, P. Block 401).
(e)Remove access platform.
(f)Remove safety barriers.

B. Screwjack Spindle/Ballnut
(Ref. Fig. 402)

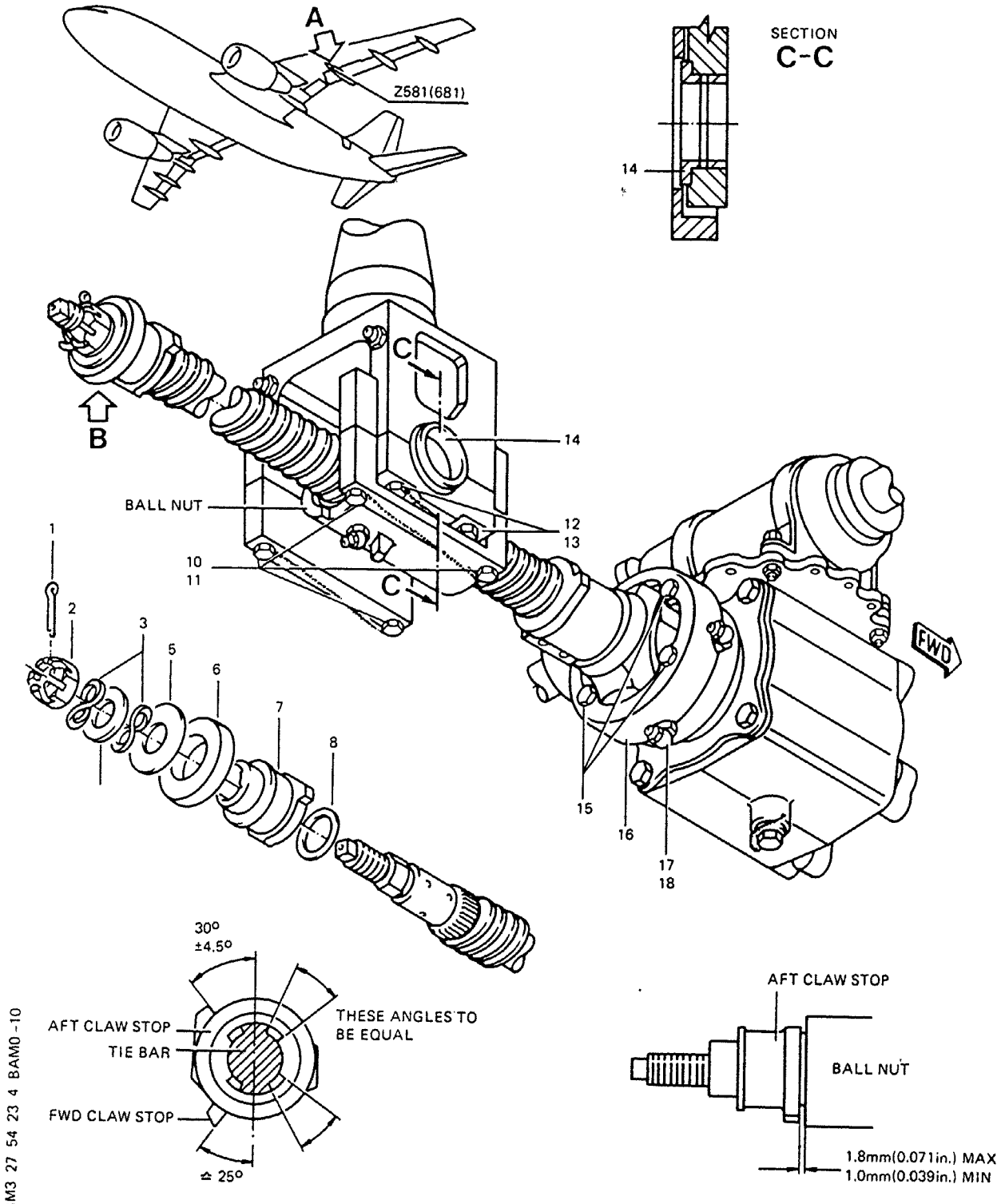
(1)Job Set-Up
(a)Position safety barriers.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.

(b)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(d)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(e)Position access platform.
(f)Remove flap track 3 fairing (Ref. 27-50-21, P. Block 401).
(g)Using carriage locking devices, lock carriages 3 and 5.
(h)Install support cradle on flap track 3.

(2)Removal
(a)Note and record angular position of forward claw stop relative to screwjack body to facilitate correct installation of replacement component.
(b)Remove and discard cotter pin (1).
(c)Remove nut (2), wavy washers (3), washer (4), washer (5), roller (6), aft claw stop (7) and spacer (8).



Screwjack Spindle/Ballnut Removal
Figure 402

(d)Cut and discard lockwire and remove four bolts (10) and washers (11) securing fail-safe trunnion bearing half housing.
(e)Separate fail-safe trunnion bearing housing halves, cut and discard lockwire and remove four bolts (12) and washers (13) securing primary trunnion bearing half housing.
(f)Separate primary bearing housing halves, lower screwjack spindle until ballnut is clear of trunnion.
(g)Remove two bushes (14) from ballnut.
(h)Remove four bolts (15) securing retainer (16) to screwjack.
(i)Slide retainer aft to gain access to drive pins (18).
(j)Extract drive pins (18) complete with grease nipples (17) from primary fork.
NOTE : Make certain that the correct two drive pins are removed, not the ones securing the secondary drive tie bar.
NOTE : If difficulty is encountered in extracting drive pins, remove grease nipples (17) and insert a suitably threaded bolt to aid extraction.
(k)Slide screwjack spindle complete with ballnut aft along secondary drive tie bar and remove from aircraft.
NOTE : Do not remove ballnut from screwjack spindle.

(3)Preparation for Installation
(a)Examine bushes (14) for excessive wear and general condition, replace if neccessary.
(b)Using white spirit (Material No. 11-002) clean aft end of secondary drive tie bar and clean nut (2), washers (3), (4),(5) roller (6), aft claw stop (7) and spacer (8).
(c)Clean preservative from replacement spindle, and from ballnut.
(d)Transfer retainer (16) to replacement spindle.

(4)Installation
(a)Place spindle complete with ballnut in position on screwjack, making certain that forward claw stop is similarly orientated relative to screwjack body as was removed item.
(b)Connect spindle to screwjack primary output, install drive pins (18) and grease nipples (17).
(c)Install retainer (16) and secure with bolts (15).
(d)TORQUE bolts (15) to between 7.9 and 9.5 Nm. (5.8 and 7.0 lbf.ft.).
(e)Apply a smear of grease (Material No. 04-004) to inner surface of aft claw stop (7).
(f)Install spacer (8) in aft claw stop (7) and locate aft claw stop complete with spacer in position on tie bar/spindle assembly, making certain that aft claw stop is correctly orientated with respect to forward claw stop and tie bar dogs.
(g)Hold aft claw stop in position, making sure it is fully home on primary spindle splines and screw ballnut along spindle until ballnut claw stop comes into contact with aft claw stop (7).
(h)Measure gap between aft face of ballnut and forward face of aft claw stop (7). Gap is to be between 1.0 and 1.8 mm (0.039 and 0.071 in.).
(i)If gap is outside limits quoted above, screw ballnut forward slightly, remove aft claw stop (7), add or remove spacers (8) as required, and repeat steps (4)(f) thru (4)(i) as necessary.
(j)Apply a smear of grease (Material 04-004) to inner surface of roller

(6).
(k)Install aft stop on primary spindle splines, making certain it is correctly positioned relative to tie bar dogs and forward claw stop.
(l)Install roller (6), washers (5), (4), wavy washers (3) and nut (2).
(m)Tighten nut (2) only sufficiently to trap wavy washers (3) with no significant load. If necessary tighten nut (2) further only until first available alignment with cotter pin hole.
(n)Safety nut (2) with cotter pin (1).
(o)Move ballnut along spindle until it is correctly positioned relative to flap trunnion.
(p)Apply a smear of grease (Material No. 04-004) to inner and outer surfaces of bushes (14) and install bushes (14) on ballnut.
(q)Raise spindle and ballnut positioning ballnut connection in primary trunnion bearing housing.
(r)Install primary trunnion bearing half housing, securing with washers (13) and bolts (12).
NOTE : If a badly worn spindle has been replaced with a new component it may be impossible to obtain exact alignment between the ballnut and flap trunnion, a misalignment of 2 mm (0.08 in.) approximately being possible. In this case it will be neccessary to slacken the carriage locking device the minimum amount required in order to allow the flaps to be repositioned manually such that the ballnut locates correctly in the trunnion housing. Care must be taken to prevent damage to bushes (12) due to inadvertent contact with machined edges of trunnion bearing housing.
(s)TORQUE bolts (12) to between 35 and 36 Nm (25.8 and 26.6) lbf.ft.).
(t)Safety bolts (12) with lockwire and apply corrosion preventive (Material No. 05-005) to bolt heads.
(u)Install fail-safe trunnion bearing half housing, securing with washers (11) and bolts (10).
(v)TORQUE bolts (10) to between 35 and 36 Nm (25.8 and 26.6 lbf.ft.).
(w)Safety bolts (10) with lockwire and apply corrosion preventive (Material No. 05-005) to bolt heads.
(x)Lubricate ballnut and flap trunnion (Ref. 12-22-27 P. Block 1).
NOTE : Charge the ballnut with applicable grease through the lubrication nipple, until grease emerges from vent hole. Remove ejected grease.
(y)Remove support cradle from track 3.
(z)Remove locking devices from tracks 3 and 5.
(aa)Remove safety clips and tags and close circuit breakers 5 CV, 6 CV and 10 CV.
(ab)Remove safety guard from flap/slat control lever quadrant.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.
(ac)Retract flaps (Ref. 27-50-00 P. Block 301).
(ad)Make certain that check pin can be inserted in carriage 3.
(ae)Remove check pin from carriage 3.
(af)Extend flaps to 40° position (Ref. 27-50-00 P. Block 301).
(5)Close-Up
(a)Make certain that work area is clean and clear of tools and

miscellaneous items of equipment.
(b)Retract flaps (Ref. 27-50-00, P. Block 301).
(c)Install flap track 3 fairing (Ref. 27-50-21, P. Block 401).
(d)Remove access platform.
(e)Remove safety barriers.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 4.5 m (15 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27508015001	Check Pin Set - Flap Neutral Setting
	D. 98A27508026000	Support Cradle - Flap Spindle
	E. 98A27508050000	Turning Jig - Flap Drive Shaft
	F. 98A27508059000	Locking Device Set - Flap Carriage
	G. LL550A017	Alignment Plug
	H.	Torque Wrench, 7 to 9 Nm (65 to 80 lbf.in.)
	I.	Torque Wrench, 10 to 12.5 Nm (90 to 110 lbf.in.)
	J.	Torque Wrench, 16 Nm (142 lbf.in.)
	K.	Torque Wrench, 35 Nm (310 lbf.in.)
	L.	Torque Wrench, 60 to 65 Nm (531 to 575 lbf.in.)
	M.	Safety Barriers
	N.	Hydraulic Blanking Plugs and Caps
	O.	Electrical Connector Protective Caps
	P.	Cotter Pins
	Q.	Spacers
	R.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	S.	Circuit Breaker Safety Clips and Tags
	T. Material No. 04-004	Common Greases (Ref. 20-31-00)
	U. Material No. 05-002	Special Materials (Ref. 20-31-00)
	V. Material No. 05-005	Special Materials (Ref. 20-31-00)
	W. Material No. 06-002	Lubricants (Ref. 20-31-00)
	X. Material No. 09-001	Sealants (Ref. 20-31-00)
	Y. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 12-13-27, P. Block 1	Flight Controls Replenishing
- 12-22-27, P. Block 1	Flight Controls Lubrication
- 20-28-11, P. Block 1	Electrical Bonding

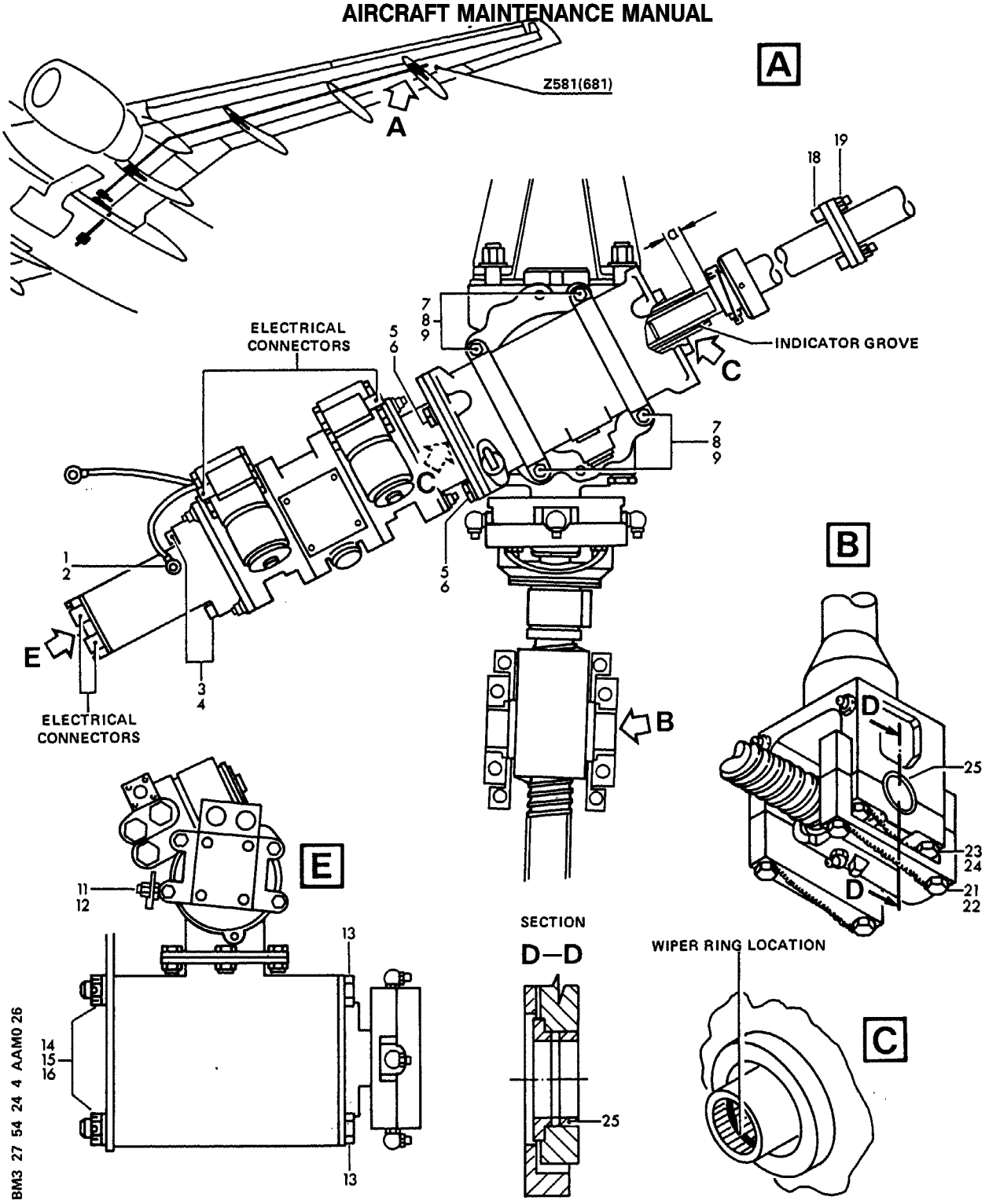
- 27-50-00, P. Block 301 Flaps
- 27-50-21, P. Block 401 Flap Track Fairings
- 27-56-13, P. Block 401 Wing Tip Brake (33CV, 34CV)
- 29-10-00, P. Block 301 Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301 Hydraulic Reservoir Pressurizing System

2. Procedure
(Ref. Fig. 401)

A. Screwjack 4 Complete
(1)Job Set-Up
(a)Position safety barriers.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.
(b)Extend flaps to 40° (Ref. 27-50-00, P. Block 301).
(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(d)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(e)Position access platform.
(f)Open access panels 581GB, HB (681GB, HB).
(g)Remove flap track 5 fairing (Ref. 27-50-21, P. Block 401).
(h)Install flap carriage locking devices on carriage 5.
R (j)Depressurize GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
R (k)Depressurize hydraulic reservoirs supplying BLUE and YELLOW systems (Ref. 29-14-00, P. Block 301).
(2)Removal
(a)Disconnect electrical connectors 29CVA, 29CVB (left wing); 30CVA, 30CVB (right wing) from flap Asymmetry Position Pick-off Unit (APPU).
(b)Install protective caps on connectors.
(c)Remove sealant material and remove bolt (1) and washer (2) securing bonding strap to APPU.
(d)Remove bolts (3), washers (4) and remove APPU from wing, leaving quill drive located in wing tip brake.
(e)Remove sealant material and remove nut (11) and bolt (12) securing bonding strap to wing tip brake.
(f)Disconnect electrical connectors 33CVA, 33CVB (left wing); 34CVA,



Flap Screwjack 4
Figure 401

34CVB (right wing), from wing tip brake.
(g)Install protective caps on connectors.
(h)Disconnect hydraulic pipes from wing tip brake.
R (j)Install blanking caps and plugs on opened hydraulic lines.
R (k)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can
R move the transmission shafts with your hands.
R (l)Install flap carriage locking device on carriage 5.
R (m)Remove nuts (18) and bolts (19) securing splitter flange on drive shaft inboard of jack 4.
R (n)Without subjecting crown spline joint to undue deflection, manoeuvre shaft inboard and withdraw splined connection from inboard side of screwjack 4.
R (p)Install screwjack support cradle on track 5.
R (q)Cut and discard lockwire and remove bolts (21), washers (22) securing flap trunnion fail-safe bearing half-housing.
R (r)Cut and discard lockwire and remove bolts (23), washers (24) securing flap trunnion primary bearing half-housing.
R (s)Remove two bushes (25).
WARNING : SCREWJACK ASSEMBLY WITH WING TIP BRAKE ATTACHED WEIGHS 33 kg (73 lbs.). DURING REMOVAL TAKE CARE TO PREVENT INJURY OR DAMAGE.
R (t)Support forward end of screwjack and remove and discard cotter pins (14), remove nuts (15), washers (16) and bolts (13) securing screwjack and remove screwjack from aircraft.
NOTE : Quantity of washers installed at each bolt position may vary to facilitate cotter pin hole alignment, but there must be at least one washer under each nut.

(3)Preparation for Installation
(a)Remove bolts (5), washers (6) and separate APPU adapter/wing tip brake/wing tip brake adapter assembly as a unit from screwjack.
(b)Withdraw quill shaft from screwjack.
(c)Remove sealant material from screwjack mounting, examine mounting structure for cracks or corrosion.
(d)Examine bushes (25) for damage or excessive wear.
(e)Make sure that screwjack to be installed is set correctly for LH wing or RH wing as applicable.
(f)If screwjack requires resetting, proceed as follows:
1 Remove four nuts (7), remove washers (8) and bolts (9).
2 Rotate screwjack input housing until arrow is aligned with "RH" or "LH" indication as applicable.
3 Install bolts (9), washers (8) and nuts (7).
4 TORQUE nuts (7) to 16.6 Nm (147 lbf.in.).
(g)If same screwjack is to be re-installed;
1 Remove felt wiper rings from quill shaft and transmission shaft connections in screwjack input housing.
2 Remove sealant material from adapter/screwjack mating surfaces.
3 Using white spirit (Material No. 11-002) clean splined surfaces.
4 Install new felt wiper rings, using alignment plug.
(h)If new screwjack is to be installed;
1 Remove sealant material from adapter/screwjack mating surfaces,

2 Using white spirit (Material No. 11-002) clean splined surfaces.
3 Install new felt wiper rings, using alignment plug.

R (j)Smear splines of quill shaft with grease (Material No. 04-004) and insert quill shaft in outboard side of screwjack.

R (k)Apply anti-corrosion compound (Material No. 05-002) to adapter/screwjack mating surface.

R (l)Install APPU adapter/wing tip brake/wing tip brake adapter assembly on screwjack.
1 Install bolts (5) and washers (6).
2 TORQUE bolts (5) to 8.0 Nm (71 lbf.in.).

(4)Installation (Ref. Fig. 401)
(a)Apply anti-corrosion compound (Material Nr. 05-002) to mating face of screwjack mounting.
(b)Install screwjack, secure with bolts (13), washers (16) and nuts (15).
(c)TORQUE nuts (15) to between 60 and 65 Nm (531 and 575 lbf.in.).
(d)Safety with cotter pins (14).
NOTE : In order to make torqueing of nut coincident with alignment of cotter pin hole, it may be necessary to vary the quantity of washers installed from 1 to 3 at each bolt position. If more than one washer is installed, one must be installed under bolt head.
(e)Apply corrosion preventive (Material No. 05-005) to bolts (13) and nuts (15).
(f)Install bushes (25) on ballnut trunnion attachments.
(g)Rotate screwjack spindle until ballnut is correctly aligned with flap trunnion.
(h)Apply lubricant (Material No. 06-002) to threads of bolts (23).

R (j)Install ballnut attachments in primary trunnion bearing housing.
R (k)Secure with washers (24) and bolts (23).
R (l)TORQUE bolts (23) to between 35 and 36 Nm (310 and 318 lbf.in.).
R (m)Safety with lockwire.
R (n)Apply lubricant (Material No. 06-002) to threads of bolts (21).
R (p)Install fail-safe trunnion bearing half housing, secure with washers (22) and bolts (21).
R (q)TORQUE bolts (21) to between 35 and 36 Nm (310 and 318 lbf.in.).
R (r)Safety with lockwire.
R (s)Remove screwjack support cradle.
R (t)Apply corrosion preventive (Material No. 05-005) to heads of bolts (21),(23).
R (u)Apply grease (Material No. 04-004) to splined surfaces of removed section of drive shafting.
R (v)Without subjecting crown spline joint to undue deflection, install drive shaft inboard of screwjack, such that bolt holes in splitter flange halves are aligned.
NOTE : If exact alignment of holes cannot be obtained, rotate driveshaft inboard of splitter flange as required, using turning jig if necessary.
R (w)Connect splitter flange halves, secure with bolts (19) and nuts (18).
R (x)TORQUE nuts (18) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
R (y)Apply corrosion preventive (Material No. 05-005) to bolts (19) and nuts (18).

R (z)Check that groove on male portion of spline connection is inside female portion of spline connector, indicating adequate engagement and that dimension 'a' is at least 10 mm (0.4 in.).
R (aa)Smear splined surfaces of quill drive in outboard end of wing tip brake with grease (Material No. 04-004).
R (ab)Install APPU on adapter, secure with washers (4) and bolts (3).
R (ac)TORQUE bolts (3) to between 7.9 and 9.6 Nm (70 and 85 lbf.in.).
R (ad)Remove blanking caps and plugs and connect hydraulic pipes to wing tip brake.
R (ae)Attach bonding strap to wing tip brake, secure with bolt (12) and nut (11).
R (af)Apply sealant (Material No. 09-001) to bonding strap connection.
R (ag)Attach bonding strap to APPU, secure with washer (2) and bolt (1).
R (ah)Apply sealant (Material No. 09-001) to bonding strap connection.
R (aj)Remove protective caps and reconnect electrical connectors 29CVA, 29CVB (left wing); 30CVA, 30CVB (right wing) to APPU.
R (ak)Remove protective caps and reconnect electrical connectors 33CVA, 33CVB (left wing); 34CVA, 34CVB (right wing) to flap wing tip brake.
R (al)Remove flap carriage locking device from track 5.
R (am)Lubricate trunnion primary and fail-safe bearing housings (Ref. 12-22-27, P. Block 1).
R (an)Lubricate ballnut (Ref. 12-22-27, P. Block 1).
NOTE : Charge the ballnut with applicable grease through the lubrication nipple until clean grease emerges from the vent hole. Remove ejected grease.
R (ap)Lubricate screwjack universal coupling (Ref. 12-22-27, P. Block 1).
R (aq)Make sure that screwjack oil levels are correct (Ref. 12-13-27, P. Block 1).
R (ar)Pressurize hydraulic reservoirs supplying BLUE and YELLOW systems (Ref. 29-14-00, P. Block 301).
R (as)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV and 10CV.
R (at)Bleed wing tip brake (Ref. 27-56-13, P. Block 401).
R (au)Carry out functional test of wing tip brake (Ref. 27-56-13, P. Block 401).
R (av)Remove safety guard from flap/slat control lever quadrant.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGES OF SURFACES ARE CLEAR.
R (aw)Fully retract flaps (Ref. 27-50-00, P. Block 301).
R (ax)Open, safety and tag circuit breakers 5CV, 6CV and 10CV.
R (ay)Make sure that rigging check pin can be inserted in carriage 5.
R (az)If rigging check pin cannot be inserted, proceed as follows:
1 Install rigging check pin in carriage 3.
R 2 Repeat steps (2)(m) thru (2)(n).
3 Rotate screwjack screw shaft as required until check pin can be inserted in carriage 5.
R 4 Repeat steps (4)(w) thru (4)(z).
R (ba)Make sure that rigging check pins are removed from carriages 3 and 5.
R (bb)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.

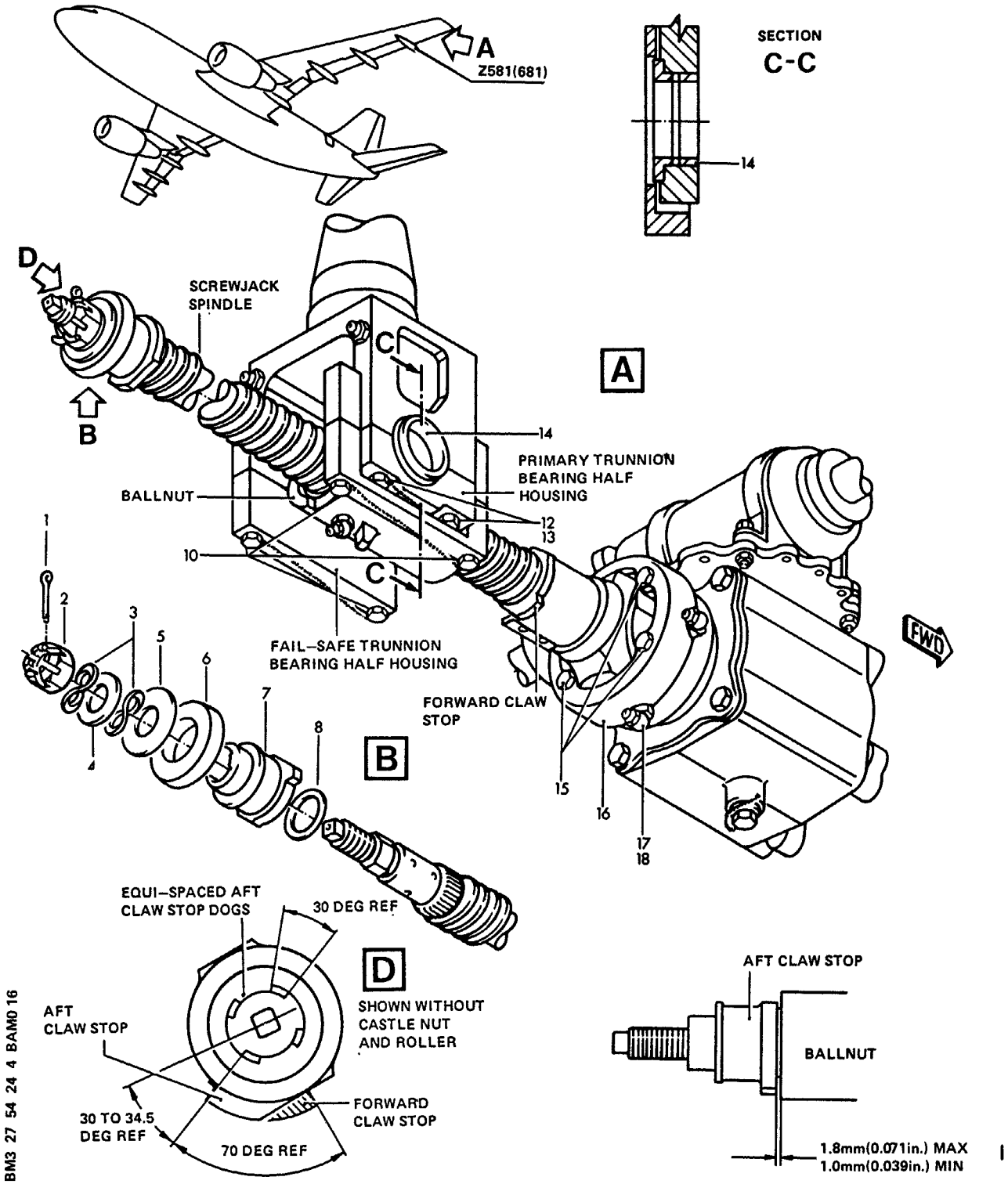
R (bc)Fully extend flaps (Ref. 27-50-00, P. Block 301).

(5)Close-Up
(a)Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.
(b)Close access panels 581GB, HB, (681GB, HB).
(c)Install flap track fairing (Ref. 27-50-21, P. Block 401).
(d)Remove access platform.
(e)Remove safety barriers.

B. Screwjack Spindle/Ballnut
(Ref. Fig. 402)
(1)Job Set-Up
(a)Position safety barriers.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGES OF SURFACES ARE CLEAR.
(b)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(d)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(e)Position access platform.
(f)Remove flap track 5 fairing (Ref. 27-50-21, P. Block 401).
(g)Using carriage locking device, lock carriage 5.
(h)Install support cradle on flap track 5.
(2)Removal
(a)Note and record angular position of forward claw stop relative to screwjack body to facilitate correct installation of replacement component.
(b)Remove and discard cotter pin (1).
(c)Remove nut (2), wavy washers (3), washer (4), washer (5), roller (6), aft claw stop (7) and spacer (8).
(d)Cut and discard lockwire and remove four bolts (10) and washers (11) securing fail-safe trunnion bearing half housing.
(e)Separate fail-safe trunnion bearing housing halves, cut and discard lockwire and remove four bolts (12) and washers (13) securing primary trunnion bearing half housing.
(f)Separate primary bearing housing halves, lower screwjack spindle until ballnut is clear of trunnion.
(g)Remove two bushes (14) from ballnut.
(h)Remove four bolts (15) securing retainer (16) to screwjack.
(i)Slide retainer aft to gain access to drive pins (18).
(j)Extract drive pins (18) complete with grease nipples (17) from primary fork.



Screwjack Spindle/Ballnut Removal
Figure 402

NOTE : Make certain that the correct two drive pins are removed, not the ones securing the secondary drive tie bar.

NOTE : If difficulty is encountered in extracting drive pins, remove grease nipples (17) and insert a suitably threaded bolt to aid extraction.

(k)Slide screwjack spindle complete with ballnut aft along secondary drive tie bar and remove from aircraft.

NOTE : Do not remove ballnut from screwjack spindle.

(3)Preparation for Installation

(a)Examine bushes (14) for excessive wear and general condition, replace if neccessary.

(b)Using white spirit (Material No. 11-002) clean aft end of secondary drive tie bar and clean nut (2), washers (3),(4),(5) roller (6), aft claw stop (7) and spacer (8).

(c)Clean preservative from replacement spindle, and from ballnut.

(d)Transfer retainer (16) to replacement spindle.

(4)Installation

(a)Place spindle complete with ballnut in position on screwjack, making certain that forward claw stop is similarly orientated relative to screwjack body as was removed item.

(b)Connect spindle to screwjack primary output, install drive pins (18) and grease nipples (17).

(c)Install retainer (16) and secure with bolts (15).

(d)TORQUE bolts (15) to between 7.9 and 9.5 Nm. (5.8 and 7.0 lbf.ft.).

(e)Apply a smear of grease (Material No. 04-004) to inner surface of aft claw stop (7).

(f)Install spacer (8) in aft claw stop (7) and locate aft claw stop complete with spacer in position on tie bar/spindle assembly, making certain that aft claw stop is correctly orientated with respect to forward claw stop.

(g)Hold aft claw stop in position, making sure it is fully home on primary spindle splines and correctly positioned relative to tie bar dogs, screw ballnut along spindle until ballnut claw stop comes into contact with aft claw stop (7).

(h)Measure gap between aft face of ballnut and forward face of aft claw stop (7). Gap is to be between 1.0 and 1.8 mm (0.039 and 0.071 in.).

(i)If gap is outside limits quoted above, screw ballnut forward slightly, remove aft claw stop (7), add or remove spacers (8) as required, and repeat steps (4)(f) thru (4)(i) as necessary.

(j)Apply a smear of grease (Material 04-004) to inner surface of roller (6).

(k)Install aft stop on primary spindle splines, making certain it is correctly positioned relative to tie bar dogs and forward claw stop.

(l)Install roller (6), washers (5),(4), wavy washers (3) and nut (2).

(m)Tighten nut (2) only sufficiently to trap wavy washers (3) with no significant load. If necessary tighten nut (2) further only until first available alignment with cotter pin hole.

(n)Safety nut (2) with cotter pin (1).

(o)Move ballnut along spindle until it is correctly positioned relative to flap trunnion.

(p)Apply a smear of grease (Material No. 04-004) to inner and outer

surfaces of bushes (14) and install bushes (14) on ballnut.

(q)Raise spindle and ballnut positioning ballnut connection in fail-safe trunnion bearing housing.

(r)Install primary trunnion bearing half housing, securing with washers (13) and bolts (12).

NOTE : If a badly worn spindle has been replaced with a new component it may be impossible to obtain exact alignment between the ballnut and flap trunnion, a misalignment of 2 mm (0.08 in.) approximately being possible. In this case it will be neccessary to slacken the carriage locking device the minimum amount required in order to allow the flaps to be repositioned manually such that the ballnut locates correctly in the trunnion housing. Care must be taken to prevent damage to bushes (14) due to inadvertent contact with machined edges of trunnion bearing housing.

(s)TORQUE bolts (12) to between 35 and 36 Nm (25.8 and 26.6 lbf.ft.).

(t)Safety bolts (12) with lockwire and apply corrosion preventive (Material No. 05-005) to bolt heads.

(u)Install fail-safe trunnion bearing half housing, securing with washers (11) and bolts (10).

(v)TORQUE bolts (10) to between 35 and 36 Nm (25.8 and 26.6 lbf.ft.).

(w)Safety bolts (10) with lockwire and apply corrosion preventive (Material No. 05-005) to bolt heads.

(x)Lubricate ballnut and flap trunnion (Ref. 12-22-27 P. Block 1).

NOTE : Charge the ballnut with applicable grease through the lubrication nipple until clean grease emerges from the vent hole. Remove ejected grease.

(y)Remove support cradle from track 5.

(z)Remove locking device from track 5.

(aa)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.

(ab)Remove safety guard from flap/slat control lever quadrant.

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGES OF SURFACES ARE CLEAR.

(ac)Retract flaps (Ref. 27-50-00 P. Block 301).

(ad)Make certain that check pin can be inserted in carriage 5.

(ae)Remove check pin from carriage 5.

(af)Extend flaps to 40° position (Ref. 27-50-00 P. Block 301).

(5)Close-Up

(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(b)Retract flaps (Ref. 27-50-00, P. Block 301).

(c)Install flap track 5 fairing (Ref. 27-50-21, P. Block 401).

(d)Remove access platform.

(e)Remove safety barriers.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

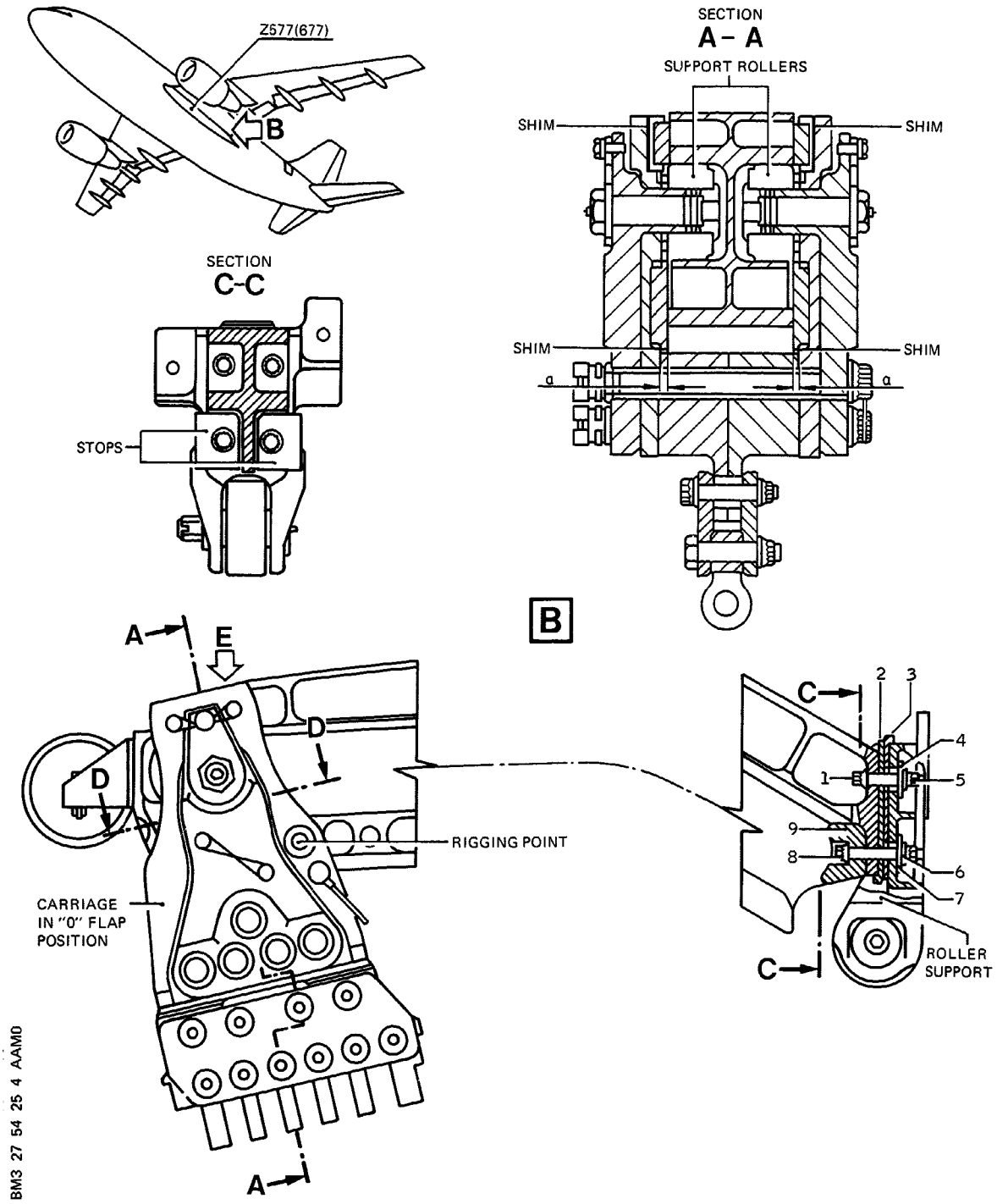
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

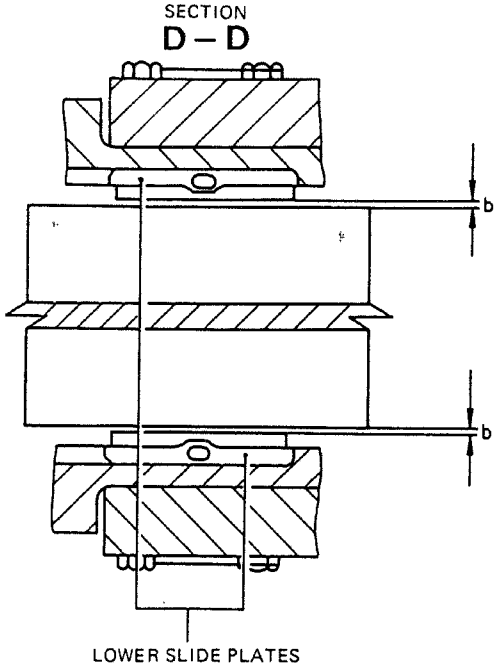
ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
R B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C. 98A27508003000	Rigging Pin Set - Flap Adjustment
D.	Torque Wrench, 0.3 to 0.4 m.daN (2.21 to 2.95 lbf.ft.)
E.	Torque Wrench, 3.5 to 6.5 m.daN (25.8 to 47.9 lbf.ft.)
F.	Safety Barriers
G.	Circuit Breaker Safety Clips and Tags
H. Material No. 05-002	Special Materials (Ref. 20-31-00)
I. Material No. 09-001	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-50-11, P. Block 401	Inboard Flap
- 27-54-36, P. Block 401	Flap Screwjack 1 Support Spring

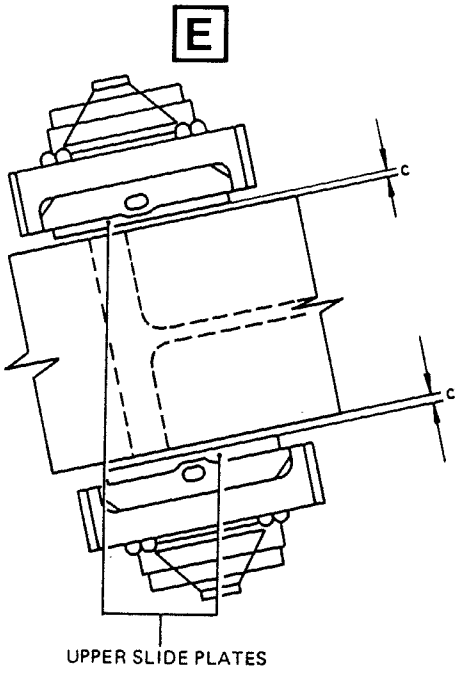
2. Procedure
(Ref. Fig. 401)
(Ref. Fig. 402)

A. Job Set-Up
(1)Position safety barriers.
(2)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
R (3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)Open, safety and tag the following circuit breakers:



Carriage 1
Figure 401





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Carriage 1
Figure 402

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(5)Position access platform.
(6)Remove inboard flap (Ref. 27-50-11, P. Block 401).
(7)Remove flap screwjack 1 support spring (Ref. 27-54-36, P. Block 401).

B. Removal

CAUTION : CARRIAGE 1 WEIGHS APPROXIMATELY 9 kg (19.8 lbs.).

(1)Position carriage 1 to forward position on flap track 1 (corresponding to "0" flap setting).
(2)Install rigging pin PN 98A27508003100 of rigging pin set PN 98A27508003000 in carriage 1, track 1.
(3)At aft end of track 1 remove nuts (6), washers (7), bolts (8) and stops (9).
(4)Remove nuts (5), washers (4) and bolts (1).
(5)Remove roller support from flap track 1, together with serrated plates (2) and (3).
(6)Remove rigging pin PN 98A27508003100 from carriage 1, flap track 1.
(7)Remove carriage 1 (weight 9 kg) (19.8 lbs.).

C. Installation

CAUTION : CARRIAGE 1 WEIGHS APPROXIMATELY 9 kg (19.8 lbs.).

(1)Install carriage 1 in forward position on flap track 1 (corresponding to "0" flap setting).
(2)Install rigging pin PN 98A27508003100 in carriage 1, flap track 1.
(3)Check clearance between upper and lower slide plates and flap track 1 as follows:
(a)Dimension "b" between lower slide plates and flap track must be 0.1 to 0.3 mm (0.004 to 0.012 in.) each side, shim as required.
(b)Dimension "c" between upper side plates and flap track must be 0.1 to 0.3 mm (0.004 to 0.012 in.) each side, shim as required.
(c)Check that dimension "a" is equal to within ±0.10 mm (±0.004 in.).
(4)When required clearances have been obtained, slide plate attaching fasteners must be torqued to the following values:
- TORQUE nuts to between 0.3 to 0.4 m.daN (2.21 to 2.95 lbf.ft.).
(5)At slide plate attaching fasteners apply sealant (Material No. 09-001) to nuts and exposed threads.
(6)Apply anti-corrosion compound (Material No. 05-002) over full length of bolts (1) and (8).
(7)At aft end of flap track 1, install bolts (1).
(8)Position stops (9) and install bolts (8).
(9)Install serrated plate (2) on bolts (1) and (8).
(10)Position serrated plate (3) on bolts (1) and (8) in approximately mid position. Make certain that teeth in serrated plate (3) are correctly engaged with teeth in serrated plate (2).

(11)Install roller support on bolts (1) and (8) and slide upwards until shoulder of roller support engages with flange of serrated plate (3). Make certain that serrated plate (3) does not move from mid position.
(12)Install washers (4), nuts (5) and hand tighten.
(13)Install washers (7), nuts (6) and TORQUE to between 3.5 to 6.5 m.daN (25.8 to 47.9 lbf.ft.).
(14)TORQUE nuts (5) to between 3.5 to 6.5 m.daN (25.8 to (47.9 lbf.ft.).
(15)Remove rigging pin PN 98A27508003100 from carriage 1, flap track 1.
(16)Position carriage 1 at aft end of flap track 1.
(17)Install inboard flap (Ref. 27-50-11, P. Block 401).
(18)Install flap screwjack 1 support spring (Ref. 27-54-36, P. Block 401).
(19)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(20)Remove safety guard from flap/slat control lever quadrant.
(21)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).

D. Test
(1)Carry out operational test (Ref. 27-54-00, P. Block 501) and observe carriage 1 during operation for correct movement in the track.

E. Close-Up
(1)Remove safety barriers.
(2)Remove access platform.
(3)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Carriage 1 - General Check

A. Reason for the Job
(1)To inspect carriage 1 for general condition and security.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 3.5 m (11 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)	Circuit Breaker Safety Clips and Tags
	(4)	Safety Barriers

Referenced Procedure
- 27-50-00, P. Block 301 Flaps

C. Procedure
(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 20° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.
(2)Inspection/Check
(a)Inspect carriage and attachments for corrosion, cracks or any other damage; none of these are permitted.

(b)Inspect carriage rollers for excessive wear, corrosion or any other damage; none of these are permitted.
(c)Check that all safety devices are intact.

(3)Close-Up
(a)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(b)Remove safety guard from flap/slat control lever quadrant.
(c)Remove access platform.
(d)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(e)Remove safety barriers.
(f)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3.5 m (11 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27508003000	Rigging Pin Set - Flap Adjustment
	D. 98A27508007000	Extractor Set - Spigot Dowels Flap Carriages 2 thru 5
	E.	Torque Wrench, 0.3 to 12.5 m.daN (2.21 to 92.19 lbf.ft.)
	F.	Safety Barriers
	G.	Circuit Breaker Safety Clips and Tags
	H.	Cotter Pins
	I.	Feeler Gage
	J. Material No. 05-002	Special Materials (Ref. 20-31-00)
	K. Material No. 09-016	Sealants (Ref. 20-31-00)

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-50-11, P. Block 401	Inboard Flap
- 27-50-21, P. Block 401	Flap Track Fairings
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)

2. Procedure

(Ref. Fig. 401)
(Ref. Fig. 402)

A. Carriage Complete

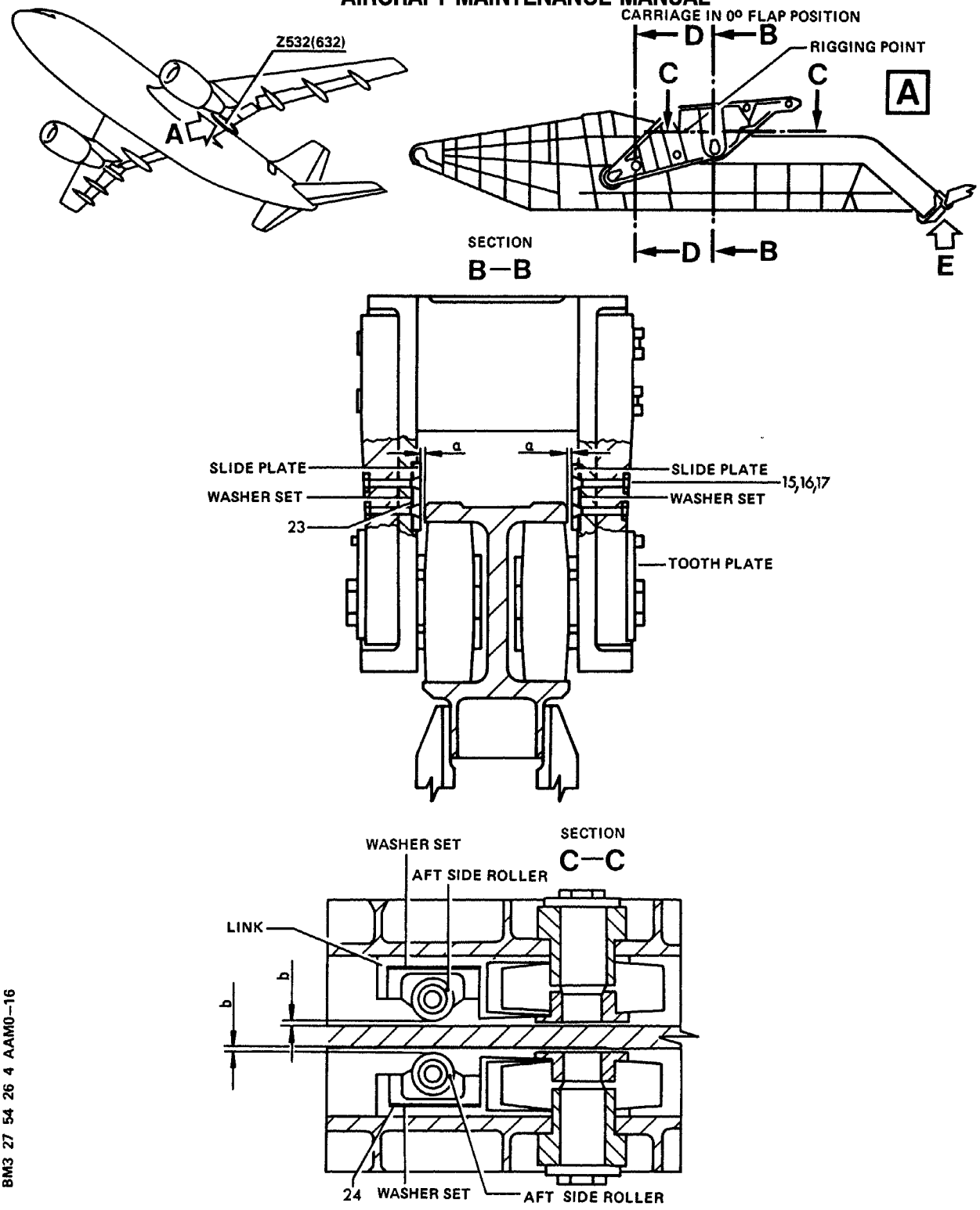
(1)Job Set-Up

(a)Position safety barriers.

(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).

R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(d)Open, safety and tag the following circuit breakers:



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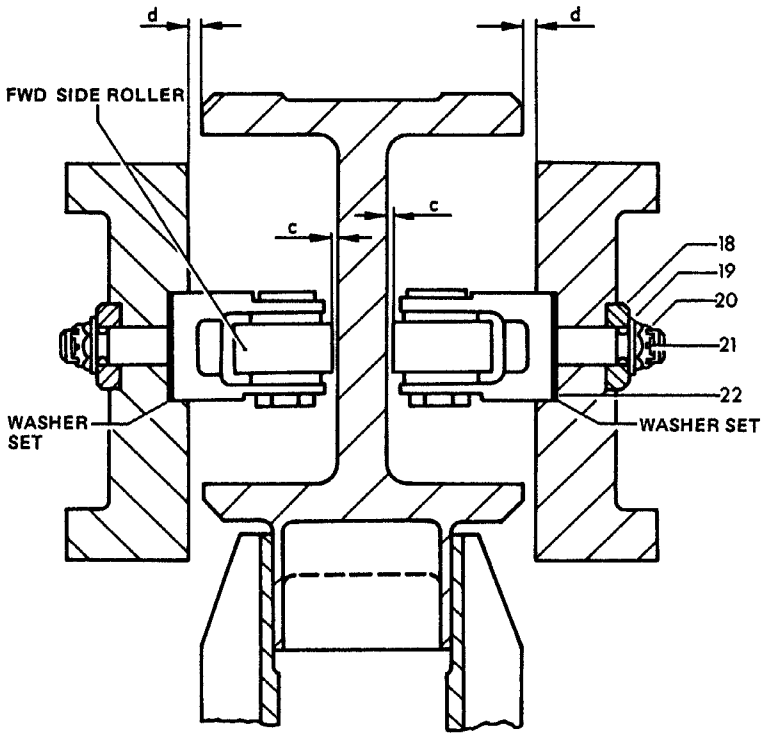
Carriage 2
Figure 401

SECTION
D–D



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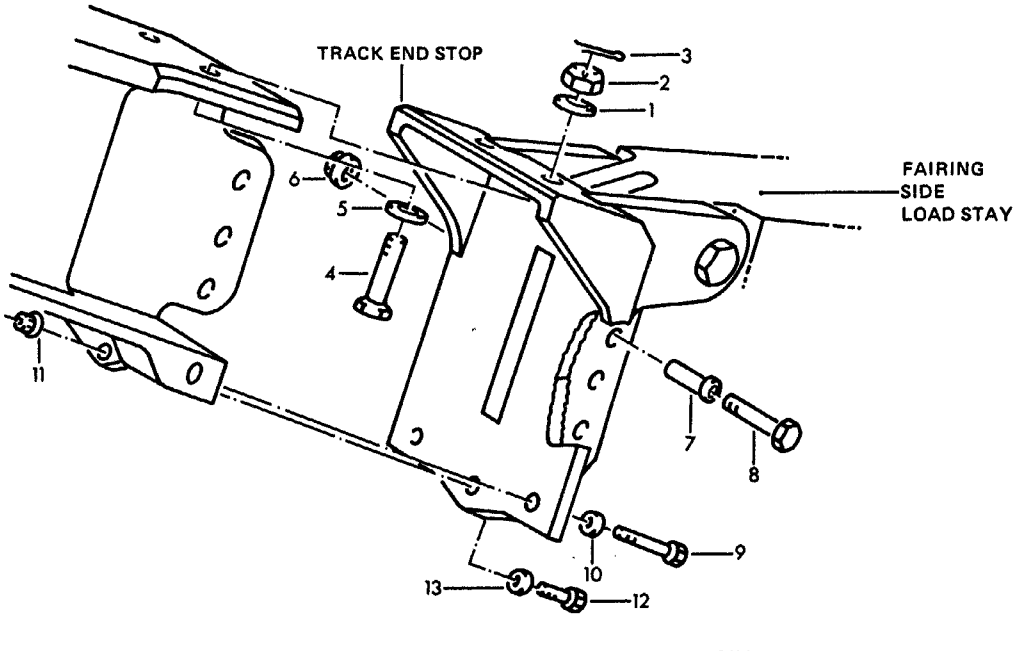

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Carriage 2
Figure 402

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.
(f)Remove fairing, flap track 2 (Ref. 27-50-21, P. Block 401).
(g)Remove inboard flap (Ref. 27-50-11, P. Block 401).

(2)Removal

CAUTION : CARRIAGE 2 WEIGHS APPROXIMATELY 80 kg (176 lb.).

(a)Position carriage 2 to forward position on track (corresponding to 0° flap setting).
(b)Install rigging pin PN 98A27508003200 of rigging pin set PN 98A27508003000 in carriage 2, track 2.
(c)At aft end of track 2 remove and discard cotter pins (3). Remove castle nuts (2), washers (1), bolts (4) and washers (5) from track 2 stop.
(d)Remove nuts (6), bolts (8) and bushes (7).
(e)Remove nut (11), bolt (12) and washer (13).
(f)Remove bolt (9) and washer (10).
(g)Remove track end stop with fairing side load stay to clear end of track.

WARNING : BEFORE REMOVAL OF RIGGING PIN, (A MINIMUM OF) THREE OPERATIVES MUST BE SUITABLY POSITIONED TO SUPPORT THE CARRIAGE AND REMOVE IT FROM THE TRACK.

(h)Support carriage 2 and remove rigging pin PN 98A27508003200 from carriage 2, track 2.
(i)Remove carriage 2.

(3)Installation

WARNING : CARRIAGE 2 WEIGHS APPROX. 80 kg (176 lb.). WHEN INSTALLING CARRIAGE 2, IT MUST BE SUITABLY SUPPORTED.

(a)If the removed carriage is to be re-installed, proceed as follows:
1 Position carriage 2 on track 2 and push carriage 2 forward until rigging pin holes are aligned (flap 0° position).
2 Install rigging pin PN 98A27508003200 in carriage 2, track 2.
3 Check clearances "a", "b", "c" and "d" between carriage 2 and track 2:
"a" = 0.7 to 0.9 mm (0.028 to 0.035 in.)
"b" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"c" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"d" = equal on both sides ±0.1 mm (±0.004 in.)
4 If any of the clearances above are not obtained, refer to step (3)(b).
(b)If a new carriage is to be installed, proceed as follows:
1 Remove washer sets (22),(23),(24) as follows:
a Remove cotter pin (21), castle nut (20), washers (19),(18) and forward side roller.
b Remove washer set (22) from forward side roller.
c Install forward side roller with washers (18),(19) and castle nut (20). Hand-tighten castle nut (20).

d Remove nut (15), washer (16), bolt (17) and slide plate.
e Remove washer set (23) from slide plate.
f Install slide plate with bolt (17), washer (16) and nut (15). Hand-tighten nut (15).
g Withdraw aft side roller from link and remove washer set (24).
h Install aft side roller back into link.

2 Position carriage 2 on track 2 and push carriage 2 forward until rigging pin holes are aligned (flap 0° position).
3 Install rigging pin PN 98A275080032000.
4 Use a feeler gage to measure the gaps at positions "a" between slide plate and track, "b" between aft side rollers and track, "c" between forward side rollers and track and "d" between carriage and track.
5 Determine thickness of washer sets (22),(23),(24) necessary to obtain dimensions "a", "b", "c" and "d":
"a" = 0.7 to 0.9 mm (0.028 to 0.035 in.)
"b" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"c" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"d" = equal on both sides ±0.1 mm (±0.004 in.)
6 Remove rigging pin.
7 Remove carriage 2.
8 If any clearances are not correct, change washer sets as required.
9 Install carriage 2 and rigging pin PN 98A27508003200.
10 Temporarily install track end stop and secure with bolts (9), washers (10), bolts (4), washers (5),(1) and castle nuts (2).
11 Re-check dimensions "a", "b", "c" and "d" in 0° position and four different places between 0° and track end stop position. Re-adjust if necessary by changing washer sets (22),(23),(24).
12 When the required clearances have been obtained, slide plates and roller attaching fasteners must be torqued to the following values:
a At slide plates TORQUE nuts (15) to between 0.3 and 0.4 m.daN (2.21 and 2.95 lbf.ft.).
b At forward side rollers, TORQUE castle nuts (20) to between 2.2 and 2.8 m.daN (16.23 and 20.65 lbf.ft.). Secure castle nuts (20) with cotter pins (21).

(c) If track end stop has been temporarily installed remove castle nuts (2), washers (1),(5), bolts (4),(9) and washers (10).
(d) Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of track end stop, track and to bolts (4).
(e) Position track end stop with fairing side load stay; install bolts (4), washers (5),(1) and castle nuts (2) and tighten.
(f) Safety castle nuts (2) with cotter pins (3).
(g) Apply anti-corrosion compound (Material No. 05-002) to bolts (8) and bushes (7).
(h) Install bushes (7), bolts (8), nuts (6) and tighten.
(i) Apply anti-corrosion compound (Material No. 05-002) to bolts (9),(12).
(j) Install bolt (12), washer (13), nut (11) and tighten.
(k) Install bolt (9), washer (10) and tighten.
(l) At slide plate and tooth plate attaching fasteners apply sealant (Material No. 09-016) to nuts and exposed thread of bolts.
(m) Remove rigging pin PN 98A27508003200 from carriage 2, track 2.

(n)Position carriage at aft end of track 2.
(o)Install inboard flap (Ref. 27-50-11, P. Block 401).
(p)Install fairing flap track 2 (Ref. 27-50-21, P. Block 401).
(q)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(r)Remove safety guard from flap/slat control lever quadrant.
(s)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).

(4)Test
(a)Carry out operational test (Ref. 27-54-00, P. Block 501) and observe carriage 2 during operation for correct movement in the track.

(5)Close-Up
(a)Remove safety barriers.
(b)Remove access platform.
(c)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

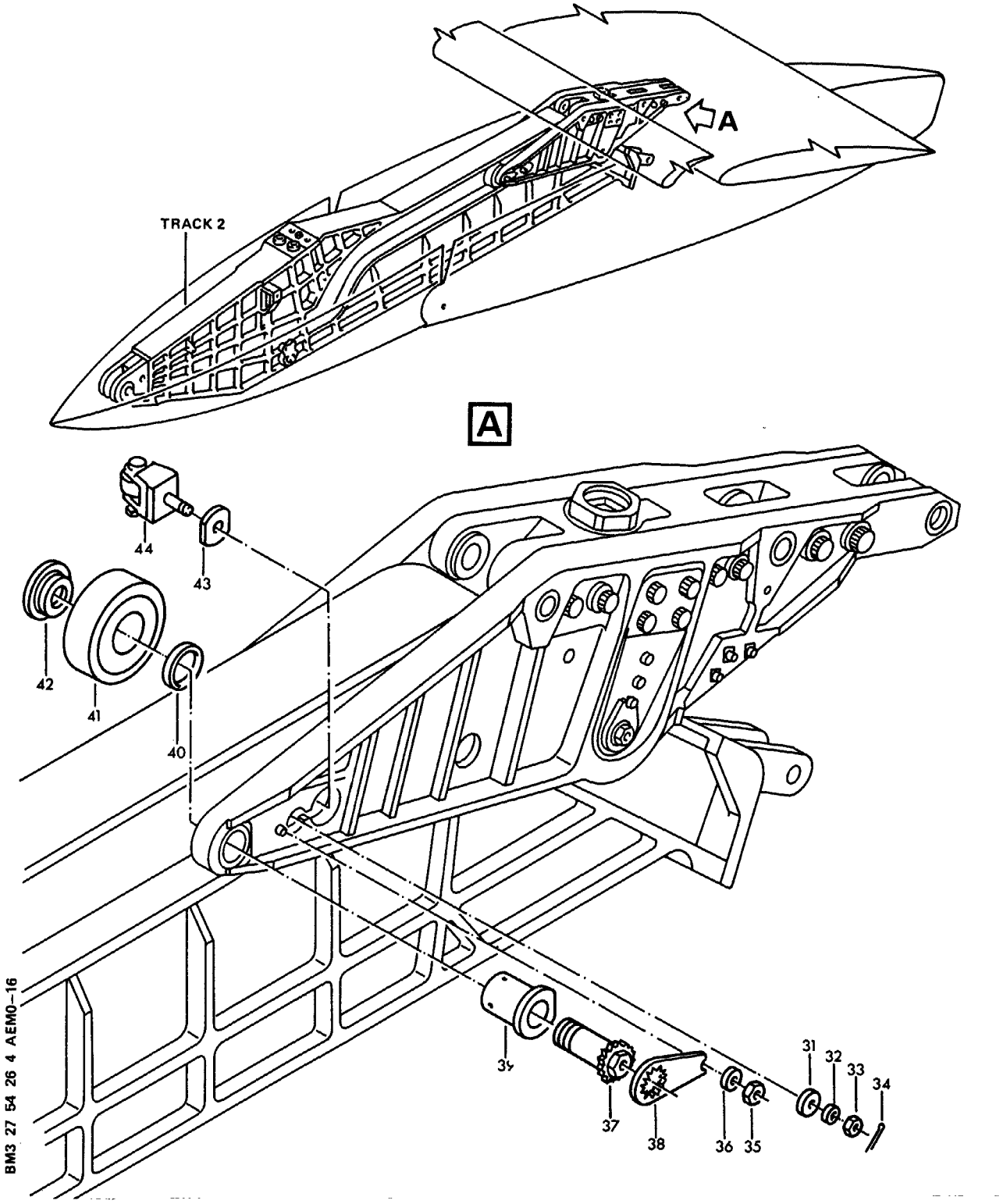
B. Carriage Rollers
(Ref. Fig. 403)
NOTE : It is possible to remove only the forward side rollers and the forward track support rollers in situ.
NOTE : Only one roller at a time is to be removed.

(1)Job Set-Up.
(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.

(2)Removal
(a)For removal of track support rollers (41) proceed as follows:
1 Remove nut (35), washer (36) and tooth plate (38).
2 Remove bolt (37). Use extractor PN 98A27508007100 of extractor set PN 98A27508007000 and extract hollow pin (39).
NOTE : During removal of bolt (37) and hollow pin (39) take care that washer (40), roller (41) and serrated nut (42) do not fall away.
3 Remove washer (40), roller (41) and serrated nut (42).
(b)For removal of forward side rollers (44) proceed as follows:
1 Remove cotter pin (34), castle nut (33), washer (32) and washer (31).
2 Move forward side rollers (44) with washer set (43) backwards and remove through access hole.
NOTE : Record number of washers in washer set (43).



Carriage Rollers
Figure 403

(3)Installation
(a)For installation of track support rollers (41) proceed as follows:
1 Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of hollow pin (39).
2 Install hollow pin (39) sufficiently to locate washer (40) and track support roller (41).
3 Install washer (40), track support roller (41), serrated nut (42) and fully insert hollow pin (39).
4 Apply anti-corrosion compound (Material No. 05-002) to bolt (37).
5 Install bolt (37). TORQUE bolt (37) to 12.5 m.daN (92.19 lbf.ft.).
6 Install tooth plate (38), washer (36) and nut (35). TORQUE nut (35) to between 0.6 and 0.7 m.daN (4.42 and 5.16 lbf.ft.).
7 Apply sealing compound (Material No. 09-016) to nut (35).
(b)For installation of forward side rollers (44) proceed as follows:
1 Install forward side rollers (44) without washer set (43).
2 Install washer (31), washer (32) and castle nut (33). Hand-tighten castle nut (33).
NOTE : If necessary use a maximum of 3 washers (32).
3 Adjust the clearances between carriage 2 and track 2 as follows (Ref. Fig. 402):
a Use a feeler gage to measure the gap between forward side roller (44) and track. Determine thickness of washer set (43) necessary to obtain dimensions "c" and "d":
- Dimension "c" must be 0.05 to 0.15 mm (0.002 to 0.006 in.).
- Dimension "d" must be equal on both sides to within ± 0.10 mm (0.004 in.).
b Remove castle nut (33), washer (32) and washer (31).
c Move forward side roller (44) backwards and remove through access hole.
d Position washer set (43) as previously determined on forward side roller (44).
e Install forward side roller (44) on carriage.
f Install washer (31), washer (32) and castle nut (33).
g Re-check dimensions "c" and "d" and if necessary re-adjust by changing washer set (43).
h TORQUE castle nut (33) to between 2.2 and 2.8 m.daN (16.23 and 20.65 lbf.ft.).
i Secure castle nut (33) with cotter pin (34).
(c)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(d)Remove safety guard from flap/slat control lever quadrant.
(e)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).
(4)Test
(a)Carry out operational test (Ref. 27-54-00, P. Block 501) and observe carriage 2 during operation for correct movement in the track.
(5)Close-Up
(a)Remove safety barriers.
(b)Remove access platform.
(c)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Carriage 2 - General Check

A. Reason for the Job

(1)To inspect carriage for general condition and security.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 3.5 m (11 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)	Circuit Breaker Safety Clips and Tags
	(4)	Safety Barriers

Referenced Procedure
- 27-50-00, P. Block 301 Flaps

C. Procedure

(1)Job Set-Up

(a)Position safety barriers.

(b)Extend flaps to 20° position (Ref. 27-50-00, P. Block 301).

R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.

(2)Inspection/Check

(a)Inspect carriage and attachments for corrosion, cracks, or any other damage; none of these are permitted.

(b)Inspect carriage rollers for excessive wear, corrosion, or any other damage; none of these are permitted.
(c)Check that all safety devices are intact.

(3)Close-Up
(a)Remove access platform.
(b)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(c)Remove safety guard from flap/slat control lever quadrant.
(d)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).
(e)Remove safety barriers.
(f)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 4 m (13 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27508003000	Rigging Pin Set - Flap Adjustment
	D. 98A27508007000	Extractor Set - Spigot Dowels Flap Carriages 2 thru 5
	E. 98A27508026000	Support Cradle - Flap Spindle
	F. 98A27508059000	Locking Device Set - Flap Carriage
	G. SL90-313-5000	Tool - Installation, Tab Washers STA-LOK NSA5454
	H. SL90-314-5000	Tool - Extraction, Tab Washers STA-LOK NSA5454
	J. SL90-321-5000	Wrench - Notched, Tightening of Nuts NSA5454
	K.	Torque Wrench, 0.3 to 11 m.daN (2.21 to 81.1 lbf.ft.)
	L.	Feeler Gage
	M.	Safety Barriers
	N.	Circuit Breaker Safety Clips and Tags
	P.	Cotter Pins
	Q.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	R.	Lockwire, Corrosion-Resistant Steel, Dia. 1 mm (0.039 in.)
	S. Material No. 04-004	Common Greases (Ref. 20-31-00)
	T. Material No. 05-002	Special Materials (Ref. 20-31-00)
	U. Material No. 05-005	Special Materials (Ref. 20-31-00)
	V. Material No. 06-002	Lubricants (Ref. 20-31-00)
	W. Material No. 09-016	Sealants (Ref. 20-31-00)

Referenced Procedures

- 27-50-00, P. Block 301	Flaps

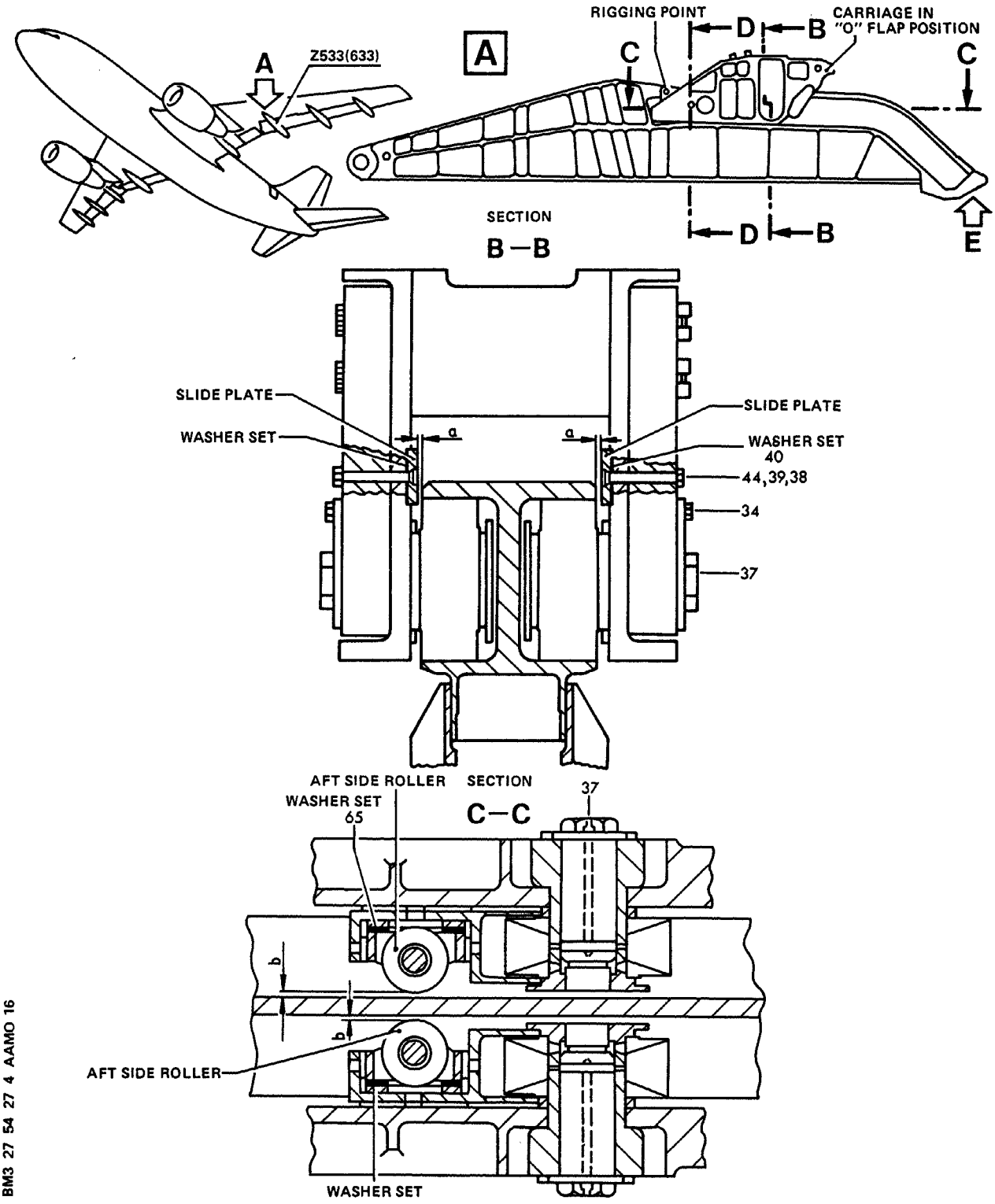
- 27-50-12, P. Block 401 Outboard Flap
- 27-50-21, P. Block 401 Flap Track Fairings
- 27-54-00, P. Block 501 Hydraulic Actuation and Power Transmission (Flaps)

2. Procedure
(Ref. Fig. 401)
(Ref. Fig. 402)

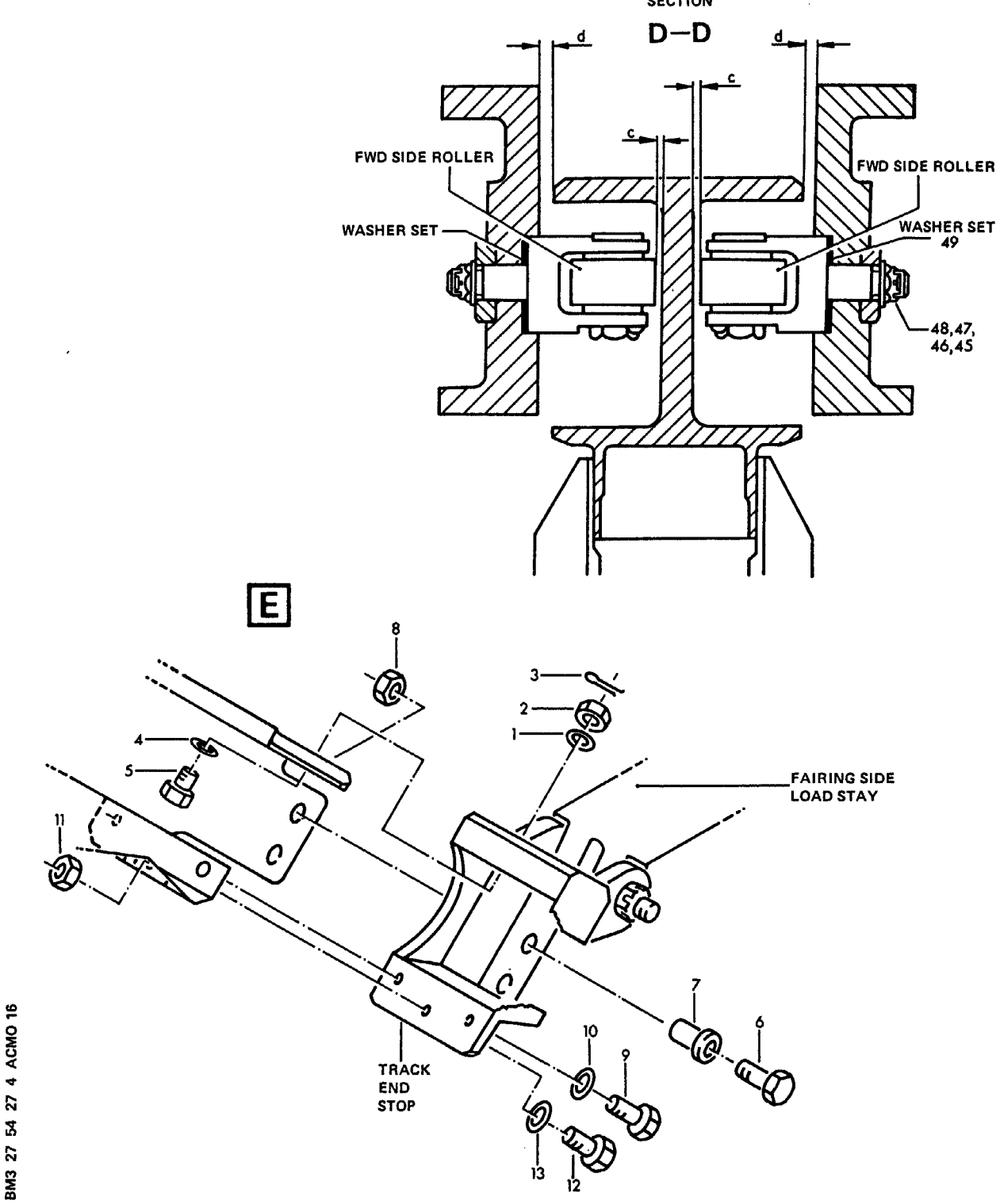
A. Carriage Complete
(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.
(f)Remove fairing, flap track 3 (Ref. 27-50-21, P. Block 401).
(g)Remove outboard flap (Ref. 27-50-12, P. Block 401).
(2)Removal
CAUTION : CARRIAGE 3 WEIGHS APPROXIMATELY 36.7 kg (81 lb.).
(a)Position carriage 3 to forward position on track (corresponding to 0° flap setting).
(b)Install rigging pin PN 98A27508003200 of rigging pin set PN 98A27508003000 in carriage 3, track 3.
(c)At aft end of track 3, remove and discard cotter pins (3). Remove castle nuts (2), washers (1), bolts (5) and washers (4) from track 3 stop.
(d)Remove nuts (8), bolts (6) and bushes (7).
(e)Remove nut (11), bolt (12) and washer (13).
(f)Remove bolts (9) and washers (10).
(g)Remove track end stop with fairing side load stay to clear end of track.
WARNING : BEFORE REMOVAL OF RIGGING PIN, (A MINIMUM OF) TWO OPERATIVES MUST BE SUITABLY POSITIONED TO SUPPORT THE CARRIAGE AND REMOVE IT FROM THE TRACK.
(h)Support carriage 3 and remove rigging pin PN 98A27508003200 from carriage 3, track 3.
(i)Remove carriage 3.
(3)Installation
WARNING : CARRIAGE 3 WEIGHS APPROX. 36.7 kg (81 lb.). WHEN INSTALLING CARRIAGE 3, IT MUST BE SUITABLY SUPPORTED.
(a)If the removed carriage is to be re-installed, proceed as follows:



Carriage 3
Figure 401



Carriage 3
Figure 402

1 Position carriage 3 on track 3 and push carriage 3 forward until rigging pin holes are aligned (flap 0° position).
2 Install rigging pin PN 98A27508003200 in carriage 3, track 3.
3 Check clearances "a", "b", "c" and "d" between carriage 3 and track 3:
"a" = 1 to 1.2 mm (0.039 to 0.047 in.)
"b" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"c" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"d" = equal on both sides ±0.1 mm (±0.004 in.)
4 If any of the clearances above are not obtained, refer to step (3)(b).

(b) If a new carriage is to be installed, proceed as follows:
1 Remove washer sets (40),(49),(65) as follows:
a Remove cotter pin (45), castle nut (46), washers (47),(48) and forward side roller.
b Remove washer set (49) from forward side roller.
c Install forward side roller with washers (48),(47) and castle nut (46). Hand-tighten castle nut (46).
d Remove nuts (38), washers (39), bolts (44) and slide plate.
e Remove washer set (40) from slide plate.
f Install slide plate with bolt (44), washer (39) and nut (38). Hand-tighten nut (38).
g Withdraw aft side roller from link and remove washer set (65).
h Install aft side roller back into link.
2 Position carriage 3 on track 3 and push carriage 3 forward until rigging pin holes are aligned (flap 0° position).
3 Install rigging pin PN 98A27508003200.
4 Use a feeler gage to measure gaps at positions "a" between slide plate and track, "b" between aft side rollers and track, "c" between forward side rollers and track and "d" between carriage and track.
5 Determine thickness of washer sets (40),(49),(65) necessary to obtain dimensions "a", "b", "c" and "d":
"a" = 1 to 1.2 mm (0.039 to 0.047 in.)
"b" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"c" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"d" = equal on both sides ±0.1 mm (±0.004 in.)
6 Remove rigging pin.
7 Remove carriage 3.
8 Install washer sets (40),(49),(65) as required.
9 Install carriage 3 and rigging pin PN 98A27508003200.
10 Temporarily install track end stop and secure with bolts (6), bushes (7), nuts (8), bolts (5), washers (4),(1) and castle nuts (2).
11 Re-check dimensions "a","b","c" and "d" in 0° position and four different places between 0° and track end stop position. Re-adjust if necessary by changing washer sets (40),(49),(65).
12 When the required clearances have been obtained, slide plates and roller attaching fasteners must be torqued to the following values:
a At slide plates TORQUE nuts (38) to between 0.3 and 0.4 m.daN (2.21 and 2.95 lbf.ft.).
b At forward side rollers, TORQUE castle nuts (46) to between 2.2 and 2.8 m.daN (16.23 and 20.65 lbf.ft.). Secure castle nuts (46) with cotter pins (45).

(c)If track end stop has been temporarily installed, remove castle nuts (2), nuts (8), washers (1),(4), bolts (5),(6) and bushes (7).
(d)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of track end stop, track and to bolts (5).
(e)Position track end stop with fairing side load stay; install bolts (5), washers (4),(1) and castle nuts (2) and tighten.
(f)Safety castle nuts (2) with cotter pins (3).
(g)Apply anti-corrosion compound (Material No. 05-002) to bolts (6),(9), (12) and bushes (7).
(h)Install bushes (7), bolts (6), nuts (8) and tighten.
(i)Install washer (10), bolt (9) and tighten.
(j)Install washer (13), bolt (12), nut (11) and tighten.
(k)At slide plate and tooth plate attaching fasteners apply sealant (Material No. 09-016) to nuts and exposed threads of bolts.
(l)Remove rigging pin PN 98A27508003200 from carriage 3, track 3.
(m)Position carriage at aft end of track 3.
(n)Install outboard flap (Ref. 27-50-12, P. Block 401).
(o)Install fairing flap track 3 (Ref. 27-50-21, P. Block 401).
(p)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(q)Remove safety guard from flap/slat control lever quadrant.
(r)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).

(4)Test
(a)Carry out operational test (Ref. 27-54-00, P. Block 501) and observe carriage 3 during operation for correct movement in the track.

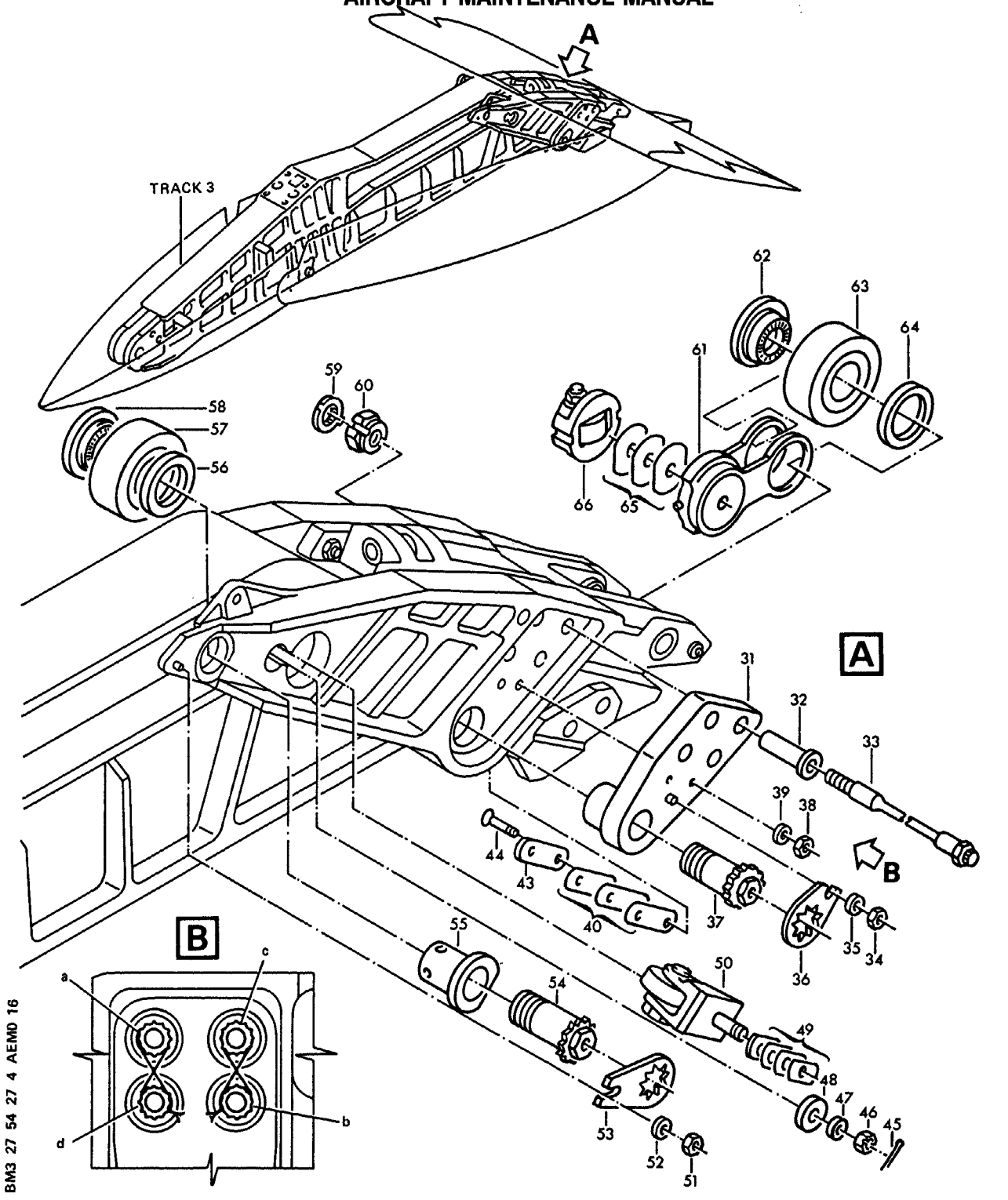
(5)Close-Up
(a)Remove safety barriers.
(b)Remove access platform.
(c)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment and miscellaneous items.

B. Carriage Rollers
(Ref. Fig. 403)
(Ref. Fig. 404)
NOTE : Only one roller at a time is to be removed.

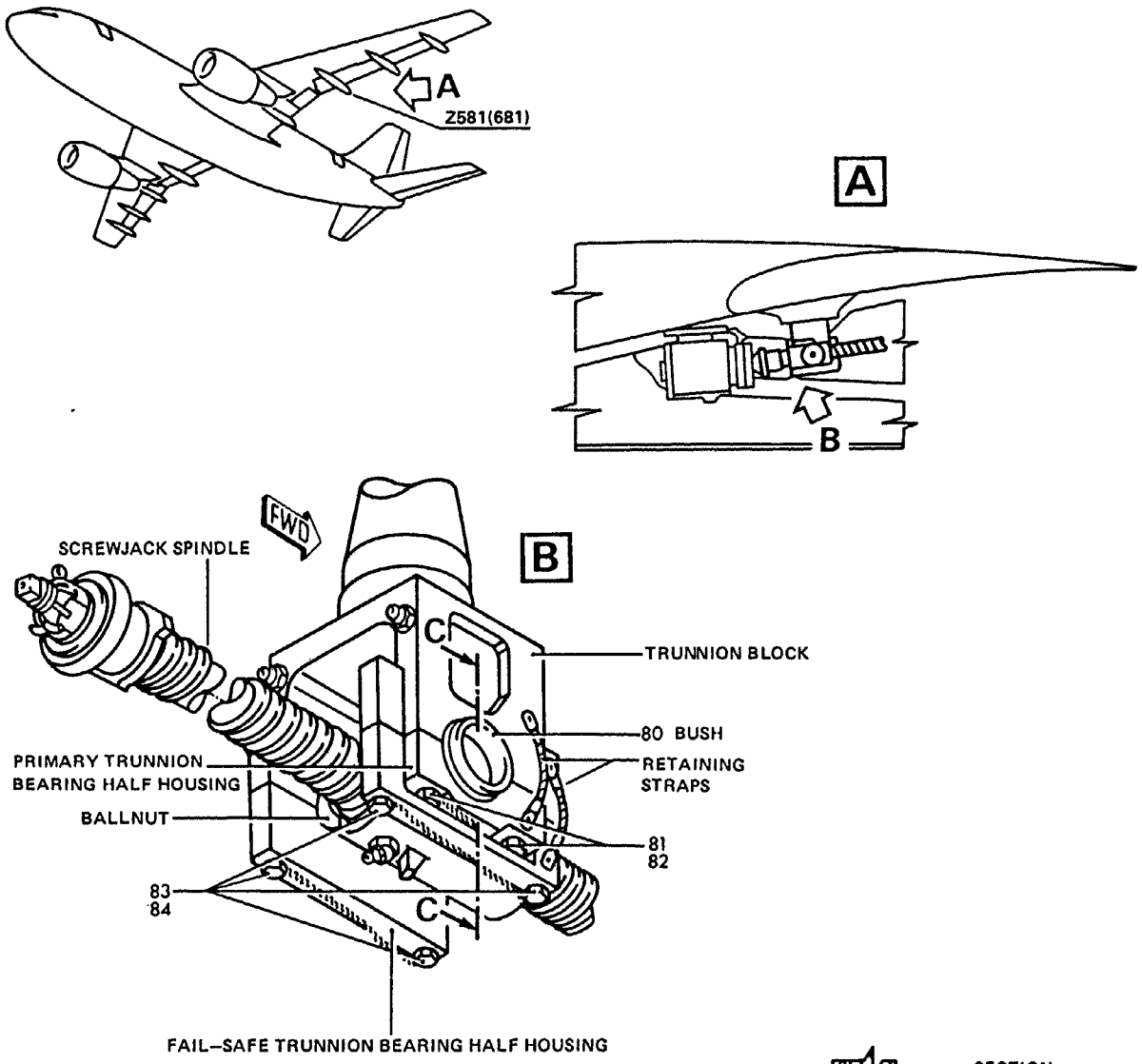
(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.
(f)Remove flap track fairing 3 (Ref. 27-50-21, P. Block 401).



Carriage Rollers
Figure 403



Screwjack 3 Trunnion Bearing
Figure 404

NOTE : Removal of flap track fairing 3 is not necessary for replacement of outboard forward track support rollers (57) or outboard forward side rollers (50).

(g)For removal of inboard forward track support rollers (57) only, proceed as follows:
1 Use carriage locking device PN 98A27508059000 and lock carriage 3.
2 Install spindle support cradle PN 98A27508026000 on flap track 3.
(h)For removal of aft side roller assembly (61) or aft track support roller (63) only, proceed as follows:
1 Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
2 Remove safety guard from flap/slat control lever quadrant.
3 Retract flaps to 15° position (Ref. 27-50-00, P. Block 301).
R 4 Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
5 Open, safety and tag circuit breakers 5CV, 6CV and 10CV.
(2)Removal
(a)For removal of outboard forward track support rollers (57), proceed as follows:
1 Remove nut (51), washer (52) and tooth plate (53).
2 Remove bolt (54). Use extractor PN 98A27508007100 and extract hollow pin (55) sufficiently enough to allow removal of washer (56), roller (57) and serrated nut (58).

NOTE : During removal of bolt (54) and hollow pin (55) take care that washer (56), roller (57) and serrated nut (58) do not fall away.

NOTE : Extractor PN 98A27508007100 is part of extractor set PN 98A27508007000.

3 Remove washer (56), roller (57) and serrated nut (58).
(b)For removal of inboard forward track support rollers (57), proceed as follows (Ref. Fig. 403, 404):
1 Cut, remove and discard lockwire. Remove four bolts (83) and washers (84) securing fail-safe trunnion bearing half housing.
2 Separate fail-safe trunnion bearing housing halves, cut lockwire. Remove four bolts (81) and washers (82) securing primary trunnion bearing half housing.

NOTE : Bearing half housings remain attached to the trunnion block by the retaining straps.

3 Separate primary bearing housing halves, lower screwjack spindle until ballnut is clear of trunnion.
4 Turn trunnion block through 90°.
5 Remove nut (51), washer (52) and tooth plate (53).
6 Remove bolt (54). Use extractor PN 98A27508007100 and extract hollow pin sufficiently enough to allow removal of washer (56), roller (57) and serrated nut (58).

NOTE : During removal of bolt (54) and hollow pin (55) take care that washer (56), roller (57) and serrated nut (58) do not fall away.

7 Remove washer (56), roller (57) and serrated nut (58).

(c)For removal of outboard forward side rollers (50), proceed as follows: (Ref. Fig. 403, 404)

1 Remove cotter pin (45), castle nut (46), washer (47) and washer (48).
2 Move forward side rollers (50) with washer set (49) backwards and remove through access hole.

NOTE : Record number of washers in washer set (49).

(d)For removal of inboard forward side rollers (50), proceed as follows:

1 Cut, remove and discard lockwire. Remove four bolts (83) and washers (84) securing fail-safe trunnion bearing half housing.
2 Separate fail-safe trunnion bearing housing halves. Cut, remove and discard lockwire. Remove four bolts (81) and washers (82) securing primary trunnion bearing half housing.

NOTE : Bearing half housings remain attached to the trunnion block by the retaining straps.

3 Separate primary bearing housing halves, lower screwjack spindle until ballnut is clear of trunnion.
4 Mark the position of the ballnut on the screwjack spindle.
5 Turn the trunnion block through 90°.
6 Remove cotter pin (45), castle nut (46), washer (47) and washer (48).
7 Move forward side rollers (50) with washer set (49) backwards and remove through access hole.

NOTE : Record number of washers in washer set (49).

(e)For removal of aft side roller assembly (61) and aft track support roller (63), proceed as follows:

1 Cut, remove and discard lockwire at special bolts (33).
2 Use extraction tool PN SL90-314-5000 and remove washers (59).
3 Use notched wrench PN SL90-321-5000 and remove nuts (60).
4 Remove special bolts (33).
5 Remove nuts (38) and washers (39).
6 Remove screws (44), slide plate (43) and washer set (40).

NOTE : Record number of washers in washer set (40).

7 Remove nut (34), washer (35) and tooth plate (36).
8 Use internal extractor from extractor set PN 98A27508007000 and remove bush (32).
9 Remove bolt (37).
10 Use extractor PN 98A27508007100 and remove spigot (31).

NOTE : During removal of spigot (31) take care that washer (64), aft track support roller (63), serrated nut (62) and aft side roller assembly (61) do not fall away.

11 Remove washer (64), aft track support roller (63), serrated nut (62) and aft side roller assembly (61).

(3)Installation

(a)For installation of outboard forward track support rollers (57), proceed as follows:

1 Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of hollow pin (55).
2 Install hollow pin (55) sufficiently to locate washer (56) and track support roller (57).
3 Install washer (56), track support roller (57), serrated nut (58) and fully insert hollow pin (55).
4 Apply anti-corrosion compound (Material No. 05-002) to bolt (54).
5 Install bolt (54). TORQUE bolt (54) to 7.0 m.daN (51.63 lbf.ft.).
6 Install tooth plate (53), washer (52) and nut (51). TORQUE nut (51) to between 0.6 and 0.7 m.daN (4.42 and 5.16 lbf.ft.).
7 Apply sealing compound (Material No. 09-016) to nut (51).

(b)For installation of inboard forward track support rollers (57), proceed as follows:

1 Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of hollow pin (55).
2 Install hollow pin (55) sufficiently to locate washer (56) and track support roller (57).
3 Install washer (56), track support roller (57), serrated nut (58) and fully insert hollow pin (55).
4 Apply anti-corrosion compound (Material 05-002) to bolt (54).
5 Install bolt (54). TORQUE bolt (54) to 7.0 m.daN (51.63 lbf.ft.).
6 Install tooth plate (53), washer (52) and nut (51). TORQUE nut (51) to between 0.6 and 0.7 m.daN (4.42 and 5.16 lbf.ft.).
7 Apply sealing compound (Material No. 09-016) to nut (51).
8 Turn trunnion block through 90° to its original position.
9 Check that ballnut is in correct position as marked at (2)(d)4.
10 Apply molykote (Material No. 06-002) to threads of bolts (81),(83).
11 Raise spindle and ballnut. Position ballnut connection in fail-safe trunnion bearing housing.
12 Install primary trunnion bearing half housing. Secure with washers (82) and bolts (81).

NOTE : Care must be taken to prevent damage to bushes (80) due to inadvertent contact with machined edges of trunnion bearing housing.

13 TORQUE bolts (81) to between 3.5 and 3.6 m.daN (25.8 and 26.6 lbf.ft.).
14 Safety bolts (81) with lockwire dia 0.8 mm (0.032 in.). Apply corrosion preventive (Material No. 05-005) to bolt heads.
15 Install fail-safe trunnion bearing half housing. Secure with washers (84) and bolts (83).
16 TORQUE bolts (83) to between 3.5 and 3.6 m.daN (25.8 and 26.6 lbf.ft.).
17 Safety bolts (83) with lockwire dia 0.8 mm (0.032 in.). Apply corrosion preventive (Material No. 05-005) to bolt heads.

18 Remove support cradle from track 3.
19 Remove locking device from track 3.

(c)For installation of outboard forward side rollers (50), proceed as follows:

1 Install forward side rollers (50) without washer set (49).
2 Install washer (48), washer (47) and castle nut (46). Hand-tighten castle nut (46).

NOTE : If necessary, use a maximum of 3 washers (47).

3 Adjust the clearances between carriage 3 and track 3 as follows: (Ref. Fig. 402)
a Use a feeler gage to measure gap between forward side roller (50) and track. Determine thickness of washer set (49) necessary to obtain dimensions "c" and "d":
- Dimension "c" must be between 0.05 and 0.15 mm (0.002 and 0.006 in.).
- Dimension "d" must be equal on both sides to within ± 0.10 mm (0.004 in.).
b Remove castle nut (46), washer (47) and washer (48).
c Move forward side roller (50) backwards and remove through access hole.
d Position washer set (49) as previously determined at (3)(c)3a on forward side roller (50).
e Install forward side roller (50) on carriage.
f Install washer (48), washer (47) and castle nut (46).
g Re-check dimensions "c" and "d" and if necessary re-adjust by changing washer set (49).
h TORQUE castle nut (46) to between 2.2 and 2.8 m.daN (16.23 and 20.65 lbf.ft.).
j Secure castle nut (46) with cotter pin (45).

(d)For installation of inboard forward side rollers (50), proceed as follows:

1 Install forward side rollers (50) without washer set (49).
2 Install washer (48), washer (47) and castle nut (46). Hand-tighten castle nut (46).

NOTE : If necessary, use a maximum of 3 washers (47).

3 Adjust the clearances between carriage 3 and track 3 as follows (Ref. Fig. 402):
a Use a feeler gage to measure gap between forward side roller (50) and track. Determine thickness of washer set (49) necessary to obtain dimensions "c" and "d":
- Dimension "c" must be between 0.05 and 0.15 mm (0.002 and 0.006 in.).
- Dimension "d" must be equal on both sides to within ± 0.10 mm (0.004 in.).
b Remove castle nut (46), washer (47) and washer (48).
c Move forward side roller (50) backwards and remove through access hole.

d Position washer set (49) as previously determined at (3)(d)3a on forward side roller (50).
e Install forward side roller (50) on carriage.
f Install washer (48), washer (47) and castle nut (46).
g Re-check dimensions "c" and "d" and if necessary readjust by changing washer set (49).
h TORQUE castle nut (46) to between 2.2 and 2.8 m.daN (16.23 and 20.65 lbf.ft.).
j Secure castle nut (46) with cotter pin (45).

4 Turn trunnion block through 90° to its original position.
5 Check that ballnut is in correct position as marked at (2)(d)4.
6 Apply molykote (Material No. 06-002) to threads of bolts (81),(83).
7 Raise spindle and ballnut. Position ballnut connection in fail-safe trunnion bearing housing.
8 Install primary trunnion bearing half housing. Secure with washers (82) and bolts (81).

NOTE : Care must be taken to prevent damage to bushes (80) due to inadvertent contact with machined edges of trunnion bearing housing.

9 TORQUE bolts (81) to between 3.5 and 3.6 m.daN (25.8 and 26.6 lbf.ft.).
10 Safety bolts (81) with lockwire dia 0.8 mm (0.032 in.). Apply corrosion preventive (Material No. 05-005) to bolt heads.
11 Install fail-safe trunnion bearing half housing. Secure with washers (84) and bolts (83).
12 TORQUE bolts (83) to between 3.5 and 3.6 m.daN (25.8 and 26.6 lbf.ft.).
13 Safety bolts (83) with lockwire dia 0.8 mm (0.032 in.). Apply corrosion preventive (Material No. 05-005) to bolt heads.
14 Remove support cradle from track 3.
15 Remove locking device from track 3.

(e)For installation of aft side roller assembly (61) and aft track support roller (63), proceed as follows:

1 Remove cage (66) and washer set (69) from aft side roller assembly (61). Re-install cage (66).
2 Position aft side roller assembly (61) between carriage and track in its original position.
3 Use a feeler gage to measure gap between aft side roller and track. Determine thickness of shim necessary to obtain dimension "b": (Ref. Fig. 401)
- Dimension "b" must be between 0.05 and 0.15 mm (0.002 and 0.006 in.).
4 Remove aft side roller assembly (61).
5 Remove cage (66) and install appropriate washers of washer set (65) as determined at (3)(e)3.
6 Apply grease (Material No. 04-004) to rubbing surfaces of washer (64) and serrated nut (62).
7 Install and align washer (64), aft side roller assembly (61), aft track support roller (63) and serrated nut (62).

8 Carefully install spigot (31) locating washer (64), aft side roller assembly (61), aft track support roller (63) and serrated nut (62).
9 Apply anti-corrosion compound (Material No. 05-002) to bolt (37).
10 Install bolt (37). Hand-tighten bolt (37).
11 Install bushes (32).
12 Apply lubricant (Material No. 06-002) to thread of special bolts (33).
13 Install special bolts (33).
14 Use notched wrench PN SL90-321-5000 and install nuts (60). TORQUE nuts (60) in sequence a, b, c, d in 3 steps as follows: (Ref. Fig. 403)
- Step 1 - 3 m.daN (22.1 lbf.ft.)
- Step 2 - 7 m.daN (51.6 lbf.ft.)
- Step 3 - 10 m.daN (73.8 lbf.ft.)
15 Use installation tool PN SL90-313-5000 and install washers (59).
16 Safety bolt heads (33) with lockwire dia 1 mm (0.039 in.).
17 TORQUE bolt (37) to 7.0 m.daN (51.63 lbf.ft.).
18 Install tooth plate (36), washer (35) and nut (34). TORQUE nut (34) to between 0.6 and 0.7 m.daN (4.42 and 5.16 lbf.ft.).
19 Apply sealant (Material No. 09-016) to nut (34).
20 Install slide plate (43), bolts (44), washers (39) and nuts (38). Hand-tighten nuts (38).
21 Use a feeler gage to measure gap "a" between slide plate and track: (Ref. Fig. 401)
- Dimension "a" must be 1.0 to 1.2 mm (0.039 to 0.047 in.).
22 If gap dimension "a" is not obtained, replace washers of washer set (40) as required.
23 TORQUE nuts (38) to between 0.3 and 0.4 m.daN (2.21 and 2.95 lbf.ft.).

(f) Install fairing, flap track 3 (Ref. 27-50-21, P. Block 401).
(g) Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(h) Remove safety guard from flap/slat control lever quadrant.
(i) Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).

(4) Test
(a) Carry out operational test (Ref. 27-54-00, P. Block 501) and observe carriage 3 during operation for correct movement in the track.

(5) Close-Up
(a) Remove safety barriers.
(b) Remove access platform.
(c) Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Carriage 3 - General Check

A. Reason for the job
(1)To inspect carriage for general condition and security.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 4 m (13 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)	Circuit Breaker Safety Clips and Tags
	(4)	Safety Barriers

Referenced Procedure
- 27-50-00, P. Block 301 Flaps

C. Procedure
(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 20° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.
(2)Inspection/Check
(a)Inspect carriage and attachments for corrosion, cracks, or any other damage; none of these are permitted.

(b)Inspect carriage rollers for excessive wear, corrosion, or any other damage; none of these are permitted.
(c)Check that all safety devices are intact.

(3)Close-Up
(a)Remove access platform.
(b)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(c)Remove safety guard from flap/slat control lever quadrant.
(d)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).
(e)Remove safety barriers.
(f)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES,LANDING GEARS ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 4.25 m (14 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27508003000	Rigging Pin Set - Flap Adjustment
	D. 98A27508007000	Extractor Set - Spigot Dowels Flap Carriages 2 thru 5
	E. SL90-313-5000	Tool - Installation, Tab Washers STA-LOK NSA5454
	F. SL90-314-5000	Tool - Extraction, Tab Washers STA-LOK NSA5454
	G. SL90-321-5000	Wrench - Notched, Tightening of Nuts NSA5454
	H.	Torque Wrench, 0.3 to 11 m.daN (2.21 to 81.1 lbf.ft.)
	J.	Feeler Gage
	K.	Safety Barriers
	L.	Circuit Breaker Safety Clips and Tags
	M.	Cotter Pins
	N.	Lockwire, Corrosion-Resistant Steel, Dia. 1.0 mm (0.039 in.)
	P. Material No. 04-004	Common Greases (Ref. 20-31-00)
	Q. Material No. 05-002	Special Materials (Ref. 20-31-00)
	R. Material No. 06-002	Lubricants (Ref. 20-31-00)
	S. Material No. 09-016	Sealants (Ref. 20-31-00)

Referenced Procedures

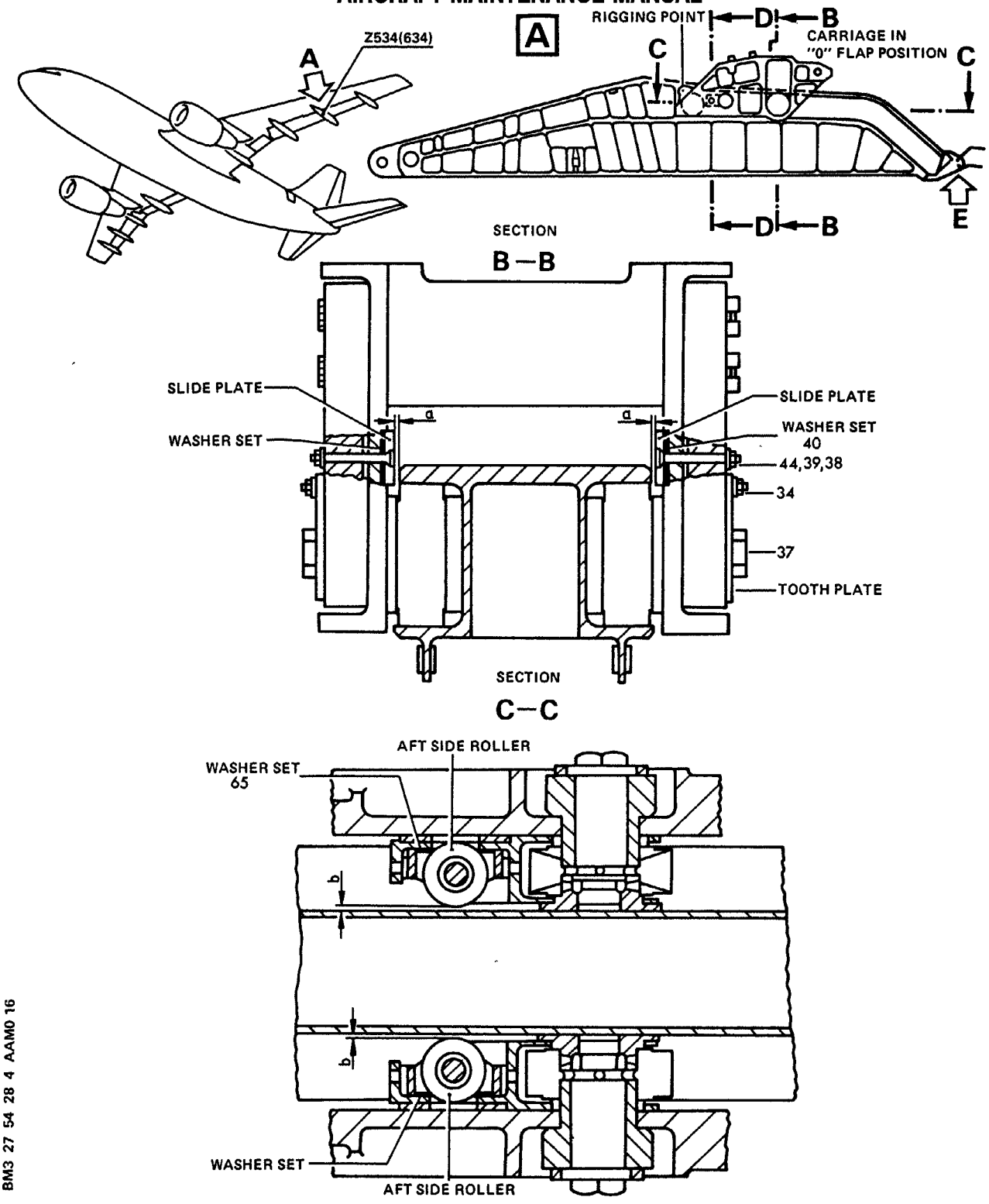
- 27-50-00, P. Block 301	Flaps
- 27-50-12, P. Block 401	Outboard Flap
- 27-50-21, P. Block 401	Flap Track Fairings
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)

2. Procedure
(Ref. Fig. 401)
(Ref. Fig. 402)

A. Carriage Complete
(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.
(f)Remove fairing, flap track 4 (Ref. 27-50-21, P. Block 401).
(g)Remove outboard flap (Ref. 27-50-12, P. Block 401).
(2)Removal
CAUTION : CARRIAGE 4 WEIGHS APPROXIMATELY 32.3 kg (71 lb.).
(a)Position carriage 4 to forward position on track (corresponding to 0° flap setting).
(b)Install rigging pin PN 98A27508003200 of rigging pin set PN 98A27508003000 in carriage 4, track 4.
(c)At aft end of track 4, remove and discard cotter pins (3). Remove castle nuts (2), washers (1), bolts (4) and washers (5) from track 4 stop.
(d)Remove nuts (6), bolts (8) and bushes (7).
(e)Remove bolts (9) and washers (10).
(f)Remove track end stop with fairing side load stay to clear end of track.
WARNING : BEFORE REMOVAL OF RIGGING PIN, (A MINIMUM OF) TWO OPERATIVES MUST BE SUITABLY POSITIONED TO SUPPORT THE CARRIAGE AND REMOVE IT FROM THE TRACK.
(g)Support carriage 4 and remove rigging pin PN 98A27508003200 from carriage 4, track 4.
(h)Remove carriage 4.
(3)Installation
WARNING : CARRIAGE 4 WEIGHS APPROX. 32.3 kg (71 lb.). WHEN INSTALLING CARRIAGE 4, IT MUST BE SUITABLY SUPPORTED.
(a)If the removed carriage is to be re-installed, proceed as follows:
1 Position carriage 4 on track 4 and push carriage 4 forward until rigging pin holes are aligned (flap 0° position).
2 Install rigging pin PN 98A27508003200 in carriage 4, track 4.
3 Check clearances "a", "b", "c"and "d" between carriage 4 and track 4:
"a" = 1 to 1.2 mm (0.039 to 0.047 in.)



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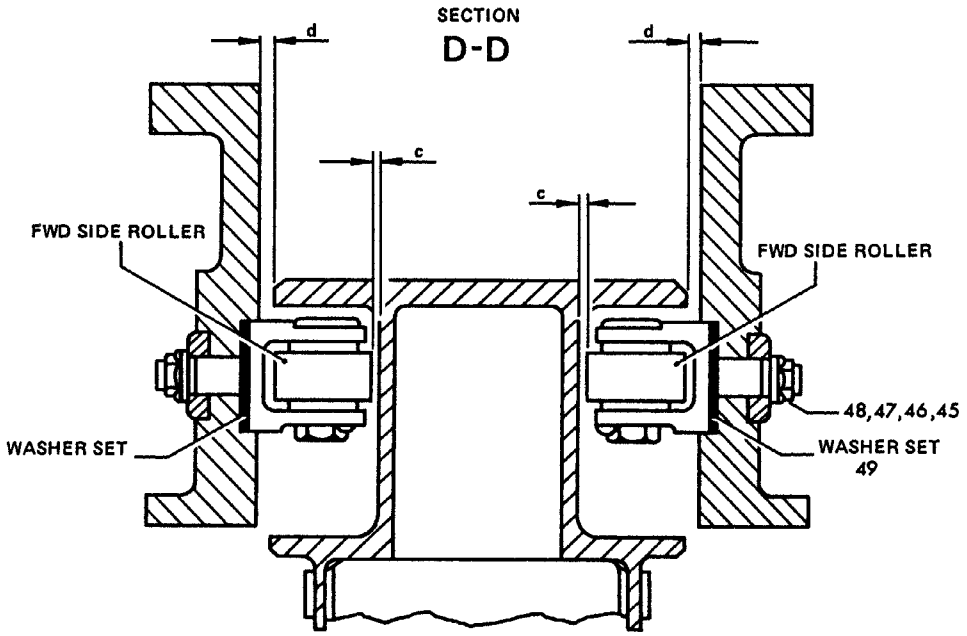
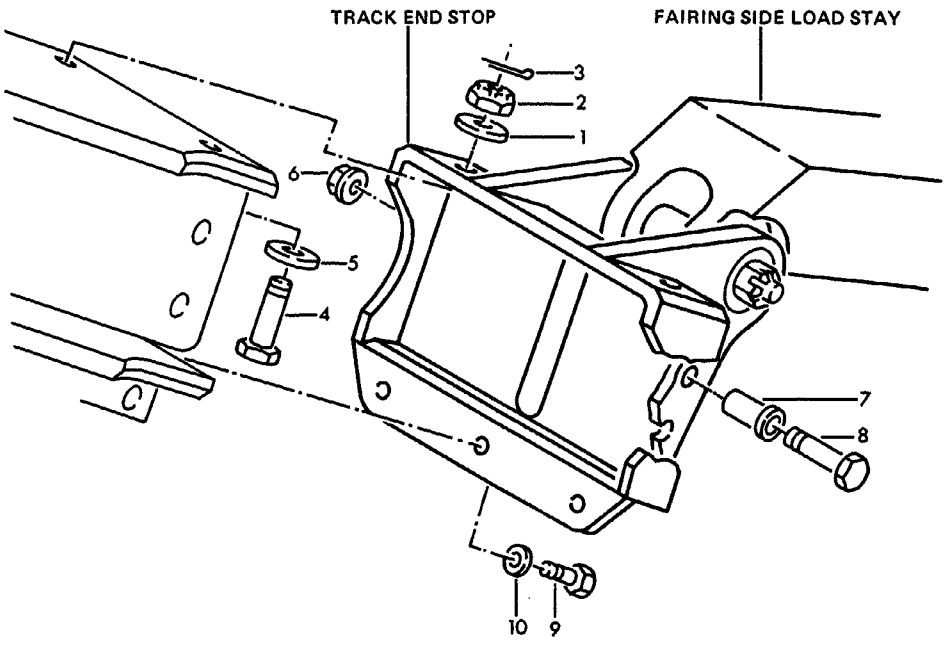
Carriage 4
Figure 401





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Carriage 4
Figure 402

"b" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"c" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"d" = equal on both sides ±0.1 mm (±0.004 in.)

4 If any of the clearances above are not obtained, refer to step (3)(b).

(b) If a new carriage is to be installed, proceed as follows:

1 Remove washer sets (40),(49),(65) as follows:
a Remove cotter pin (45), castle nut (46), washers (47),(48) and forward side roller.
b Remove washer set (49) from forward side roller.
c Install forward side roller with washers (48),(47) and castle nut (46). Hand-tighten castle nut (46).
d Remove nut (38), washer (39), bolt (44) and slide plate.
e Remove washer set (40) from slide plate.
f Install slide plate with bolt (44), washer (39) and nut (38). Hand-tighten nut (38).
g Withdraw aft side roller from link and remove washer set (65).
h Install aft side roller back into link.

2 Position carriage 4 on track 4 forward until rigging pin holes are aligned (flap 0° position).

3 Install rigging pin PN 98A27508003200.

4 Use a feeler gage to measure the gaps at positions "a" between slide plate and track, "b" between aft side rollers and track, "c" between forward side rollers and track and "d" between carriage and track.

5 Determine thickness of washer sets (40),(49),(65) necessary to obtain dimensions "a", "b", "c" and "d":
"a" = 1 to 1.2 mm (0.039 to 0.047 in.)
"b" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"c" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"d" = equal on both sides ±0.1 mm (±0.004 in.)

6 Remove rigging pin.

7 Remove carriage 4.

8 Install washer sets (40),(49),(65) as required.

9 Install carriage 4 and rigging pin PN 98A27508003200.

10 Temporarily install track end stop and secure with bolts (8), bushes (7), nuts (6), bolts (4), washers (5),(1) and castle nuts (2).

11 Re-check dimensions "a","b","c" and "d" in 0° position and four different places between 0° and track end stop position. Re-adjust if necessary by changing washer sets (40),(49),(65).

12 When the required clearances have been obtained, slide plates and roller attaching fasteners must be torqued to the following values:
a At slide plates TORQUE nuts (38) to between 0.3 and 0.4 m.daN (2.21 and 2.95 lbf.ft.).
b At forward side rollers, TORQUE castle nuts (46) to between 2.2 and 2.8 m.daN (16.23 and 20.65 lbf.ft.). Secure castle nuts (46) with cotter pins (45).

(c) If track end stop has been temporarily installed, remove castle nuts (2), nuts (6), washers (1),(5), bolts (4),(8) and bushes (7).

(d) Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of track end stop, track and to bolts (4).

(e) Position track end stop with fairing side load stay; install bolts (4),

washers (5),(1) and castle nuts (2) and tighten.
(f)Safety castle nuts (2) with cotter pins (3).
(g)Apply anti-corrosion compound (Material No. 05-002) to bolts (8),(9) and bushes (7).
(h)Install bushes (7), bolts (8), nuts (6) and tighten.
(i)Install washer (10), bolt (9) and tighten.
(j)At slide plate and tooth plate attaching fasteners apply sealant (Material No. 09-016) to nuts and exposed threads of bolts.
(k)Remove rigging pin PN 98A27508003200 from carriage 4, track 4.
(l)Position carriage at aft end of track 4.
(m)Install outboard flap (Ref. 27-50-12, P. Block 401).
(n)Install fairing, flap track 4 (Ref. 27-50-21, P. Block 401).
(o)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(p)Remove safety guard from flap/slat control lever quadrant.
(q)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).

(4)Test
(a)Carry out operational test (Ref. 27-54-00, P. Block 501) and observe carriage 4 during operation for correct movement in the track.

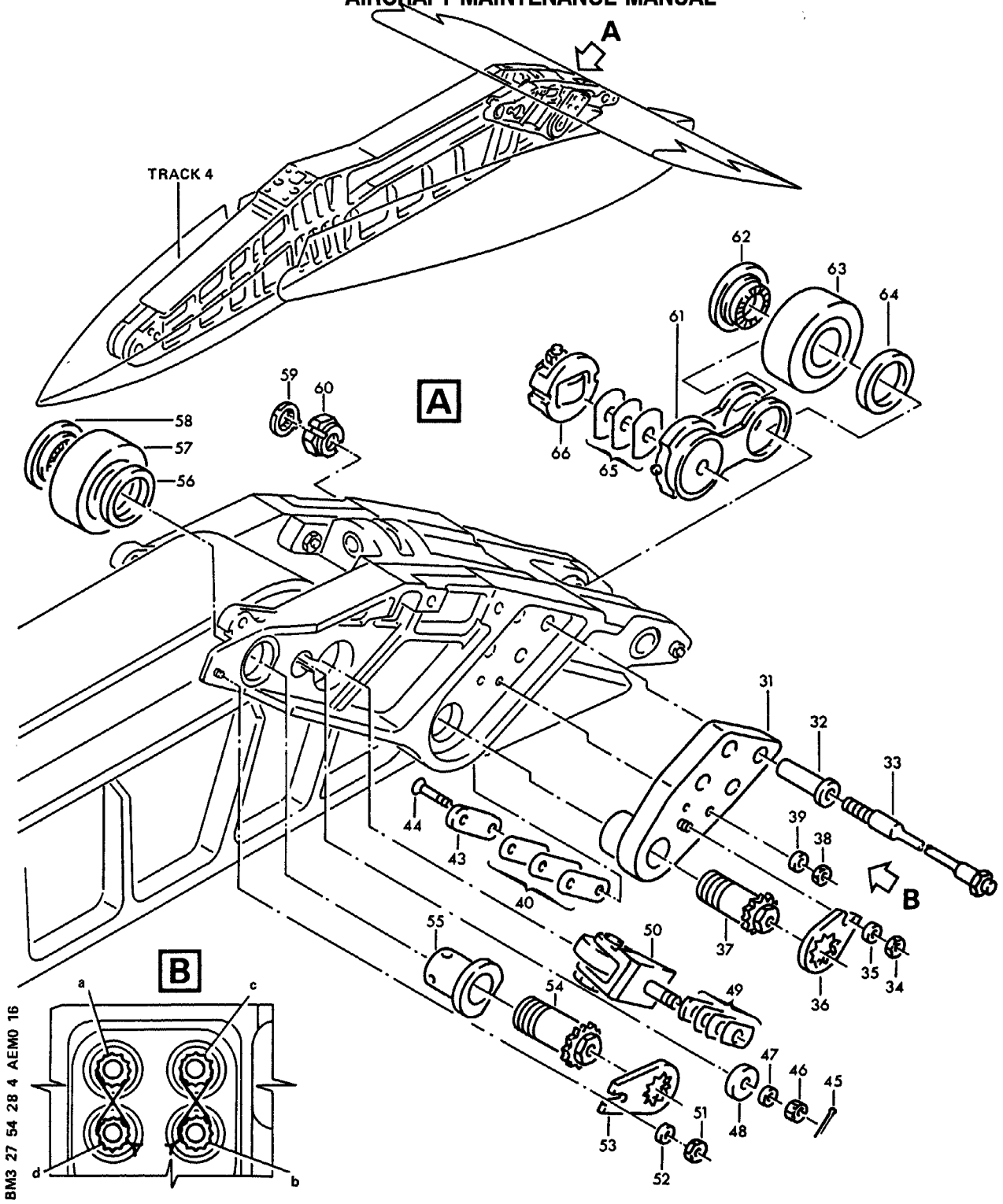
(5)Close-Up
(a)Remove safety barriers.
(b)Remove access platform.
(c)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

B. Carriage Rollers
(Ref. Fig. 403)
NOTE : Only one roller at a time is to be removed.

(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.
(f)For removal of aft rollers only, proceed as follows:
1 Remove fairing, flap track 4 (Ref. 27-50-21, P. Block 401).
2 Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
3 Remove safety guard from flap/slat control lever quadrant.
4 Retract flaps to 15° position (Ref. 27-50-00, P. Block 301).
5 Install safety guard on flap/slat control lever quadrant.



Carriage Rollers
Figure 403

6 Open, safety and tag circuit breakers 5CV, 6CV and 10CV.

(2)Removal

(a)For removal of forward track support rollers (57), proceed as follows:

1 Remove nut (51), washer (52) and tooth plate (53).

2 Remove bolt (54). Use extractor PN 98A27508007100 and extract hollow pin (55) sufficiently enough to allow removal of washer (56), roller (57) and serrated nut (58).

NOTE : During removal of bolt (54) and hollow pin (55) take care that washer (56), roller (57) and serrated nut (58) do not fall away.

NOTE : Extractor PN 98A27508007100 is part of extractor set PN 98A27508007000.

3 Remove washer (56), roller (57) and serrated nut (58).

(b)For removal of forward side rollers (50), proceed as follows:

1 Remove cotter pin (45), castle nut (46), washer (47) and washer (48).

2 Move forward side rollers (50) with washer set (49) backwards and remove through access hole.

NOTE : Record number of washers in washer set (49).

(c)For removal of aft side roller assembly (61) and aft track support roller (63), proceed as follows:

1 Cut, remove and discard lockwire.

R 2 Use extraction tool PN SL90-314-5000 and remove washers (59).

R

R 3 Use notched wrench PN SL90-321-5000 and remove nut (60).

4 Remove special bolt (33).

5 Remove nut (38) and washer (39).

6 Remove screw (44), slide plate (43) and washer set (40).

NOTE : Record number of washers in washer set (40).

7 Remove nut (34), washer (35) and tooth plate (36).

8 Use internal extractor from extractor set PN 98A27508007000 and remove bush (32).

9 Remove bolt (37).

10 Use extractor PN 98A27508007100 and remove spigot (31).

NOTE : During removal of spigot (31) take care that washer (64), aft track support roller (63), serrated nut (62) and aft side roller assembly (61) do not fall away.

11 Remove washer (64), aft track support roller (63), serrated nut (62) and aft side roller assembly (61).

(3)Installation

(a)For installation of forward track support rollers (57), proceed as follows:

1 Apply anti-corrosion compound (Material No. 05-002) to mating

surfaces of hollow pin (55).
2 Install hollow pin (55) sufficiently to locate washer (56) and track support roller (57).
3 Install washer (56), track support roller (57), serrated nut (58) and fully insert hollow pin (55).
4 Apply anti-corrosion compound (Material No. 05-002) to bolt (54).
5 Install bolt (54). TORQUE bolt (54) to 7.0 m.daN (51.63 lbf.ft.).
6 Install tooth plate (53), washer (52) and nut (51). TORQUE nut (51) to between 0.6 and 0.7 m.daN (4.42 and 5.16 lbf.ft.).
7 Apply sealing compound (Material No. 09-016) to nut (51).

(b)For installation of forward side rollers (50), proceed as follows:
1 Install forward side rollers (50) without washer set (49).
2 Install washer (48), washer (47) and castle nut (46). Hand-tighten castle nut (46).

NOTE : If necessary, use a maximum of 3 washers (47).

3 Adjust the clearances between carriage 4 and track 4 as follows (Ref. Fig. 402):
a Use a feeler gage to measure gap between forward side roller (50) and track. Determine thickness of washer set (49) necessary to obtain dimensions "c" and "d":
- Dimension "c" must be between 0.05 and 0.15 mm (0.002 and 0.006 in.).
- Dimension "d" must be equal on both sides to within ± 0.10 mm (0.004 in.).
b Remove castle nut (46), washer (47) and washer (48).
c Move forward side roller (50) backwards and remove through access hole.
d Position washer set (49) as previously determined at (3)(b)3a on forward side roller (50).
e Install forward side roller (50) on carriage.
f Install washer (48), washer (47) and castle nut (46).
g Re-check dimensions "c" and "d" and if necessary re-adjust by changing washer set (49).
h TORQUE castle nut (46) to between 2.2 and 2.8 m.daN (16.23 and 20.65 lbf.ft.).
R j Secure castle nut (46) with cotter pin (45).

(c)For installation of aft side roller assembly (61) and aft track support roller (63), proceed as follows:
1 Remove cage (66) and washer set (65) from aft side roller assembly (61). Re-install cage (66).
2 Position aft side roller assembly (61) between carriage and track in its original position.
3 Use a feeler gage to measure gap between aft side roller and track. Determine thickness of shim necessary to obtain dimension "b" (Ref. Fig. 401):
- Dimension "b" must be between 0.05 and 0.15 mm (0.002 and 0.006 in.).
4 Remove aft side roller assembly (61).
5 Remove cage (66) and install appropriate washers of washer set (65)

as determined at (3)(c)3.
6 Apply grease (Material No. 04-004) to rubbing surfaces of washer (64) and serrated nut (62).
7 Install and align washer (64), aft side roller assembly (61), aft track support roller (63) and serrated nut (62).
8 Carefully install spigot (31) locating washer (64), aft side roller assembly (61), aft track support roller (63) and serrated nut (62).
9 Apply anti-corrosion compound (Material No. 05-002) to bolt (37).
10 Install bolt (37). Hand-tighten bolt (37).
11 Install bushes (32).
12 Apply lubricant (Material No. 06-002) to thread of special bolts (33).
13 Install special bolts (33).
R 14 Use notched wrench PN SL90-321-5000 and install nuts (60). TORQUE nuts (60) in sequence a, b, c, d in 3 steps as follows (Ref. Fig. 403):
- Step 1 3 m.daN (22.1 lbf.ft.)
- Step 2 7 m.daN (51.6 lbf.ft.)
- Step 3 11 m.daN (81.1 lbf.ft.)

R 15 Use installation tool PN SL90-313-5000 and install washer (59).
R
R

16 Safety bolt heads (33) with lockwire dia 1 mm (0.039 in.).
17 TORQUE bolt (37) to 7.0 m.daN (51.63 lbf.ft.).
18 Install tooth plate (36), washer (35) and nut (34). TORQUE nut (34) to between 0.6 and 0.7 m.daN (4.42 and 5.16 lbf.ft.).
19 Apply sealant (Material No. 09-016) to nut (34).
20 Install slide plate (43), bolt (44), washer (39) and nut (38). Hand-tighten nut (38).
21 Use a feeler gage to measure gap "a" between slide plate and track (Ref. Fig. 401):
- Dimension "a" must be 1.0 to 1.2 mm (0.039 to 0.047 in.).

22 If gap dimension "a" is not obtained, replace washers of washer set (40) as required.
23 TORQUE nut (38) to between 0.3 and 0.4 m.daN (2.21 and 2.95 lbf.ft.).

(d)If fairing, flap track 4 has been removed, proceed as follows:
1 Install fairing, flap track 4 (Ref. 27-50-00, P. Block 401).
(e)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(f)Remove safety guard from flap/slat control lever quadrant.
(g)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).

(4)Test
(a)Carry out operational test (Ref. 27-54-00, P. Block 501) and observe carriage 4 during operation for correct movement in the track.

(5)Close-Up
(a)Remove safety barriers.
(b)Remove access platform.
(c)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Carriage 4 - General Check

A. Reason for the Job

(1)To inspect carriage for general condition and security.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 4.25 m (14 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)	Circuit Breaker Safety Clips and Tags
	(4)	Safety Barriers

Referenced Procedure

- 27-50-00, P. Block 301 — Flaps

C. Procedure

(1)Job Set-Up

(a)Position safety barriers.

(b)Extend flaps to 20° position (Ref. 27-50-00, P. Block 301).

R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.

(2)Inspection/Check

(a)Inspect carriage and attachments for corrosion, cracks, or any other damage; none of these are permitted.

(b)Inspect carriage rollers for excessive wear, corrosion, or any other damage; none of these are permitted.
(c)Check that all safety devices are intact.

(3)Close-Up
(a)Remove access platform.
(b)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(c)Remove safety guard from flap/slat control lever quadrant.
(d)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).
(e)Remove safety barriers.
(f)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 4.6 m (15 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27508003001	Rigging Pin Set - Flap Adjustment
	D. 98A27508007000	Extractor Set - Spigot Dowels Flap Carriages 2 thru 5
	E. 98A27508026000	Support Cradle - Flap Spindle
	F. 98A27508059000	Locking Device Set - Flap Carriage
	G. SL90-313-5000	Tool - Installation, Tab Washers STA-LOK NSA5454
	H. SL90-314-5000	Tool - Extraction, Tab Washers STA-LOK NSA5454
	J. SL90-321-5000	Wrench - Notched, Tightening of Nuts NSA5454
	K.	Torque Wrench, 0.3 to 11 m.daN (2.21 to 81.1 lbf.ft.)
	L.	Feeler Gage
	M.	Safety Barriers
	N.	Circuit Breaker Safety Clips and Tags
	P.	Cotter Pins
	Q.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	R.	Lockwire, Corrosion-Resistant Steel, Dia. 1 mm (0.039 in.)
	S. Material No. 04-004	Common Greases (Ref. 20-31-00)
	T. Material No. 05-002	Special Materials (Ref. 20-31-00)
	U. Material No. 05-005	Special Materials (Ref. 20-31-00)
	V. Material No. 06-002	Lubricants (Ref. 20-31-00)
	W. Material No. 09-016	Sealants (Ref. 20-31-00)

Referenced Procedures

- 27-50-00, P. Block 301	Flaps

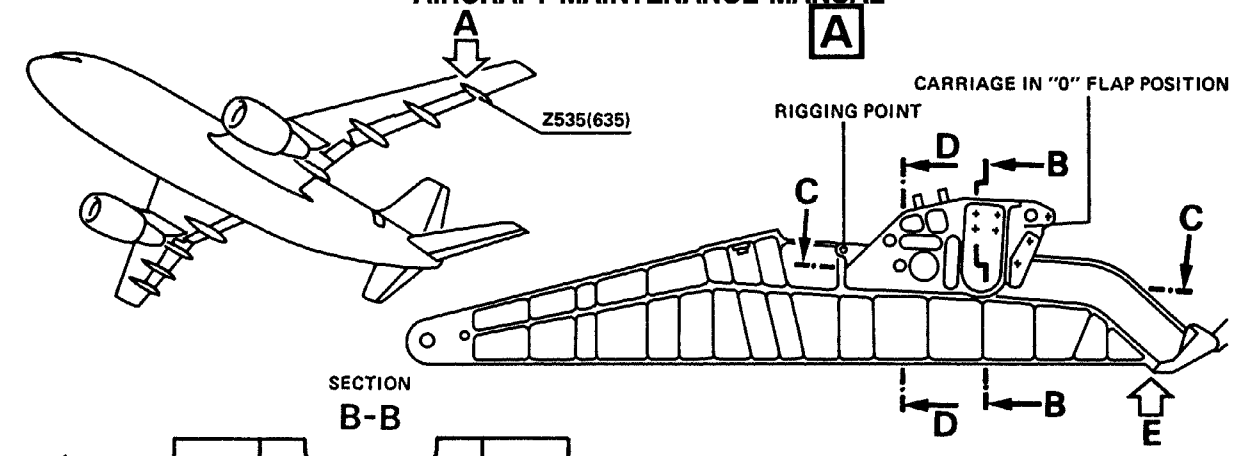
- 27-50-12, P. Block 401 Outboard Flap
- 27-50-21, P. Block 401 Flap Track Fairings
- 27-54-00, P. Block 501 Hydraulic Actuation and Power Transmission (Flaps)

2. Procedure
(Ref. Fig. 401)
(Ref. Fig. 402)

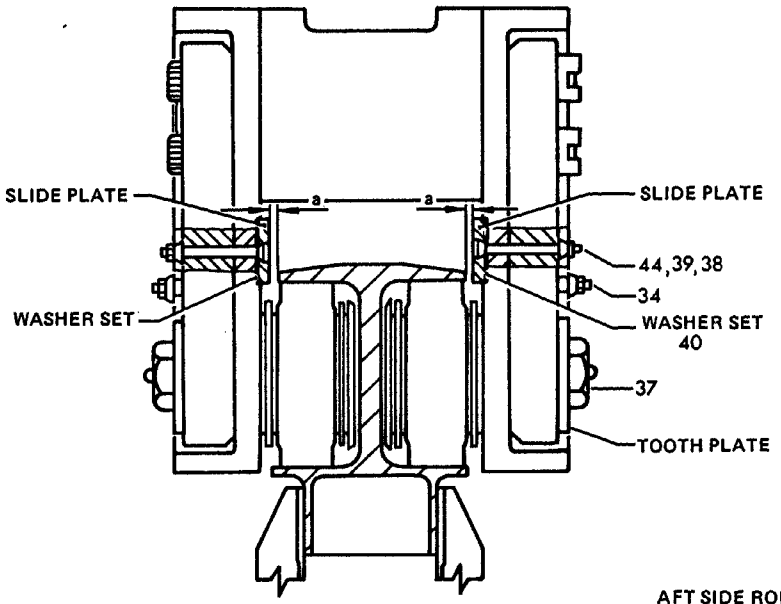
A. Carriage Complete
(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

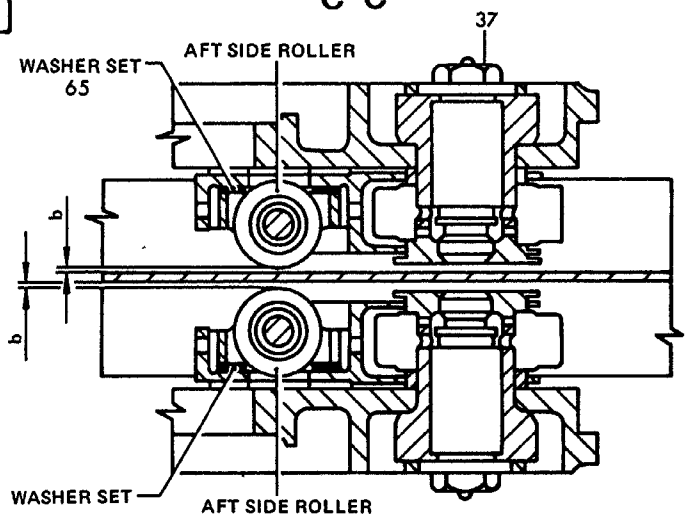
(e)Position access platform.
(f)Remove fairing, flap track 5 (Ref. 27-50-21, P. Block 401).
(g)Remove outboard flap (Ref. 27-50-12, P. Block 401).
(2)Removal
CAUTION : CARRIAGE 5 WEIGHS APPROXIMATELY 27.4 kg (60 lb.).
(a)Position carriage 5 to forward position on track (corresponding to 0° flap setting).
(b)Install rigging pin PN 98A27508003200 of rigging pin set PN 98A27508003001 in carriage 5, track 5.
(c)At aft end of track 5, remove and discard cotter pins (5). Remove castle nuts (4), washers (3), bolts (1) and washers (2) from track 5 stops.
(d)Remove nuts (8), bolts (6) and bushes (7).
(e)Remove nut (11), bolt (12) and washer (13).
(f)Remove bolt (9) and washer (10).
(g)Remove track end stop and fairing side load stay to clear end of track.
WARNING : BEFORE REMOVAL OF RIGGING PIN, (A MINIMUM OF) TWO OPERATIVES MUST BE SUITABLY POSITIONED TO SUPPORT THE CARRIAGE AND REMOVE IT FROM THE TRACK.
(h)Support carriage 5 and remove rigging pin PN 98A27508003200 from carriage 5, track 5.
(i)Remove carriage 5.
(3)Installation
WARNING : CARRIAGE 5 WEIGHS APPROX. 27.4 kg (60 lb.). WHEN INSTALLING CARRIAGE 5, IT MUST BE SUITABLY SUPPORTED.
(a)If the removed carriage is to be re-installed, proceed as follows:
1 Position carriage 5 on track 5 and push carriage 5 forward until



SECTION
B-B



SECTION
C-C



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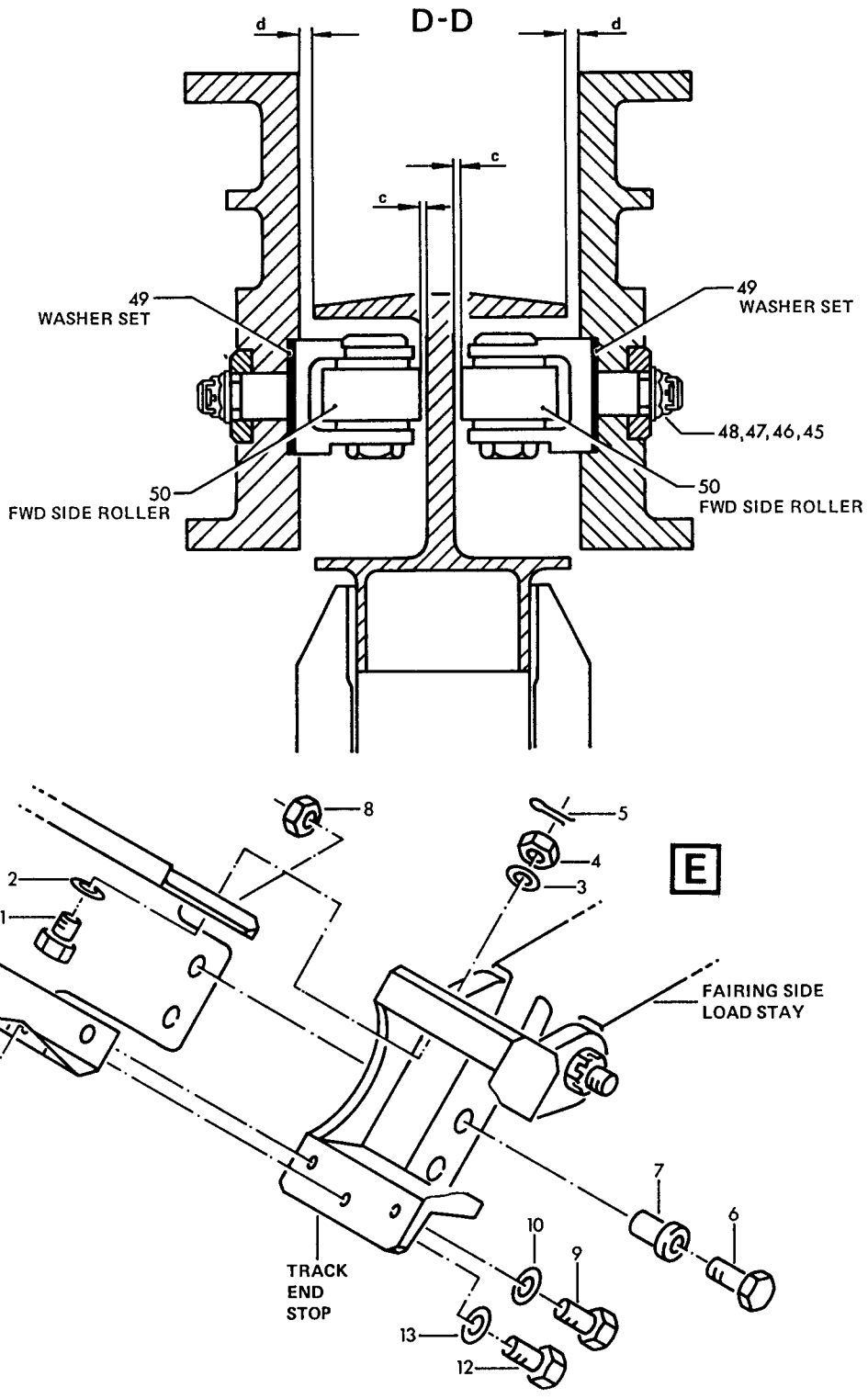
Carriage 5
Figure 401



Carriage 5
Figure 402

R

rigging pin holes are aligned (flap 0° position).
2 Install rigging pin PN 98A27508003200 in carriage 5, track 5.
3 Check clearances "a", "b", "c" and "d" between carriage 5 and track 5:
"a" = 1 to 1.2 mm (0.039 to 0.047 in.)
"b" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"c" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"d" = equal on both sides ±0.1 mm (±0.004 in.)
4 If any of the clearances above are not obtained, refer to step (3)(b).

(b) If a new carriage is to be installed, proceed as follows:
1 Remove washer sets (40),(49),(65) as follows:
a Remove cotter pin (45), castle nut (46), washers (47),(48) and
R forward side roller (50).
b Remove washer set (49) from forward side roller (50).
c Install forward side roller (50) with washers (48),(47) and castle nut (46). Hand-tighten castle nut (46).
d Remove nuts (38), washers (39), bolts (44) and slide plate.
e Remove washer set (40) from slide plate.
f Install slide plate with bolts (44), washers (39) and nuts (38). Hand-tighten nuts (38).
g Withdraw aft side roller from link and remove washer set (65).
h Install aft side roller back into link.
2 Position carriage 5 on track 5 and push carriage 5 forward until rigging pin holes are aligned (flap 0° position).
3 Install rigging pin PN 98A27508003200 in carriage 5, track 5.
4 Use a feeler gage to measure the gaps at positions "a" between slide plate and track, "b" between aft side rollers and track, "c" between forward side rollers and track and "d" between carriage and track.
5 Determine thickness of washer sets (40),(49),(65) necessary to obtain dimensions "a", "b", "c" and "d":
"a" = 1 to 1.2 mm (0.039 to 0.047 in.)
"b" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"c" = 0.05 to 0.15 mm (0.002 to 0.006 in.)
"d" = equal on both sides ±0.1 mm (±0.004 in.)
6 Remove rigging pin.
7 Remove carriage 5.
8 Install washer sets (40),(49),(65) as required.
9 Install carriage 5 and rigging pin PN 98A27508003200.
10 Temporarily install track end stop and secure with bolts (6), bushes (7), nuts (8), bolts (1), washers (3),(2) and castle nuts (4).
11 Re-check dimensions "a","b","c" and "d" in 0° position and four different places between 0° and track end stop position. Re-adjust if necessary by changing washer sets (40),(49),(65).
12 When the required clearances have been obtained, slide plates and roller attaching fasteners must be torqued to the following values:
a At slide plates TORQUE nuts (38) to between 0.3 and 0.4 m.daN (2.21 and 2.95 lbf.ft.).
b At forward side rollers, TORQUE castle nuts (46) to between 2.2 and 2.8 m.daN (16.23 and 20.65 lbf.ft.). Secure castle nuts (46) with cotter pins (45).

(c)If track end stop has been temporarily installed, remove castle nuts (4), nuts (8), washers (2),(3), bolts (1),(6) and bushes (7).
(d)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of track end stop, track and to bolts (1).
(e)Position track end stop with fairing side load stay; install bolts (1), washers (2),(3) and castle nuts (4) and tighten.
(f)Safety castle nuts (4) with cotter pins (5).
(g)Apply anti-corrosion compound (Material No. 05-002) to bolts (6),(9), (12) and bushes (7).
(h)Install bushes (7), bolts (6), nuts (8) and tighten.
(i)Install washer (10), bolt (9) and tighten.
(j)Install washer (13), bolt (12), nut (11) and tighten.
(k)At slide plate and tooth plate attaching fasteners apply sealant (Material No. 09-016) to nuts and exposed thread of bolts.
(l)Remove rigging pin PN 98A27508003200 from carriage 5, track 5.
(m)Position carriage at aft end of track 5.
(n)Install outboard flap (Ref. 27-50-12, P. Block 401).
(o)Install fairing flap track 5 (Ref. 27-50-21, P. Block 401).
(p)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(q)Remove safety guard from flap/slat control lever quadrant.
(r)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).

(4)Test
(a)Carry out operational test (Ref. 27-54-00, P. Block 501) and observe carriage 5 during operation for correct movement in the track.

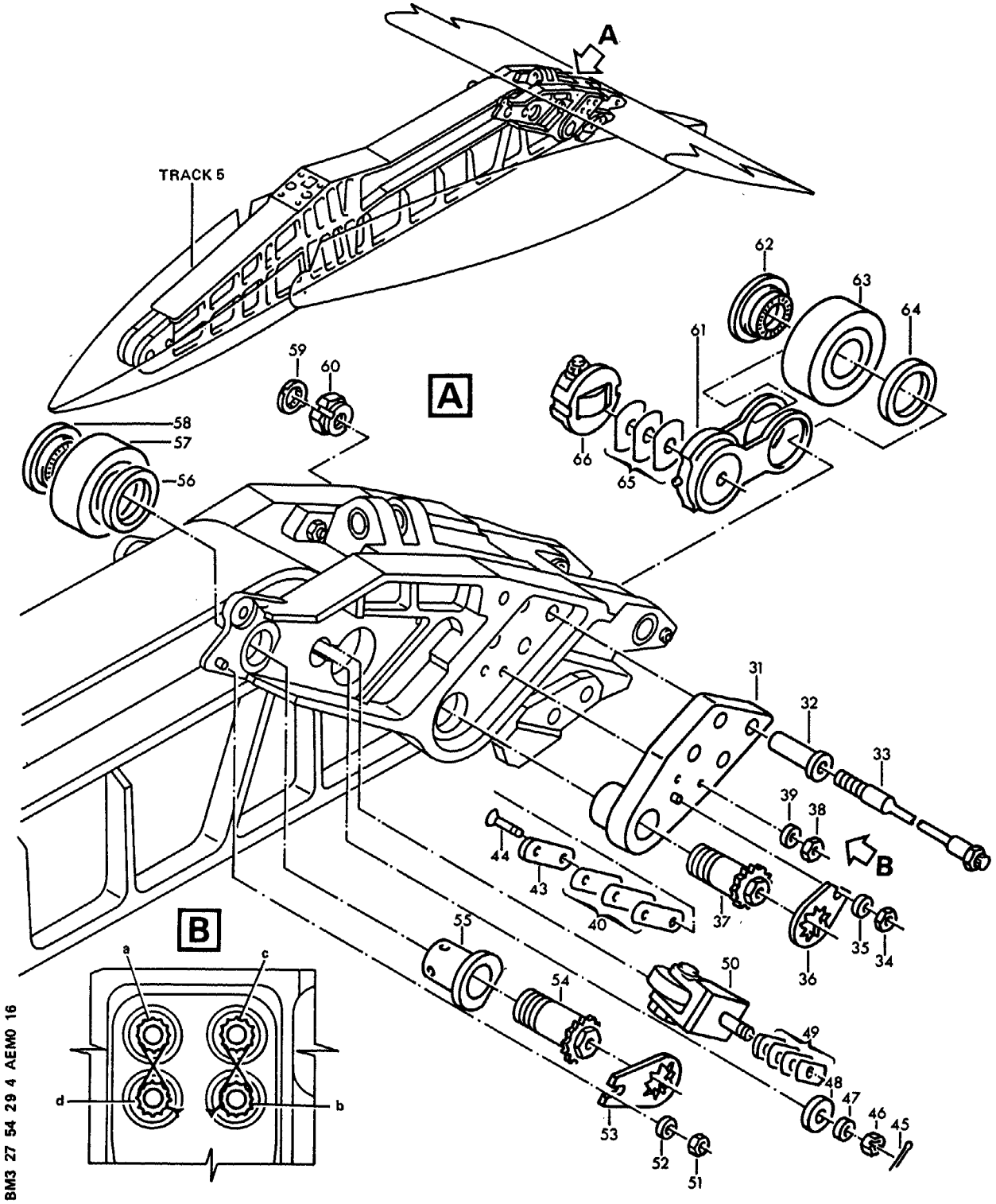
(5)Close-Up
(a)Remove safety barriers.
(b)Remove access platform.
(c)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment and miscellaneous items.

B. Carriage Rollers
(Ref. Fig. 403)
(Ref. Fig. 404)
NOTE : Only one roller at a time is to be removed.

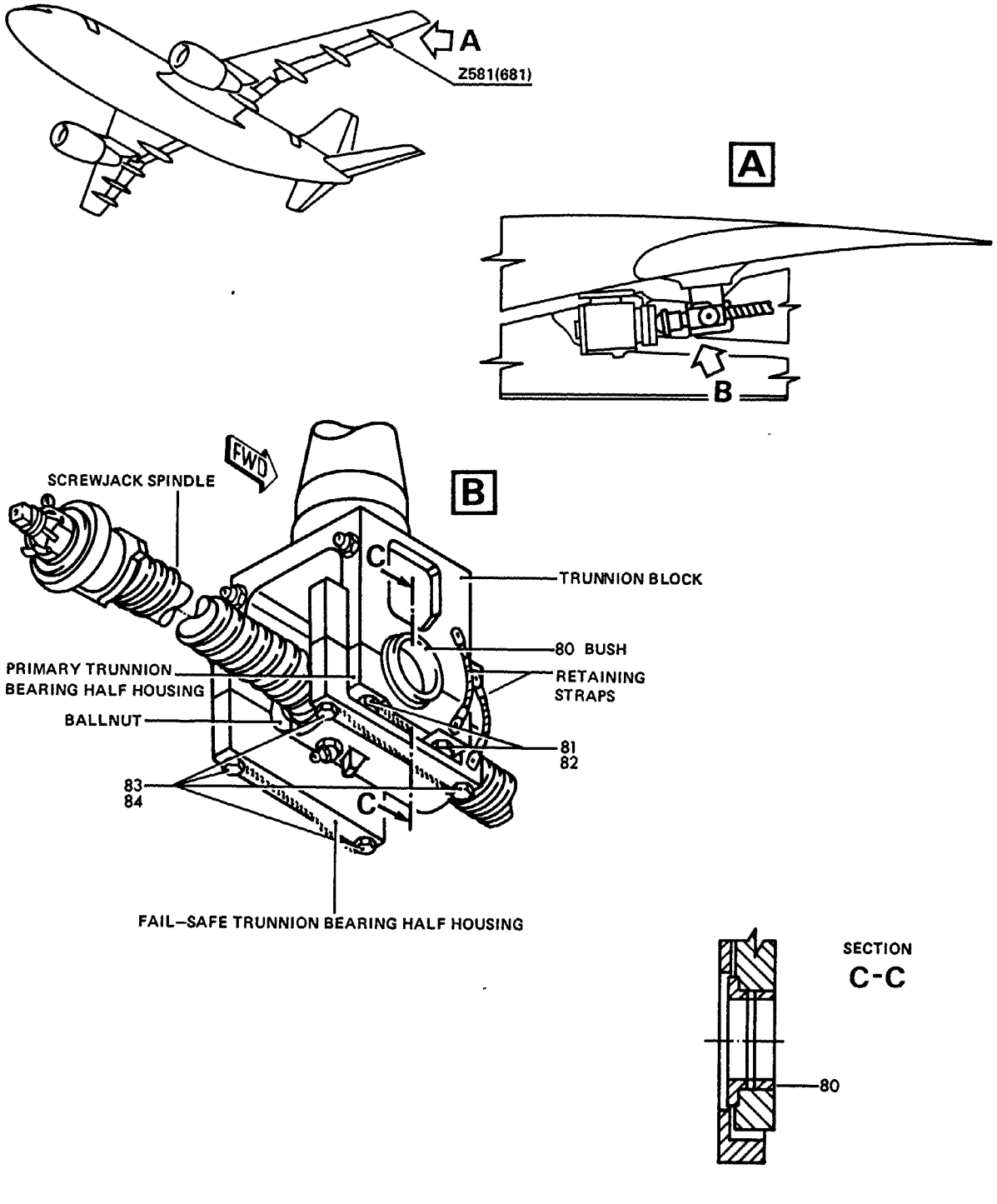
(1)Job Set-Up
(a)Position safety barriers.
(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.



Carriage Rollers
Figure 403



Screwjack 4 Trunnion Bearing
Figure 404

(f)Remove flap track fairing 5 (Ref. 27-50-21, P. Block 401).

NOTE : Removal of flap track fairing 5 is not necessary for replacement of outboard forward track support rollers (57) or outboard forward side rollers (50).

(g)For removal of inboard forward track support rollers (57) only, proceed as follows:
1 Use carriage locking device PN 98A27508059000 and lock carriage 5.
2 Install spindle support cradle PN 98A27508026000 on flap track 5.

(h)For removal of aft side roller assembly (61) or aft track support roller (63) only, proceed as follows:
1 Remove safety clips and tags and close circuit breakers 5CV, 6CV and10CV.
2 Remove safety guard from flap/slat control lever quadrant.
3 Retract flaps to 15° position (Ref. 27-50-00, P. Block 301).
R 4 Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
5 Open, safety and tag circuit breakers 5CV, 6CV and 10CV.

(2)Removal

(a)For removal of outboard forward track support rollers (57), proceed as follows:
1 Remove nut (51), washer (52) and tooth plate (53).
2 Remove bolt (54). Use extractor PN 98A27508007100 and extract hollow pin (55) sufficiently enough to allow removal of washer (56), roller (57) and serrated nut (58).

NOTE : During removal of bolt (54) and hollow pin (55) take care that washer (56), roller (57) and serrated nut (58) do not fall away.

NOTE : Extractor PN 98A27508007100 is part of extractor set PN 98A27508007000.

3 Remove washer (56), roller (57) and serrated nut (58).

(b)For removal of inboard forward track support rollers (57), proceed as follows (Ref. Fig. 403, 404):
1 Cut, remove and discard lockwire. Remove four bolts (83) and washers (84) securing fail-safe trunnion bearing half housing.
2 Separate fail-safe trunnion bearing housing halves, cut lockwire. Remove four bolts (81) and washers (82) securing primary trunnion bearing half housing.

NOTE : Bearing half housings remain attached to the trunnion block by the retaining straps.

3 Separate primary bearing housing halves, lower screwjack spindle until ballnut is clear of trunnion.
4 Turn trunnion block through 90°.
5 Remove nut (51), washer (52) and tooth plate (53).
6 Remove bolt (54). Use extractor PN 98A27508007100 and extract

hollow pin sufficiently enough to allow removal of washer (56), roller (57) and serrated nut (58).

NOTE : During removal of bolt (54) and hollow pin (55) take care that washer (56), roller (57) and serrated nut (58) do not fall away.

7 Remove washer (56), roller (57) and serrated nut (58).

(c)For removal of outboard forward side rollers (50), proceed as follows:

1 Remove cotter pin (45), castle nut (46), washer (47) and washer (48).
2 Move forward side rollers (50) with washer set (49) backwards and remove through access hole.

NOTE : Record number of washers in washer set (49).

(d)For removal of inboard forward side rollers (50), proceed as follows (Ref. Fig. 403, 404):

1 Cut, remove and discard lockwire. Remove four bolts (83) and washers (84) securing fail-safe trunnion bearing half housing.
2 Separate fail-safe trunnion bearing housing halves. Cut, remove and discard lockwire. Remove four bolts (81) and washers (82) securing primary trunnion bearing half housing.

NOTE : Bearing half housings remain attached to the trunnion block by the retaining straps.

3 Separate primary bearing housing halves, lower screwjack spindle until ballnut is clear of trunnion.
4 Mark the position of the ballnut on the screwjack spindle.
5 Turn trunnion block through 90°.
6 Remove cotter pin (45), castle nut (46), washer (47) and washer (48).
7 Move forward side rollers (50) with washer set (49) backwards and remove through access hole.

NOTE : Record number of washers in washer set (49).

(e)For removal of aft side roller assembly (61) and aft track support roller (63), proceed as follows:

1 Cut, remove and discard lockwire at special bolts (33).
2 Use extraction tool PN SL90-314-5000 and remove washers (59).
3 Use notched wrench PN SL90-321-5000 and remove nuts (60).
4 Remove special bolts (33).
5 Remove nuts (38) and washers (39).
6 Remove screws (44), slide plate (43) and washer set (40).

NOTE : Record number of washers in washer set (40).

7 Remove nut (34), washer (35) and tooth plate (36).
8 Use internal extractor from extractor set PN 98A27508007000 and remove bush (32).
9 Remove bolt (37).

10 Use extractor PN 98A27508007100 and remove spigot (31).

NOTE : During removal of spigot (31) take care that washer (64), aft track support roller (63), serrated nut (62) and aft side roller assembly (61) do not fall away.

11 Remove washer (64), aft track support roller (63), serrated nut (62) and aft side roller assembly (61).

(3)Installation

(a)For installation of outboard forward track support rollers (57), proceed as follows:

1 Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of hollow pin (55).
2 Install hollow pin (55) sufficiently to locate washer (56) and track support roller (57).
3 Install washer (56), track support roller (57), serrated nut (58) and fully insert hollow pin (55).
4 Apply anti-corrosion compound (Material No. 05-002) to bolt (54).
5 Install bolt (54). TORQUE bolt (54) to 7.0 m.daN (51.63 lbf.ft.).
6 Install tooth plate (53), washer (52) and nut (51). TORQUE nut (51) to between 0.6 and 0.7 m.daN (4.42 and 5.16 lbf.ft.).
7 Apply sealing compound (Material No. 09-016) to nut (51).

(b)For installation of inboard forward track support rollers (57), proceed as follows:

1 Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of hollow pin (55).
2 Install hollow pin (55) sufficiently to locate washer (56) and track support roller (57).
3 Install washer (56), track support roller (57), serrated nut (58) and fully insert hollow pin (55).
4 Apply anti-corrosion compound (Material No. 05-002) to bolt (54).
5 Install bolt (54). TORQUE bolt (54) to 7.0 m.daN (51.63 lbf.ft.).
6 Install tooth plate (53), washer (52) and nut (51). TORQUE nut (51) to between 0.6 and 0.7 m.daN (4.42 and 5.16 lbf.ft.).
7 Apply sealant (Material No. 09-016) to nut (51).
8 Turn the trunnion block through 90° to its original position.
9 Check that ballnut is in correct position as marked at (2)(d)4.
10 Apply molykote (Material No. 06-002) to threads of bolts (81),(83).
11 Raise spindle and ballnut. Position ballnut connection in fail-safe trunnion bearing housing.
12 Install primary trunnion bearing half housing. Secure with washers (82) and bolts (81).

NOTE : Care must be taken to prevent damage to bushes (80) due to inadvertent contact with machined edges of trunnion bearing housing.

13 TORQUE bolts (81) to between 3.5 and 3.6 m.daN (25.8 and 26.6 lbf.ft.).
14 Safety bolts (81) with lockwire dia 0.8 mm (0.032 in.). Apply corrosion preventive (Material No. 05-005) to bolt heads.

15 Install fail-safe trunnion bearing half housing. Secure with washers (84) and bolts (83).
16 TORQUE bolts (83) to between 3.5 and 3.6 m.daN(25.8 and 26.6 lbf.ft.).
17 Safety bolts (83) with lockwire dia 0.8 mm (0.032 in.). Apply corrosion preventive (Material No. 05-005) to bolt heads.
18 Remove support cradle from track 5.
19 Remove locking device from track 5.

(c)For installation of outboard forward side rollers (50), proceed as follows:

1 Install forward side rollers (50) without washer set (49).
2 Install washer (48), washer (47) and castle nut (46). Hand-tighten castle nut (46).

NOTE : If necessary, use a maximum of 3 washers (47).

3 Adjust the clearances between carriage 5 and track 5 as follows (Ref. Fig. 402):
a Use a feeler gage to measure gap between forward side roller (50) and track. Determine thickness of washer set (49) necessary to obtain dimensions "c" and "d":
- Dimension "c" must be between 0.05 and 0.15 mm (0.002 and 0.006 in.).
- Dimension "d" must be equal on both sides to within ±0.10 mm (0.004 in.).
b Remove castle nut (46), washer (47) and washer (48).
c Move forward side roller (50) backwards and remove through access hole.
d Position washer set (49) as previously determined at (3)(c)3a on forward side roller (50).
e Install forward side roller (50) on carriage.
f Install washer (48), washer (47) and castle nut (46).
g Re-check dimensions "c" and "d" and if necessary re-adjust by changing washer set (49).
h TORQUE castle nut (46) to between 2.2 and 2.8 m.daN (16.23 and 20.65 lbf.ft.).
j Secure castle nut (46) with cotter pin (45).

(d)For installation of inboard forward side rollers (50), proceed as follows:

1 Install forward side rollers (50) without washer set (49).
2 Install washer (48), washer (47) and castle nut (46). Hand-tighten castle nut (46).

NOTE : If necessary, use a maximum of 3 washers (47).

3 Adjust the clearances between carriage 5 and track 5 as follows (Ref. Fig. 402):
a Use a feeler gage to measure gap between forward side roller (50) and track. Determine thickness of washer set (49) necessary to obtain dimensions "c" and "d":
- Dimension "c" must be between 0.05 and 0.15 mm (0.002 and

0.006 in.).
- Dimension "d" must be equal on both sides to within ±0.10 mm (0.004 in.).

b Remove castle nut (46), washer (47) and washer (48).
c Move forward side roller (50) backwards and remove through access hole.
d Position washer set (49) as previously determined at (3)(d)3a on forward side roller (50).
e Install forward side roller (50) on carriage.
f Install washer (48), washer (47) and castle nut (46).
g Re-check dimensions "c" and "d" and if necessary re-adjust by changing washer set (49).
h TORQUE castle nut (46) to between 2.2 and 2.8 m.daN (16.23 and 20.65 lbf.ft.).
j Secure castle nut (46) with cotter pin (45).

4 Turn trunnion block through 90° to its original position.
5 Check that the ballnut is in correct position as marked at (2)(d)4.
6 Apply molykote (Material No. 06-002) to threads of bolts (81),(83).
7 Raise spindle and ballnut. Position ballnut connection in fail-safe trunnion bearing housing.
8 Install primary trunnion bearing half housing. Secure with washers (82) and bolts (81).

NOTE : Care must be taken to prevent damage to bushes (80) due to inadvertent contact with machined edges of trunnion bearing housing.

9 TORQUE bolts (81) to between 3.5 and 3.6 m.daN (25.8 and 26.6 lbf.ft.).
10 Safety bolts (81) with lockwire dia 0.8 mm (0.032 in.). Apply corrosion preventive (Material No. 05-005) to bolt heads.
11 Install fail-safe trunnion bearing half housing. Secure with washers (84) and bolts (83).
12 TORQUE bolts (83) to between 3.5 and 3.6 m.daN (25.8 and 26.6 lbf.ft.).
13 Safety bolts (83) with lockwire dia 0.8 mm (0.032 in.). Apply corrosion preventive (Material No. 05-005) to bolt heads.
14 Remove support cradle from track 5.
15 Remove locking device from track 5.

(e)For installation of aft side roller assembly (61) and aft track support roller (63), proceed as follows:

1 Remove cage (66) and washer set (69) from aft side roller assembly (61). Re-install cage (66).
2 Position aft side roller assembly (61) between carriage and track in its original position.
3 Use a feeler gage to measure gap between aft side roller and track. Determine thickness of shim necessary to obtain dimension "b" (Ref. Fig. 401):
- Dimension "b" must be between 0.05 and 0.15 mm (0.002 and 0.006 in.).

4 Remove aft side roller assembly (61).

5 Remove cage (66) and install appropriate washers of washer set (65) as determined at (3)(e)3.
6 Apply grease (Material No. 04-004) to rubbing surfaces of washer (64) and serrated nut (62).
7 Install and align washer (64), aft side roller assembly (61), aft track support roller (63) and serrated nut (62).
8 Carefully install spigot (31) locating washer (64), aft side roller assembly (61), aft track support roller (63) and serrated nut (62).
9 Apply anti-corrosion compound (Material No. 05-002) to bolt (37).
10 Install bolt (37). Hand-tighten bolt (37).
11 Install bushes (32).
12 Apply lubricant (Material No. 06-002) to thread of special bolts (33).
13 Install special bolts (33).
14 Use notched wrench PN SL90-321-5000 and install nuts (60). TORQUE nuts (60) in sequence a, b, c, d in 3 steps as follows (Ref. Fig. 403):
- Step 1 - 3 m.daN (22.1 lbf.ft.)
- Step 2 - 7 m.daN (51.6 lbf.ft.)
- Step 3 - 10 m.daN (73.8 lbf.ft.)

15 Use installation tool PN SL90-313-5000 and install washers (59).
16 Safety bolt heads (33) with lockwire dia 1 mm (0.039 in.).
17 TORQUE bolt (37) to 7.0 m.daN (51.63 lbf.ft.).
18 Install tooth plate (36), washer (35) and nut (34). TORQUE nut (34) to between 0.6 and 0.7 m.daN (4.42 and 5.16 lbf.ft.).
19 Apply sealant (Material No. 09-016) to nut (34).
20 Install slide plate (43), bolts (44), washers (39) and nuts (38). Hand-tighten nuts (38).
21 Use a feeler gage to measure gap "a" between slide plate and track (Ref. Fig. 401):
- Dimension "a" must be 1.0 to 1.2 mm (0.039 to 0.047 in.).

22 If gap dimension "a" is not obtained, replace washers of washer set (40) as required.
23 TORQUE nuts (38) to between 0.3 and 0.4 m.daN (2.21 and 2.95 lbf.ft.).

(f) Install fairing, flap track 5 (Ref. 27-50-21, P. Block 401).
(g) Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(h) Remove safety guard from flap/slat control lever quadrant.
(j) Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).

(4) Test
(a) Carry out operational test (Ref. 27-54-00, P. Block 501) and observe carriage 5 during operation for correct movement in the track.

(5) Close-Up
(a) Remove safety barriers.
(b) Remove access platform.
(c) Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Carriage 5 - General Check

A. Reason for the Job

(1)To inspect carriage for general condition and security.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 4.6 m (15 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)	Circuit Breaker Safety Clips and Tags
	(4)	Safety Barriers

Referenced Procedure

- 27-50-00, P. Block 301	Flaps

C. Procedure

(1)Job Set-Up

(a)Position safety barriers.

(b)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).

R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Position access platform.

(2)Inspection/Check

(a)Inspect carriage and attachments for corrosion, cracks, or any other damage; none of these are permitted.

(b)Inspect carriage rollers for excessive wear, corrosion, or any other damage; none of these are permitted.
(c)Check that all safety devices are intact.

(3)Close-Up
(a)Remove access platform.
(b)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(c)Remove safety guard from flap/slat control lever quadrant.
(d)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).
(e)Remove safety barriers.
(f)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

FLAP PCU INTERMEDIATE GEARBOX - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
R	A. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	B.	Circuit Breaker Safety Clips and Tags
	C. Material No. 05-002	Special Materials (Ref. 20-31-00)
	D. Material No. 05-005	Special Materials (Ref. 20-31-00)
	E. Material No. 05-054	Special Materials (Ref. 20-31-00)
	F. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 27-51-19, P. Block 401	Feedback Position Pick-Off Unit
- 27-55-12, P. Block 401	Instrumentation Position Pick-Off Unit
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)

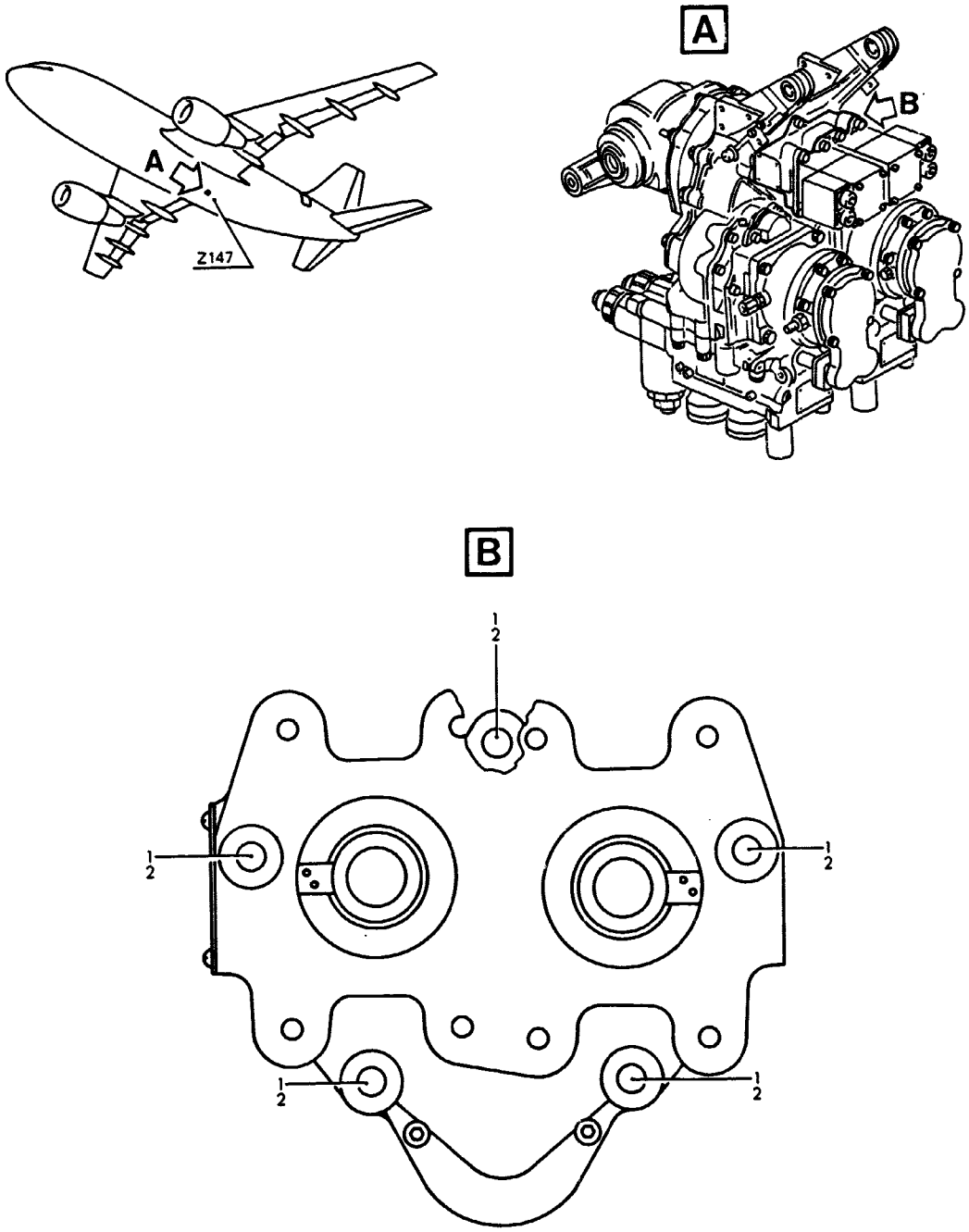
A. Job Set-Up

(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

R (2)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(3)Open LH main gear main door (Ref. 32-12-11, P. Block 301).



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Flap PCU Intermediate Gearbox
Figure 401

(4)Remove Instrumentation Position Pick-off Unit (IPPU) (Ref. 27-55-12, P. Block 401).
(5)Remove Feedback Position Pick-off Unit (FPPU) (Ref. 27-51-19, P. Block 401).

B. Removal
(1)Remove screws (1) and washers (2) securing intermediate gearbox.
(2)Remove intermediate gearbox from PCU.

C. Preparation for Installation
(1)Using solvent (Material No. 11-004), remove all traces of anti-corrosion compound from Power Control Unit (PCU)/intermediate gearbox mating surfaces.
(2)Apply anti-corrosion compound (Material No. 05-002) to threads of screws (1).
(3)Prepare a small quantity of a mixture comprising 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. 05-054).
NOTE : The above proportions are by weight.
(4)Apply a quantity of the mixture prepared above to the electrical bonding area on the intermediate gearbox/PCU mating surface.

D. Installation
(1)Position intermediate gearbox on PCU, secure with washers (2) and screws (1).
(2)TORQUE screws (1) to between 8.7 and 9.57 Nm (6.4 and 7.0 lbf.ft.).
(3)Apply corrosion preventive (Material No. 05-005) to screws (1).
(4)Install IPPU (Ref. 27-55-12, P. Block 401).
(5)Install FPPU (Ref. 27-51-19, P. Block 401).

E. Test
(1)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV and 10CV.
(2)Remove safety guard from flap/slat control lever quadrant.
(3)Carry out operational test of flap system (Ref. 27-54-00, P. Block 501).

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close LH main gear main door (Ref. 32-12-11, P. Block 301).

FLAP PCU PRESSURE-OFF BRAKE - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A. 55638S0000	Extractor - Pressure-Off Brake
B.	Torque Wrench, 8.7 to 9.6 Nm (77 to 85 lbf.in.)
C.	O-Rings
D.	Gasket
E. Material No. 03-003	Oils (Ref. 20-31-00)
F. Material No. 05-002	Special Materials (Ref. 20-31-00)
G. Material No. 05-054	Special Materials (Ref. 20-31-00)
H. Material No. 06-001	Lubricants (Ref. 20-31-00)
I. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 12-13-27, P. Block 1	Flight Controls Replenishing
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-54-34, P. Block 401	Flap PCU Hydraulic Motor
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

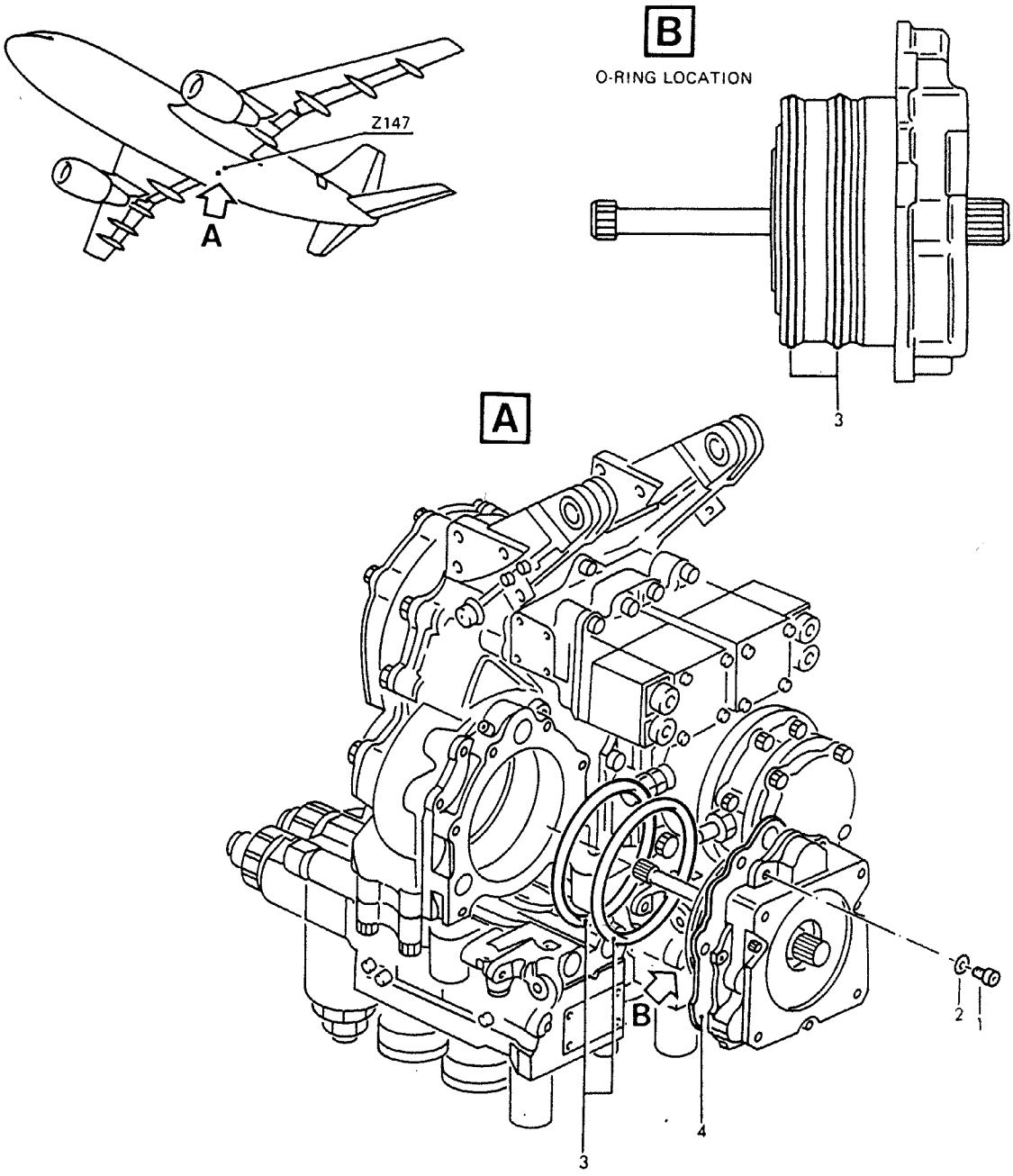
(Ref. Fig. 401)

A. Job Set-Up

(1) Open LH main gear main door (Ref. 32-12-11, P. Block 301).

(2) Remove hydraulic motor associated with Pressure-Off Brake (POB) being removed (Ref. 27-54-34, P. Block 401).

(3) Drain lubricant from Power Control Unit (PCU) (Ref. 12-13-27, P. Block 1).



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Flap PCU Pressure-Off Brake
Figure 401

B. Removal
(1)Remove six screws (1) and washers (2) securing Pressure-Off Brake (POB).
(2)Install extractors in 2 hydraulic motor attaching bolt holes on POB and remove POB from PCU housing.
NOTE : Considerable force may be required to separate POB from PCU.
(3)Remove and discard O-rings (3) from POB.
(4)Remove and discard gasket (4) from between POB and PCU.

C. Preparation for Installation
(1)Using cleaning agent (Material No. 11-004) remove all traces of jointing compound from mating surfaces of POB and PCU.
(2)Prepare a small quantity of a mixture composed of 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. 05-054).
NOTE : Ratios quoted are by weight.
(3)Apply mixture prepared above to threads of screws (1).
(4)Install new O-rings (3) on POB and lubricate with oil (Material No. 03-003).
(5)Spray splined surfaces of POB/motor connection with lubricant (Material No. 06-001).

D. Installation
(1)Position new gasket (4) between POB and PCU, install POB, taking care not to displace O-rings (3); if necessary use extractors to aid installation.
NOTE : Some early POB/PCU gaskets were installed with a sealant coating, this is no longer necessary.
(2)Secure POB with washers (2) and screws (1).
(3)TORQUE screws (1) to between 8.7 and 9.6 Nm (77 and 85 lbf.in.).
R (4)Repeat step (3) after 2 hours.
R (5)Install hydraulic motor (Ref. 27-54-34, P. Block 301).
R (6)Fill PCU with lubricant (Ref. 12-13-27, P. Block 1) and make certain that there are no leaks from POB/PCU joint or PCU drain plug.

E. Test
(1)Carry out operational test (Ref. 27-54-00, P. Block 501) and additionally stop and restart the flaps at a variety of selections checking that stopping and starting of flap system is accomplished without judder.

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close main gear main door (Ref. 32-12-11, P. Block 301).

FLAP PCU VALVE BLOCK 23CV 24CV - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.8 m (9 ft.).
B.	Torque Wrench, 2.2 to 2.43 Nm (20 to 22 lbf.in.)
C.	Torque Wrench, 2.8 to 3.1 Nm (25 to 27.5 lbf.in.)
D.	Torque Wrench, 16.6 to 18.2 Nm (12.25 to 13.4 lbf.ft.)
E.	Torque Wrench, 60 to 63 Nm (44.3 to 46.5 lbf.ft.)
F.	Torque Wrench, 90 to 94.5 Nm (66.6 to 69.5 lbf.ft.)
G.	Ohmmeter, 0-20 milliohms
H.	Notice Prohibiting Pressurization of Hydraulic Systems
I.	Hydraulic Blanks and Plugs
J.	Electrical Connector Protective Caps
K.	Container for Collecting Spilt Fluid
L.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
M.	Circuit Breaker Safety Clips and Tags
N.	O-Rings
O. Material No. 05-002	Special Materials (Ref. 20-31-00)
P. Material No. 05-005	Special Materials (Ref. 20-31-00)
Q. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
R. Material No. 05-054	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 12-12-29, P. Block 1	Hydraulics
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-54-34, P. Block 401	Flap PCU Hydraulic Motor

- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

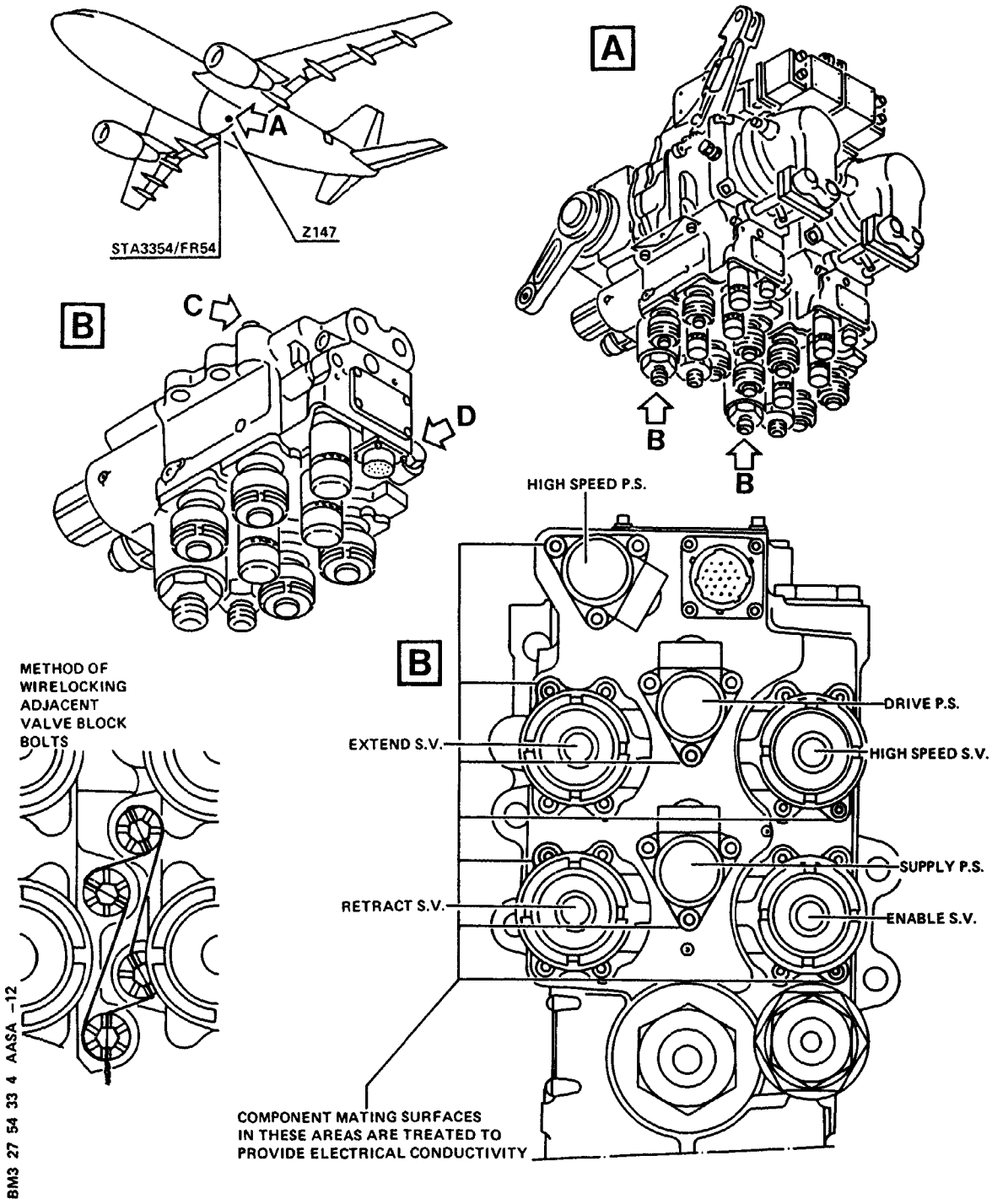
2. Procedure
(Ref. Fig. 401) (Sheet 1/3)
(Ref. Fig. 401) (Sheet 2/3)
(Ref. Fig. 401) (Sheets 3/3)

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers:

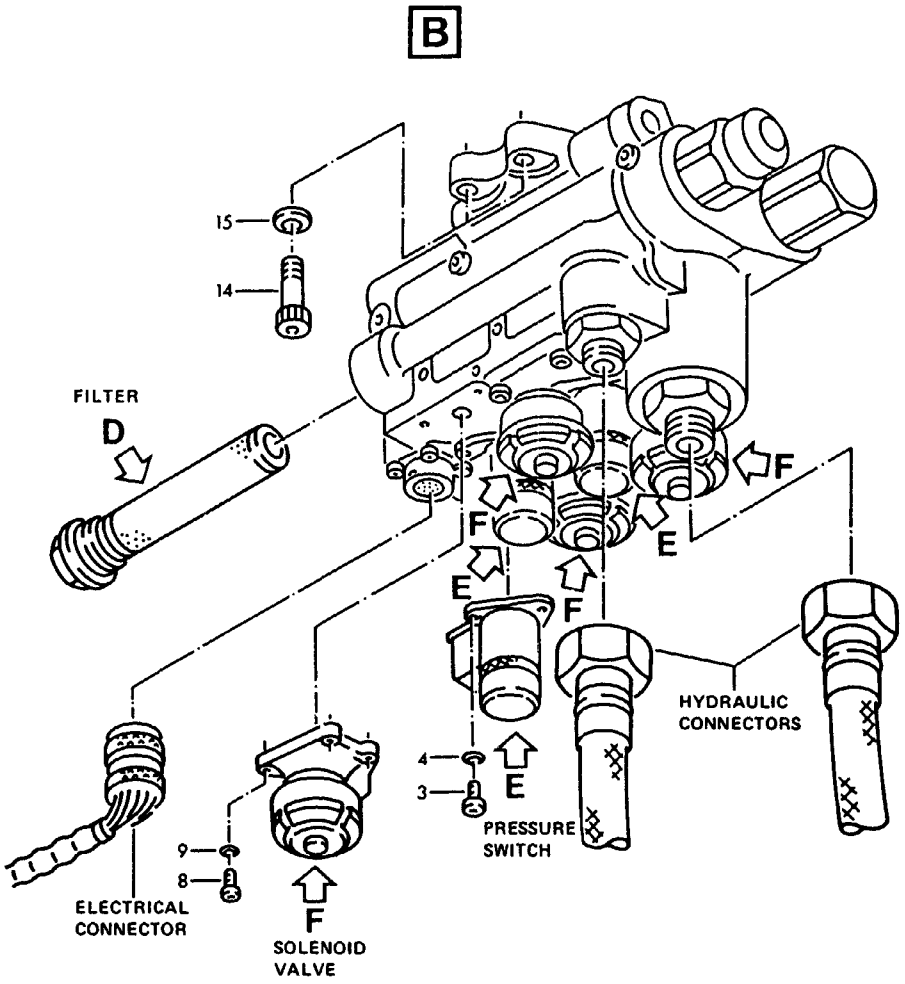
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(2)Open LH or RH main landing gear door (Ref. 32-12-11, P. Block 301).
(3)Position access platform.
(4)Depressurize hydraulic system supplying component to be removed (Ref. 29-10-00, P. Block 301).
(5)Depressurize hydraulic reservoir of system supplying component to be removed (Ref. 29-14-00, P. Block 301).
(6)Display notice prohibiting pressurization of hydraulic systems.
(7)Position container to collect any spilt fluid.

B. Removal
(1)For removal of filter only, proceed as follows:
(a)Cut and discard lockwire.
(b)Slacken filter and remove from valve block assembly.
(c)Discard O-ring (1).
(2)For removal of pressure switch only, proceed as follows;
(a)Cut and discard lockwire.
(b)Remove screws (3) and washers (4).
(c)Extract pressure switch from valve block assembly.
(d)Discard O-rings (5),(7) and back-up rings (6).
(3)For removal of solenoid valve only, proceed as follows:
(a)Cut and discard lockwire.
(b)Remove screws (8) and washers (9).
(c)Extract solenoid valve from valve block assembly.
(d)Discard O-rings (10), (11), (12).
(4)For removal of valve block assembly complete, proceed as follows:
NOTE : The valve block (23CV) of flap system 1 is located on the RH side and valve block (24CV) of flap system 2 is located on the LH side of the power control unit (in flight direction).
(a)Remove hydraulic motor associated with valve block to be removed (Ref. 27-54-34, P. Block 401).
(b)Cut and discard lockwire, disconnect electrical connector.
(c)Install protective caps on electrical connector and plug.
(d)Disconnect both hydraulic pipes and install blanking plugs and caps on



PCU Valve Block (Sheet 1/3)
Figure 401



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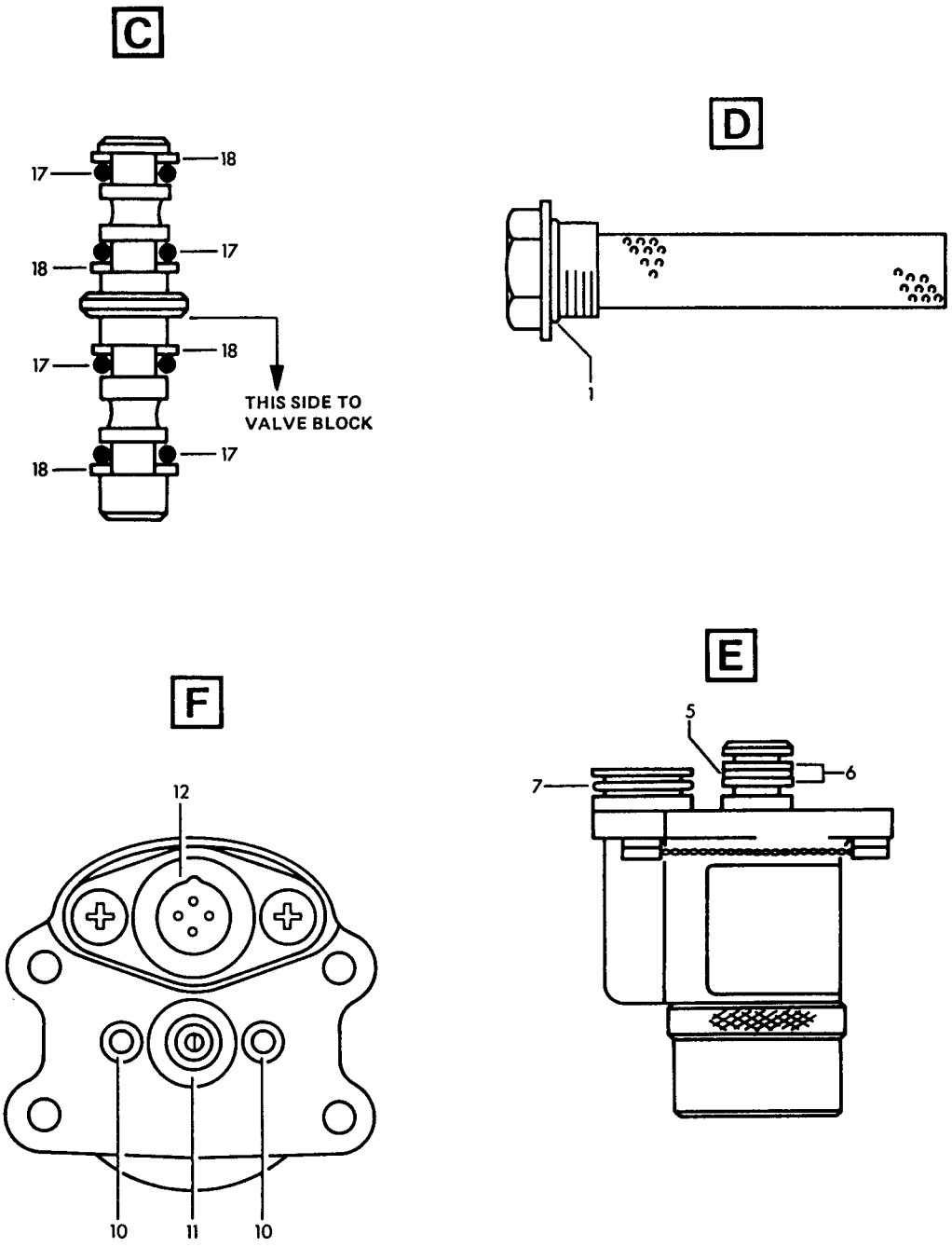
PCU Valve Block (Sheet 2/3)
Figure 401



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PCU Valve Block (Sheet 3/3)
Figure 401

R

hydraulic connectors and pipes.
(e)Disconnect hydraulic pipe from filter and install hydraulic blanks.
(f)Cut and discard lockwire and slacken screws (14).
(g)Support valve block and remove screws (14) and washers (15).
(h)Carefully lower valve block assembly clear of PCU, making certain that Pressure-off Brake (POB) transfer tube between PCU and valve block is not damaged.
(i)Extract POB transfer tube and discard O-rings (17).

C. Preparation for Installation
(1)Using solvent (Material No. 11-004), remove all traces of sealant from component mating surfaces.
(2)Soak O-rings in operating fluid before installation.
(3)For filter only, install new O-ring (1).
(4)For pressure switch only, install new O-rings (5),(7), making certain that O-ring (5) is correctly positioned between the two back-up rings (6) apply anti-corrosion compound (Material No. 05-002) to threads of screws (3).
(5)For solenoid valve only, install new O-rings (10) (11) (12) and apply anti-corrosion compound (Material No. 05-002) to threads of screws (8).
(6)For installation of complete valve block, solenoid valves or pressure switches only prepare a small quantity of a mixture composed of 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. 05-054).
NOTE : Proportions quoted are by weight.
(7)For valve block assembly complete, proceed as follows:
(a)Remove storage plugs and O-rings from POB transfer tube port and motor transfer tube ports.
(b)Install new O-rings (17) on POB transfer tube, correctly located in relation to retaining rings (18).
(c)Install POB transfer tube in valve block, so that shoulder is located in recess in valve block housing.
(d)Apply a quantity of the mixture prepared above to the non-anodised portion of the valve block mating surface.
(e)Apply anti-corrosion compound (Material No. 05-002) to threads of screws (14).
(8)Apply mixture prepared above to areas of components indicated to ensure electrical conductivity.

D. Installation
(1)For installation of filter only, proceed as follows:
(a)Install filter in valve block and tighten.
(b)TORQUE to between 90 and 94.5 Nm (66.6 and 69.5 lbf.ft.).
(c)Safety with lockwire.
(2)For installation of pressure switch only, proceed as follows:
(a)Position pressure switch on valve block, secure with washers (4) and screws (3).
(b)TORQUE screws (3) to between 2.2 and 2.43 Nm (20 and 22 lbf.in.).
(c)Measure electrical resistance between pressure switch and PCU housing (at main bonding point), resistance must not exceed 20 milliohms.
(d)Safety screws (3) with lockwire.

(e)Apply corrosion preventive (Material No. 05-005) to screws (3).
(3)For installation of solenoid valve only, proceed as follows:
(a)Position solenoid valve on valve block, secure with washers (9) screws (8).
(b)TORQUE screws (8) to between 2.8 and 3.1 Nm (25 and 27.5 lbf.in.).
(c)Measure electrical resistance between solenoid valve and PCU housing (at main bonding point), resistance must not exceed 20 milliohms.
(d)Safety screws (8) with lockwire.
(e)Apply corrosion-preventive (Material No. 05-005) to screws (8).
(4)For installation of valve block complete, proceed as follows:
(a)Position valve block on PCU, making certain that POB transfer tube is correctly seated and that O-rings are not damaged during assembly.
(b)Secure valve block with washers (15) and screws (14).
(c)TORQUE screws (14) to between 16.6 and 18.2 Nm (12.25 and 13.4 lbf.ft.).
(d)Measure electrical resistance between valve block and PCU housing (at main bonding point), resistance must not exceed 20 milliohms.
(e)Safety screws (14) with lockwire.
NOTE : Due to restricted access, it may be necessary to wirelock screws (14) closest to PCU centerline to corresponding screws on other valve block.
(f)Apply corrosion preventive (Material No. 05-005) to screws (14).
(g)Install hydraulic motor (Ref. 27-54-34, P. Block 401).
(h)Remove hydraulic blanks and connect hydraulic pipes.
(i)Remove protective caps and connect electrical connector.
(j)Safety electrical connector with lockwire.
(5)Pressurize hydraulic reservoir of system supplying replaced component (Ref. 29-14-00, P. Block 301).
(6)Check fluid level in reservoir of system supplying replaced component (Ref. 12-12-29, P. Block 1), replenish as required.
(7)Position safety barriers in area of flap extension.
(8)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV, 10CV.
(9)Remove notice prohibiting pressurization of hydraulic system.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACES IS CLEAR.
(10)Using only system supplying replaced component, carry out operational test of flaps (Ref. 27-54-00, P. Block 501).
(11)Check all disturbed hydraulic connections, making certain that there are no leaks.
(12)Check that no fault indications are present on front faces of computers SFCC1 and SFCC2.

E. Close-Up
(1)Check fluid level in hydraulic reservoir of system supplying replaced component (Ref. 12-12-29, P. Block 1), replenish as required.
(2)Remove container.
(3)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(4)Remove access platform.

(5)Close main gear main door (Ref. 32-12-11, P. Block 301).
(6)Remove safety barriers.

FLAP PCU HYDRAULIC MOTOR - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 2.8 m (9 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C.	Torque Wrench, 3.75 to 4.1 Nm (33 to 36 lbf.in.)
	D.	Torque Wrench, 16.6 to 18.3 Nm (146.9 to 161.9 lbf.in.)
	E.	Ohmmeter, 0 to 20 milliohms
	F.	Notice Prohibiting Pressurization of Hydraulic Systems
	G.	Circuit Breaker Safety Clips and Tags
	H.	Container for Collecting Spilt Fluid
	I.	Safety Barriers
	J.	Lockwire, Corrosion-Resistant Steel, Dia. 0.63 mm (0.025 in.)
	K.	O-Rings
	L. Material No. 05-002	Special Materials (Ref. 20-31-00)
	M. Material No. 05-005	Special Materials (Ref. 20-31-00)
	N. Material No. 05-054	Special Materials (Ref. 20-31-00)
	O. Material No. 06-001	Lubricants (Ref. 20-31-00)
	P. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
	Q. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)

Referenced Procedures

- 12-12-29, P. Block 1	Hydraulics
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

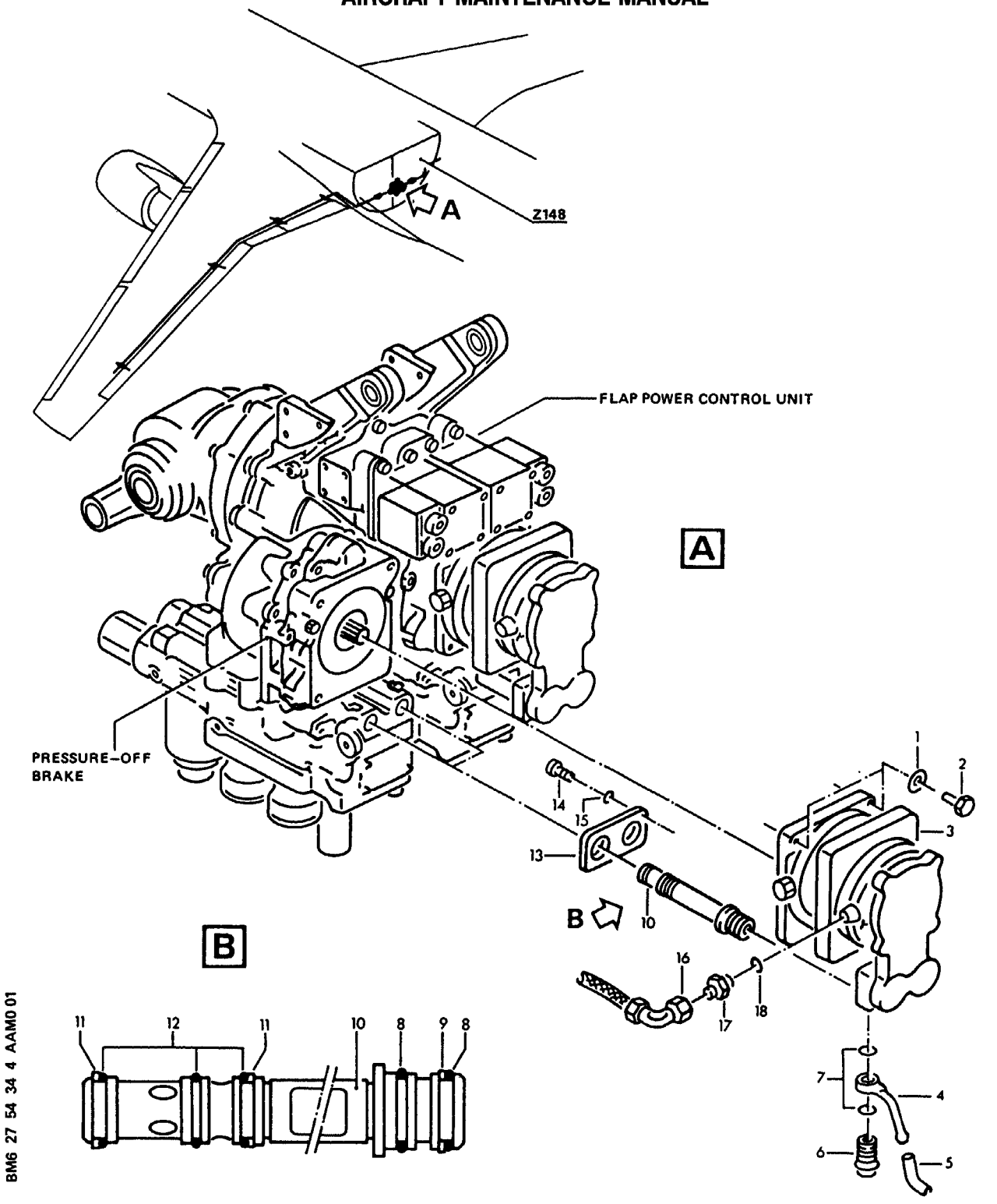
R (2)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(3)Open LH main gear main door (Ref. 32-12-11, P. Block 301).
(4)Position access platform.
(5)Depressurize hydraulic system supplying motor to be removed (Ref. 29-10-00, P. Block 301).
(6)Depressurize hydraulic reservoir of system supplying motor to be removed (Ref. 29-14-00, P. Block 301).
(7)Display notice prohibiting pressurization of hydraulic systems.
(8)Position container beneath power control unit (PCU) to collect any spilt fluid.

B. Removal

(1)Remove case drain hose (16) from union (17) of case drain port.
(2)Remove seal drain hose (5) from drain pipe (4) of seal drain port.
(3)Cut and remove lockwire securing bolts (2).
(4)Remove bolts (2) and washers (1) attaching hydraulic motor on pressure-off brake of flap power control unit.
(5)Remove hydraulic motor (3) together with transfer tube assy (10) from flap power control unit.
(6)Cut and remove lockwire from bolts (14).
(7)Remove bolts (14), washers (15) and attaching plate (13) from hydraulic motor (3).
(8)Remove transfer tubes (10) from hydraulic motor (3).
(9)Remove union (17) and O-ring (18) from case drain port. Discard O-ring.
(10)Remove banjo bolt (6), drain pipe (4) and O-rings (7) from seal drain port. Discard O-rings.
(11)Remove O-rings (8),(12) from transfer tubes (10). Discard O-rings.

C. Preparation for Installation

(1)Lubricate all new O-rings with hydraulic fluid (Material No. 02-003).
(2)Position new O-rings (8),(12) on transfer tubes (10).
NOTE : Make certain that O-rings (8),(12) are correctly fitted in relation to retainer (9),(11).
(3)Position new O-ring (18) on union (17).
(4)Position new O-rings (7) and drain pipe (4) on banjo bolt (6).



Flap PCU Hydraulic Motor
Figure 401

R

R (5)Prepare mating surfaces of hydraulic motor (3) and pressure-off brake as follows:
R (a)Clean mating surfaces with scraper blade and solvent (Material No. 11-004) to remove old sealant mixture.
R (b)Prepare a small quantity of a mixture of 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. 05-054).
R NOTE : Proportions quoted are by weight.
R (c)Coat this mixture on electrical bonding areas of hydraulic motor and pressure-off brake.
R (d)Apply lubricant (Material No. 06-001) to splines of pressure-off brake.
R (6)Apply anti-corrosion compound (Material No. 05-002) to threads of bolts (2),(14).

R D. Installation
R CAUTION : DO NOT INSTALL TRANSFER TUBES FROM SLAT POWER CONTROL UNIT ON FLAP POWER CONTROL UNIT.
R (1)Insert carefully transfer tubes (10) to hydraulic motor (3).
R (2)Attach plate (13) with bolts (14) and washers (15) on hydraulic motor (3).
R (3)TORQUE bolts (14) to between 3.75 and 4.10 Nm (33 and 36 lbf.in.).
R (4)Safety bolts (14) with lockwire, corrosion-resistant steel, dia. 0.63 mm (0.025 in.).
R (5)Align splines of hydraulic motor (3) and pressure-off brake.
R (6)Insert transfer tubes (10) together with hydraulic motor (3) on flap power control unit.
R (7)Attach hydraulic motor (3) with bolts (2) and washers (1) on pressure-off brake of flap power control unit.
R (8)TORQUE bolts (2) to between 16.6 and 18.3 Nm (146.9 and 161.9 lbf.in.).
R (9)Safety bolts (2) with lockwire, corrosion-resistant steel, dia. 0.63 mm (0.025 in.).
R (10)Install banjo bolt (6) together with drain pipe (4) and new O-rings (7) on seal drain port of hydraulic motor (3).
R (11)Install seal drain hose (5) on drain pipe (4) of seal drain port.
R (12)Install union (17) together with new O-ring (18) on case drain port of hydraulic motor (3).
R (13)Install case drain hose (16) on union (17) of case drain port.
R (14)Measure electrical resistance at main bonding point between hydraulic motor and flap power control unit.
R NOTE : Resistance must not exceed 20 milliohms.
R (15)Apply corrosion preventive (Material No. 05-005) to bolts (2).

E. Test
R (1)Pressurize hydraulic reservoir of system supplying replaced motor (Ref. 29-14-00, P. Block 301).
R (2)Check contents of hydraulic reservoir of system supplying replaced motor (Ref. 12-12-29, P. Block 1), replenish as required.
R (3)Position safety barriers.
R (4)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV, 10CV.
R (5)Remove notice prohibiting pressurization of hydraulic system.

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACES IS CLEAR.

R (6)Using only system supplying replaced motor, carry out operational test of flaps (Ref. 27-54-00, P. Block 501).

R (7)During operation of flaps, make certain that no fluid is discharged from seal drain pipe.

R (8)Check all disturbed hydraulic connections, making certain that there are no leaks.

F. Close-Up

(1)Check contents of hydraulic reservoir of system supplying replaced motor (Ref. 12-12-29, P. Block 1), replenish as required.

(2)Remove container from beneath PCU.

(3)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(4)Remove access platform.

(5)Close LH main gear main door (Ref. 32-12-11, P. Block 301).

(6)Remove safety barriers.

FLAP SCREWJACK 1 SUPPORT SPRING - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3.5 m (11 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27508051000	Setting Device Set - Supporting Spring, Flap Screwjack No. 1
	D.	Safety Barriers
	E.	Cotter pins
	F.	Circuit Breaker Safety Clips and Tags

Referenced Procedure
- 27-50-00, P. Block 301 Flaps

2. Procedure

(Ref. Fig. 401) (Sheet 1/2)
(Ref. Fig. 401) (Sheet 2/2)

A. Job Set-Up

(1)Position safety barriers.

(2)Extend flaps to 20° position (Ref. 27-50-00, P. Block 301).

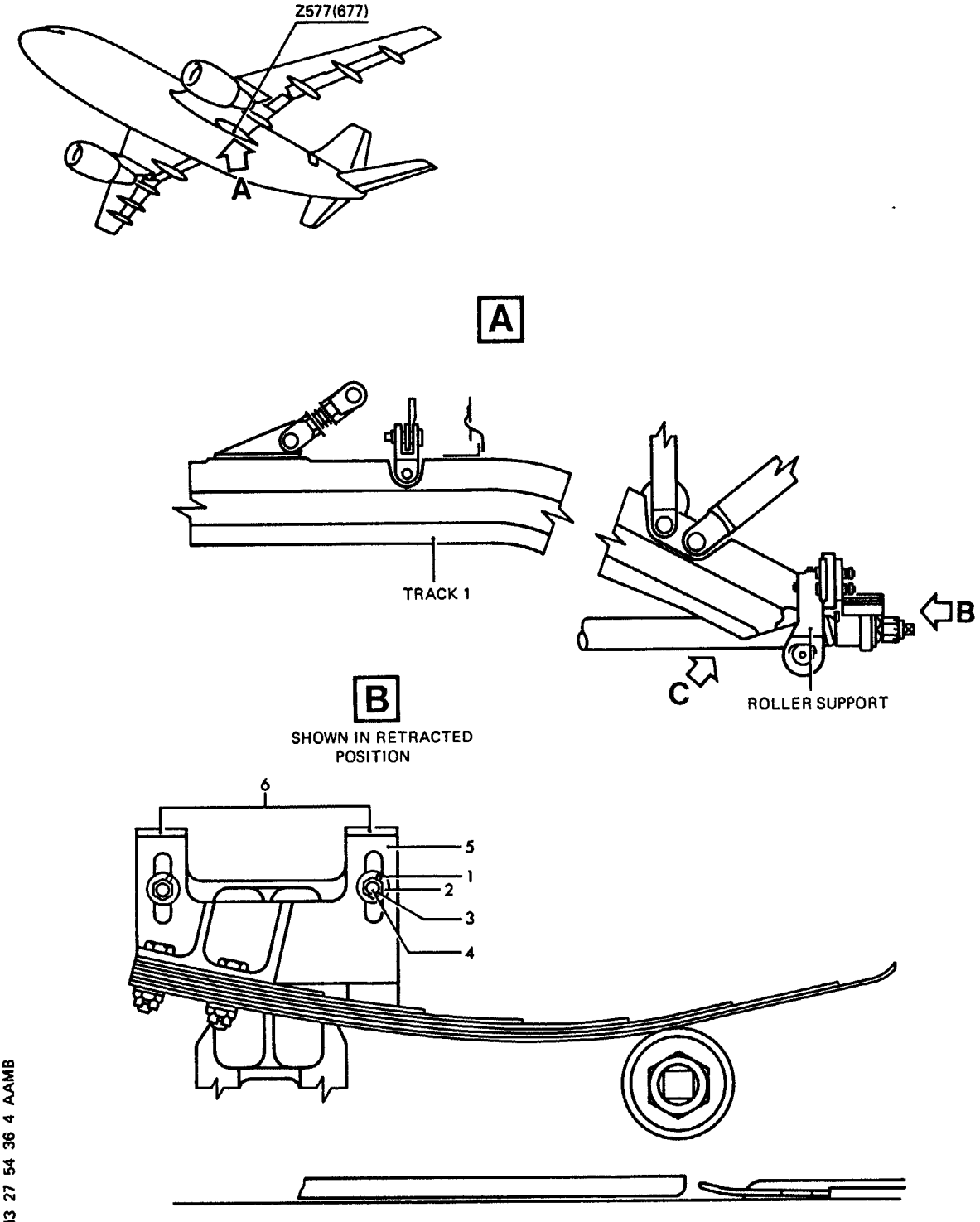
R (3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/FLAPS/SYS 1	10CV	335/R67

(5)Position access platform.

(6)Remove access panels 577AB and 577BB (677AB and 677BB).



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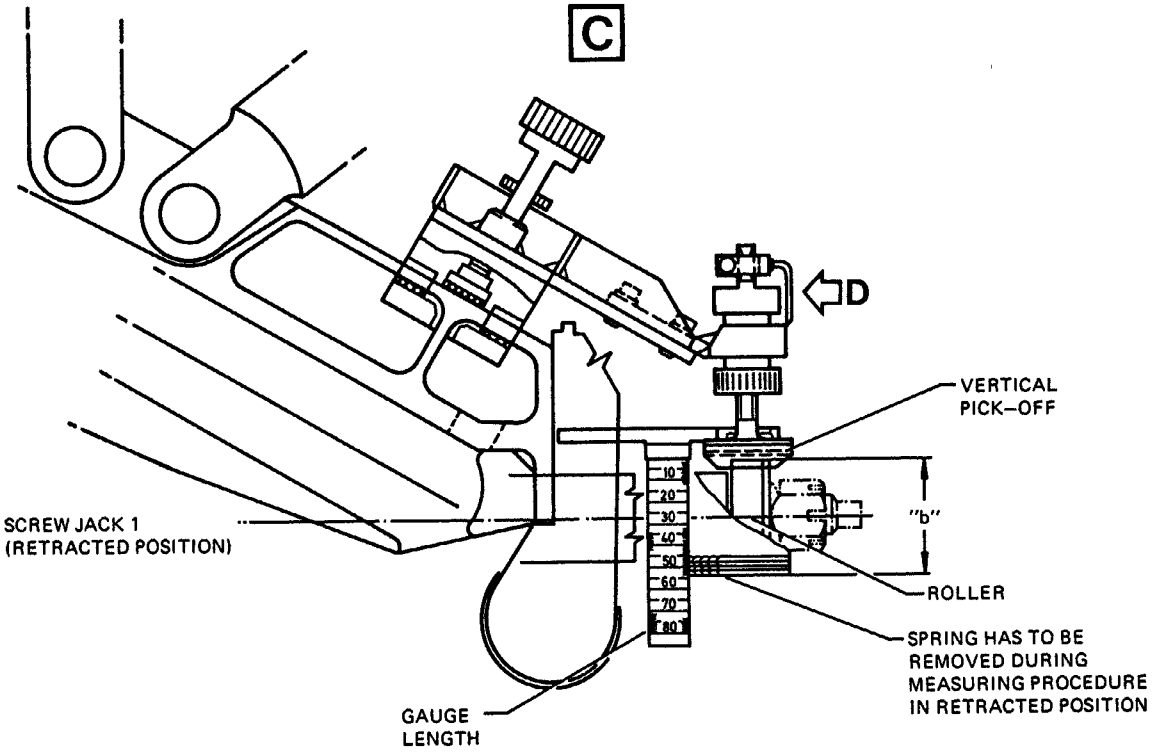
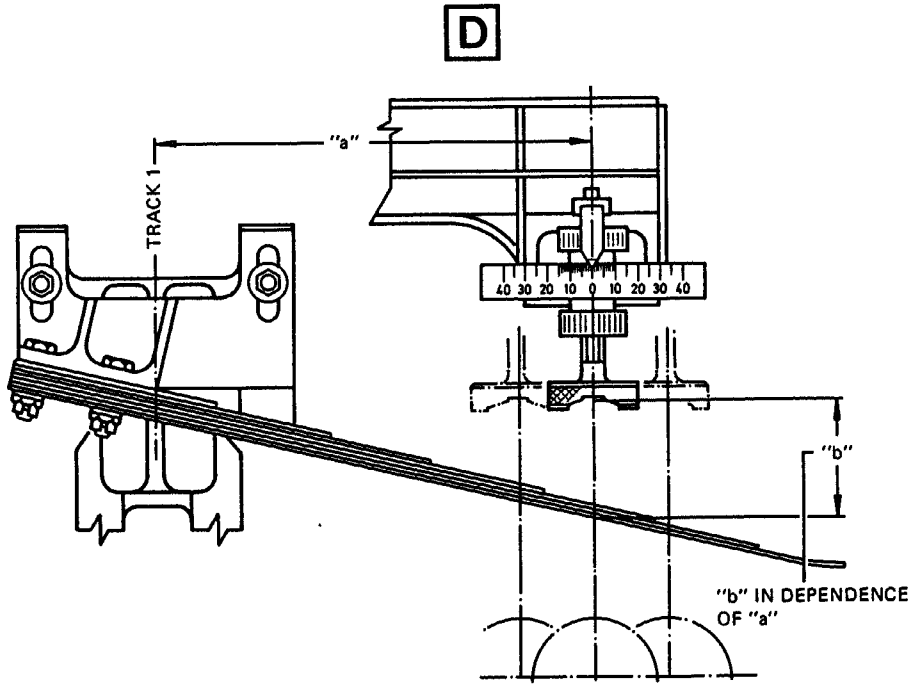
Support Spring - Flap Screwjack 1
(Sheet 1/2)
Figure 401





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Support Spring - Flap Screwjack 1
(Sheet 2/2)
Figure 401

B. Removal
(1)Remove and discard cotter pins (1), nuts (3), washers (2) and screws (4).
(2)Remove support spring (5) and intermediate plate (6).

C. Installation
(1)Attach setting device PN 98A27508051000 to track 1.
(2)Position the vertical pick-off on setting device to its uppermost position.
(3)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(4)Remove safety guard from flap/slat control lever quadrant.
(5)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(6)Install safety guard on flap/slat control lever quadrant.
(7)Open, safety and tag circuit breakers 5CV, 6CV and 10CV.
(8)Adjust the vertical pick-off on the setting device so as to contact the roller at the end of screwjack 1.
(9)Determine dimension "a" by means of the scale provided on the setting device.
NOTE : Dimension "a" is 196 mm (7.72 in.) plus or minus the value stated on the setting device.
(10)Determine dimension "b" as a function of dimension "a" see table below:

"a"	166	171	176	181	186	191	196	201	206
mm (in.)	(6.54)	(6.73)	(6.93)	(7.13)	(7.32)	(7.52)	(7.72)	(7.91)	(8.11)
"b"	22.5	23	23.5	24	25	25.5	26	26.5	27
mm (in.)	(0.89)	(0.91)	(0.93)	(0.94)	(0.98)	(1.00)	(1.02)	(1.04)	(1.06)

"a"	211	216	221	226	231	236
mm (in.)	(8.30)	(8.50)	(8.70)	(8.89)	(9.09)	(9.29)
"b"	27.5	28.5	29	29.5	30	30.5
mm (in.)	(1.08)	(1.12)	(1.14)	(1.16)	(1.18)	(1.20)

(11)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(12)Remove safety guard from flap/slat control lever quadrant.
(13)Extend flaps to 20° position (Ref. 27-50-00, P. Block 301).
(14)Install safety guard on flap/slat control lever quadrant.
(15)Open, safety and tag circuit breakers 5CV, 6CV and 10CV.
(16)Install support spring (5) and intermediate plate (6) with screws (4), washers (2) and nuts (3). Do not fully tighten nuts at this stage.
(17)Adjust support spring to dimension "b" determined at step (10) by using gauge length on setting device.
(18)Tighten nuts (3) and safety with new cotter pin (1).
(19)Remove setting device from track 1.

D. Test
(1)Remove safety guard from flap/slat control lever quadrant.
(2)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.
(3)Carefully retract and extend the flaps (Ref. 27-50-00, P. Block 301) twice and check the support spring and screwjack 1 for satisfactory operation.

E. Close-Up
(1)Remove safety barriers.
(2)Install access panels 577AB and 577BB (677AB and 677BB).
(3)Remove access platform.

FLAP TRUNNION, SCREWJACKS 1 THRU 4 - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

R 1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C. 98A27508026000	Support Cradle - Flap Spindle
D. 98A27508047000	Socket Wrench Set
F. 98A27508059000	Locking Device Set - Flap Carriage
G.	Torque Wrench, 3.5 to 6.5 m.daN (25.8 to 47.9 lb.ft.)
H.	Safety Barriers
I.	Circuit Breaker Safety Clips and Tags
J.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
K.	Single Key Washer
L.	Shim
M. Material No. 05-005	Special Materials (Ref. 20-31-00)
N. Material No. 06-002	Lubricants (Ref. 20-31-00)
Referenced Procedures	
- 12-22-27, P. Block 1	Flight Controls Lubrication
- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)

2. Procedure

A. Flap Trunnions at Screwjacks 2,3 and 4

(1)Job Set-Up

(a)Position safety barriers.

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.

(b)Extend flaps to 40° (Ref. 27-50-00, P. Block 301).

(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

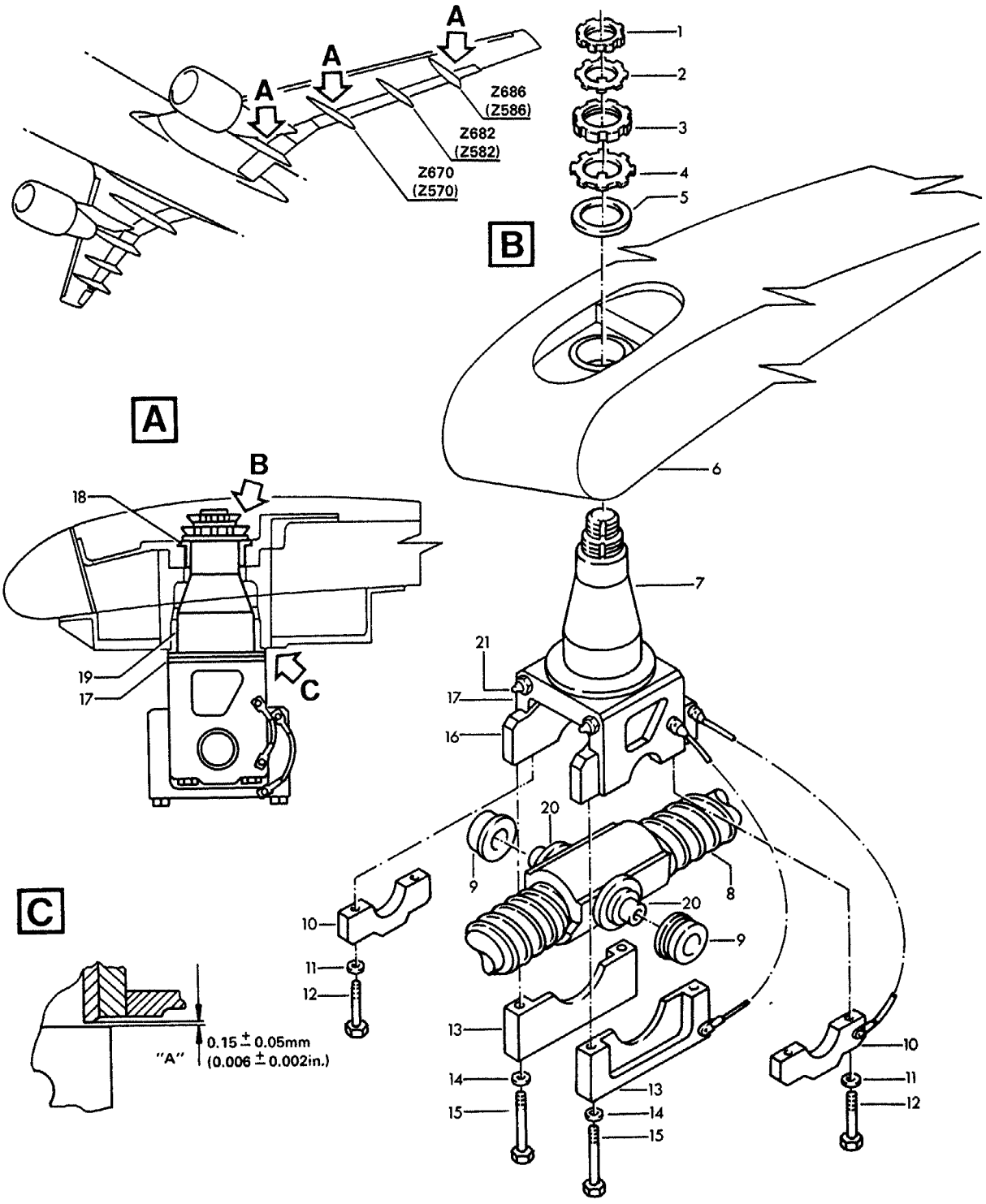
R (d)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(e)Position access platform 3.5 m (11 ft.).
(f)Remove access panels as follows:
- 574BT (674BT) for trunnion at screwjack 2,
- 587BT (687BT) for trunnion at screwjack 3,
- 587DT (687DT) for trunnion at screwjack 4.

(g)Install flap carriage locking device PN 98A27508059000 on carriages 2 and/or 3 and/or 4.

(2)Removal
(Ref. Fig. 401)
NOTE : Removal/Installation of the trunnions at screwjacks 2, 3 and 4 are similar, only one trunnion is described. Differences between other trunnions are noted where applicable.

(a)Cut and discard lockwire and remove bolts (15) and washers (14) from trunnion fail-safe bearing half housing (13).
(b)Support screwjack spindle (8).
(c)Cut and discard lockwire and remove bolts (12) and washers (11) from trunnion primary bearing half housing (10).
(d)Carefully lower screwjack spindle (8).
(e)Remove bushes (9) from ball nut attachments (20).
(f)Release single key washer (2) from castle nut (1).
(g)Remove castle nut (1) using socket wrench PN 98A27508047002.
NOTE : Socket wrench PN 98A27508047002 is part of tool set PN 98A27508047000.
(h)Remove and discard single key washer (2).
(i)Support trunnion (17).
(j)Release single key washer (4) from castle nut (3).
(k)Remove castle nut (3) using socket wrench PN 98A27508047001.
NOTE : Socket wrench PN 98A27508047001 is part of tool set PN 98A27508047000.
(l)Remove and discard single key washer (4).
(m)Remove shim (5).
(n)Pull trunnion (17) out of mounting.
(o)Install screwjack support cradle PN 98A27508026000.
(p)Position screwjack spindle (8) in screwjack support cradle.

(3)Preparation for Installation
(a)Examine trunnion bushes (19),(18) for excessive wear or damage of teflon lining.
(b)If teflon lining is damaged, replace bush in accordance with the Component Maintenance Manual (CMM).
NOTE : The trunnion housing at jack 2 has four trunnion bushes with teflon lining.



Trunnion - Jacks 2/3/4
Figure 401

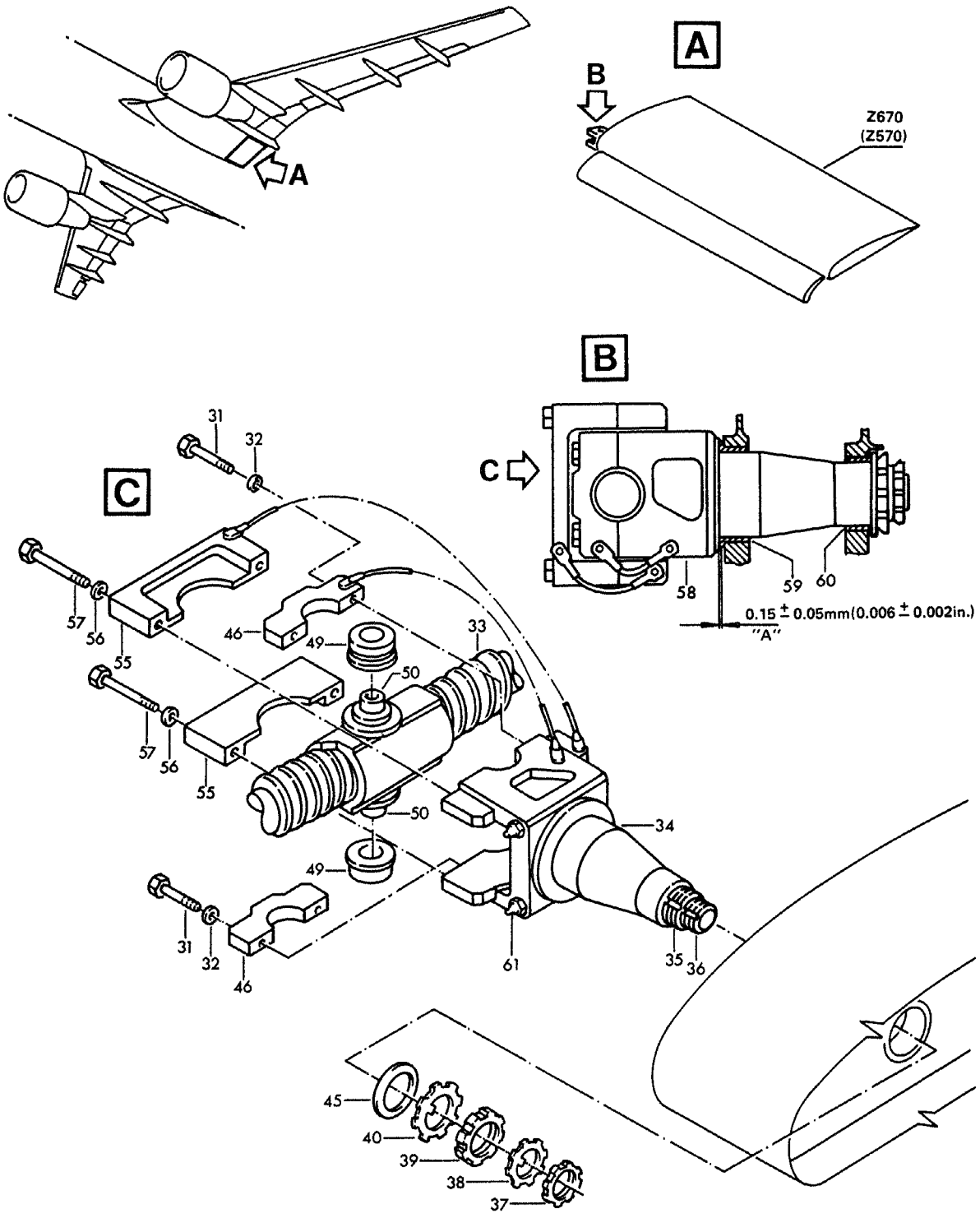
(4)Installation (Ref. Fig. 401)
(a)Carefully insert trunnion (17) in bushes (18),(19).
(b)Install shim (5), new single key washer (4) and castle nut (3) using socket wrench PN 98A27508047001 on trunnion (7).
NOTE : Socket wrench PN 98A27508047001 is part of tool set PN 98A27508047000.
(c)TORQUE castle nut (3) to between 6.5 and 7.0 m.daN (47.94 and 51.63 lbf.ft.).
(d)Use a feeler gage to measure the gap "A" of 0.15 ±0.05 mm (0.006 ±0.002 in.) between trunnion block (17) and bush (19).
(e)If the gap measurement is not correct, remove castle nut (3), single key washer (4) and change shim (5) as required, then repeat steps (b) and (c).
(f)Install new single key washer (2) and castle nut (1) using socket wrench PN 98A27508047002 on trunnion (7).
NOTE : Socket wrench PN 98A27508047002 is part of tool set PN 98A27508047000.
(g)TORQUE castle nut (1) to between 4.5 and 5.0 m.daN (33.2 and 36.87 lbf.ft.).
(h)Turn trunnion manually to make certain it turns freely.
(i)Bend two tabs of each single key washer up into the mating recess of each castle nut to safety.
(j)Apply lubricant (Material No. 06-002) to the threads of the bolts (12),(15).
(k)Raise spindle (8). Position ballnut connection (20) in fail-safe trunnion housing.
(l)Install primary trunnion bearing half housing (10) and secure with washers (11) and bolts (12).
NOTE : Care must be taken to prevent damage to bushes (9) due to inadvertent contact with machined edges of trunnion bearing housing.
(m)TORQUE bolts (12) to between 3.5 and 3.6 m.daN (25.8 and 26.6 lbf.ft.).
(n)Safety bolts (12) with lockwire dia 0.8 mm (0.032 in.). Apply anti-corrosion compound (Material No. 05-005) to bolt heads.
(o)Install fail-safe trunnion bearing half housing (13) and secure with washers (14) and bolts (15).
(p)TORQUE bolts (15) to between 3.5 and 3.6 m.daN (25.8 and 26.6 lbf.ft.).
(q)Safety bolts (15) with lockwire corrosion-resistant steel dia. 0.8 mm (0.032 in.).
(r)Apply anti-corrosion compound (Material No. 05-005) to bolt heads.
(s)Lubricate trunnion through grease nipples (21) (Ref. 12-22-27, P. Block 1).
(t)Remove support cradle PN 98A27508026000.
(u)Remove flap carriage locking device PN 98A27508059000.
R (v)Remove safety guard PN 98A27503003000 from flap/slat control lever quadrant.
(w)Remove safety clips and tags and close circuit breakers 5CV, 6CV, 10CV.
(x)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(y)Retract flaps (Ref. 27-50-00, P. Block 301).
(z)Do an operational test (Ref. 27-54-00, P. Block 501).

(5)Close-Up
(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(b)Close access panels 574BT (674BT) and/or 587BT (687BT) and/or 587DT (687DT).
(c)Remove access platforms.
(d)Remove safety barriers.

B. Flap Trunnion at Screwjack 1
(1)Job Set-Up
(a)Position safety barriers.
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.
(b)Extend flaps to 40° (Ref. 27-50-00, P. Block 301).
(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

R (d)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(e)Position access platform 3.5 m (11 ft.).
(f)Remove access panels 574AB and/or (674AB) for trunnion at screwjack 1.
(g)Install flap carriage locking device PN 98A27508059000.
(2)Removal
(Ref. Fig. 402)
(a)Cut and discard lockwire and remove bolts (57) and washers (56) from trunnion fail-safe bearing half housing (55).
(b)Support screwjack spindle (33).
(c)Cut and discard lockwire and remove bolts (31) and washers (32) from trunnion primary bearing half housing (46).
(d)Carefully lower screwjack spindle (33).
(e)Remove bushes (49) from screwjack spindle ball nut attachments (50).
(f)Release single key washer (38) from castle nut (37).
(g)Release castle nut (37) using socket wrench PN 98A27508047002.
NOTE : Socket wrench PN 98A27508047002 is part of tool set PN 98A27508047000.
(h)Remove and discard single key washer (38).
(i)Support trunnion (34).
(j)Release single key washer (40) from castle nut (39).
(k)Remove castle nut (39) using socket wrench PN 98A27508047001.
NOTE : Socket wrench PN 98A27508047001 is part of tool set PN 98A27508047000.
(l)Remove and discard single key washer (40).
(m)Remove shim (45).
(n)Carefully pull trunnion (34) out of mounting.
(o)Install screwjack support cradle PN 98A27508026000.



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Trunnion - Jack 1
Figure 402

(p)Position screwjack spindle (33) in screwjack support cradle.

(3)Preparation for Installation

(a)Examine bushes (59),(60) for excessive wear or damage of teflon lining.

(b)If teflon lining is damaged, replace bush in accordance with the Component Maintenance Manual (CMM).

(4)Installation (Ref. Fig. 402)

(a)Carefully insert trunnion (34) in bushes (59),(60).

(b)Install shim (45), new single key washer (40) and castle nut (39) using socket wrench PN 98A27508047001 on thread of primary trunnion (35).

NOTE : Socket wrench PN 98A27508047001 is part of tool set PN 98A27508047000.

(c)TORQUE castle nut (39) to between 6.0 and 6.5 m.daN (44.3 and 47.9 lbf.ft.).

(d)Use a feeler gage to measure the gap "A" of 0.15 ±0.05 mm (0.006 ±0.002 in.) between trunnion block (58) and bush (59).

(e)If the gap measurement is not correct, remove castle nut (39), single key washer (40) and change shim (45) as required, then repeat steps (b) and (c).

(f)Install new single key washer (38) and castle nut (37) using socket wrench PN 98A27508047002 on thread of fail-safe trunnion (36).

NOTE : Socket wrench PN 98A27508047002 is part of tool set PN 98A27508047000.

(g)TORQUE castle nut (37) to between 4.0 and 4.5 m.daN (29.5 and 33.2 lbf.ft.).

(h)Turn trunnion manually to make certain it turns freely.

(i)Bend two tabs of each single key washer up into the mating recess of each castle nut to safety.

(j)Apply lubricant (Material No. 06-002) to the threads of bolts (31),(57).

(k)Install bushes (49) on ballnut connection (50).

(l)Raise screwjack spindle and position ballnut connection (50) in fail-safe trunnion housing.

(m)Install primary trunnion half housing (46) and secure with washers (32) and bolts (31).

NOTE : Care must be taken to prevent damage to bushes (19) due to inadvertent contact with machined edges of trunnion bearing housing.

(n)TORQUE bolts (31) to between 3.5 and 3.6 m.daN (25.8 and 26.6 lbf.ft.).

(o)Safety bolts (31) with lockwire corrosion-resistant steel dia. 0.8 mm (0.032 in.).

(p)Apply anti-corrosion compound (Material No. 05-005) to bolt heads.

(q)Install fail-safe trunnion bearing half housing (55) and secure with washers (56) and bolts (57).

(r)TORQUE bolts (57) to between 3.5 and 3.6 m.daN (25.8 and 26.6 lbf.ft.).

(s)Safety bolts (57) with lockwire corrosion-resistant steel dia. 0.8 mm (0.032).

(t)Apply anti-corrosion compound (Material No. 05-005) to bolt heads.

(u)Lubricate trunnion through grease nipples (61) (Ref. 12-22-27, P. Block 1).

(v)Remove support cradle PN 98A27508026000.
(w)Remove flap carriage locking device PN 98A27508059000.
R (x)Remove safety guard PN 98A27503003000 from flap/slat control lever quadrant.
(y)Remove safety clips and tags and close circuit breakers 5CV, 6CV, 10CV.
(z)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(aa)Retract flaps (Ref. 27-50-00, P. Block 301).
(ab)Do an operational test (Ref. 27-54-00, P. Block 501).
(5)Close-Up
(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(b)Close access panels 574AB and/or (674AB).
(c)Remove access platform.
(d)Remove safety barriers.

POSITION INDICATING (FLAPS) - DESCRIPTION AND OPERATION

R 1. General

R Flap position is indicated by a servo-driven slat/flap position indicator
R which operates in conjunction with an Instrumentation Position Pick-off
R Unit (IPPU) mounted on the flap Power Control Unit (PCU).
R Flap position and status signals are also generated by the Slat/Flap Control
R Computers (SFCC) for use by other systems.
R External markings are installed on the LH and RH inboard flap. They show the
R actual flap position and are visible from the cabin window between FR53
R and FR54.
R A triangle on the cabin side wall panel identifies the window through which
R you can observe the external flap position markings.

2. Component Location

(Ref. Fig. 001)

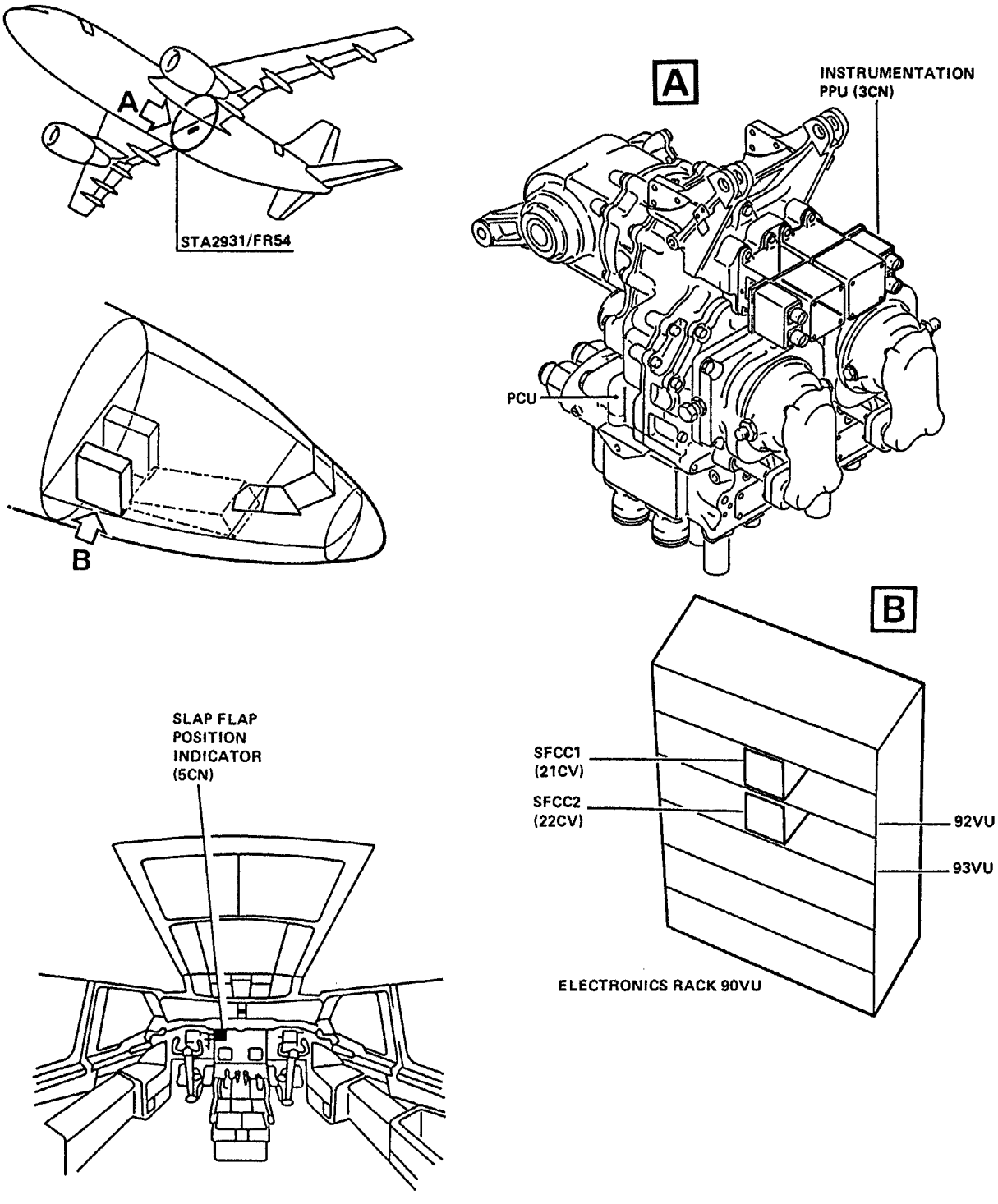
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
3CN	POSITION PICK-OFF UNIT-INSTRUMENTATION		148		27-55-12
5CN	INDICATOR-SLAT FLAP POSITION	4VU	212		27-55-11

3. Description

A. The IPPU is located on the PCU intermediate gearbox.

B. The slat/flap position indicator is located on the center instrument panel and provides servo-driven displays of flap and slat positions. The slat/flap position indicator is driven from an IPPU output. Four annunciators, operated by the SFCC, provide system status information. A fifth annunciator provides speed brake warning.

C. The SFCC are located in avionics racks 92VU and 93VU and supply status information to the slat/flap position indicator, and status and position information to other systems.



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Component Location
Figure 001

4. Component Description
(Ref. Fig. 002)
(Ref. Fig. 003)

A. Instrumentation Position Pick-Off Unit (3CN)
The IPPU is mounted on the flap power control unit, adjacent to the Feedback Position Pick-off Unit (FPPU) and is similar in construction and operation to the FPPU (Ref. 27-51-00).

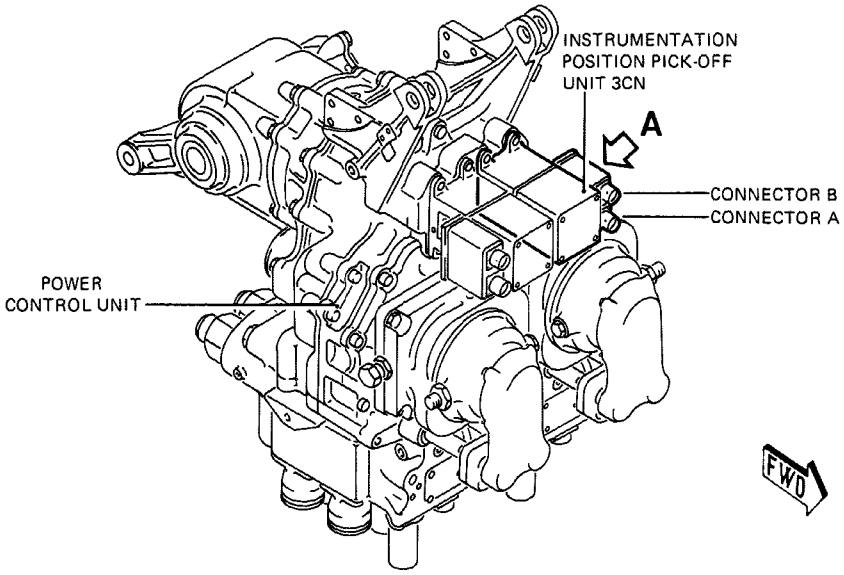
B. Slat/Flap Position Indicator (5CN)
The slat/flap position indicator, located on the center instrument panel, provides visual indication of slat and flap angles and related airspeed limitations (VFE). Each indicator comprises a servo-driven vertical display.

(1) FLAPS Position Indicator
This is a servo-driven, vertical bar indicator which is read against two scales. One scale is marked 0, 15, 20, 40 (degrees - corresponding to the slat/flap control lever FLAPS positions) and the other scale is marked 245, 210, 195, 180 (knots - corresponding to maximum permissible airspeed at the associated flap setting). The FLAPS position indicator displays the nominal flap angle.

(3) Annunciator Lights
The following annunciator lights are fitted:
(a) SLATS amber warning light - (Ref. 27-85-00).
(b) KRUEGER amber warning light - (Ref. 27-89-00).

(c) FLAPS amber warning light - illuminates when the flap drive is arrested by the wing tip brakes (Ref. 27-56-00).
(d) ALPHA-LOCK blue indicator light - (Ref. 27-81-00).
(e) SPD BRK amber warning light - (Ref. 27-65-00).
(f) Spare.

C. Slat Flap Control Computers (21CV, 22CV)
The SFCCs are described in 27-51-00.



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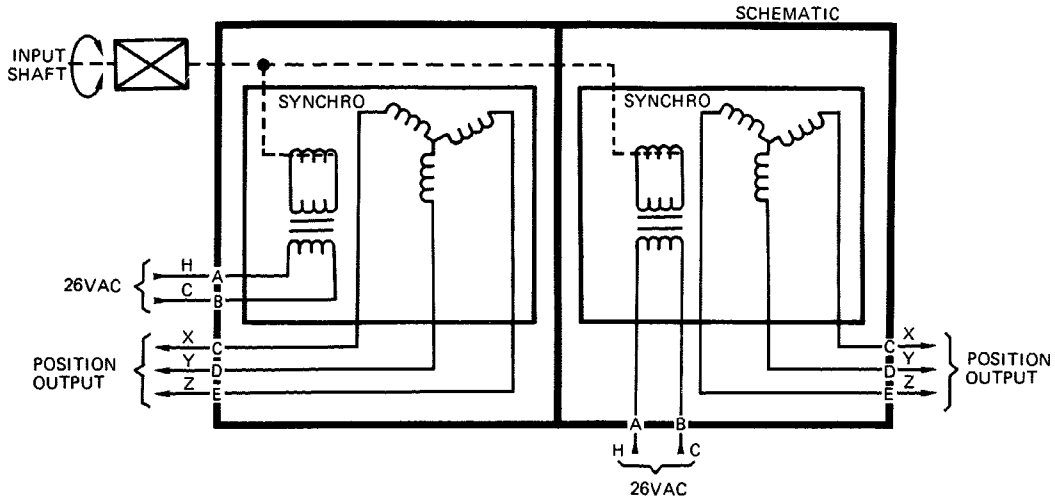

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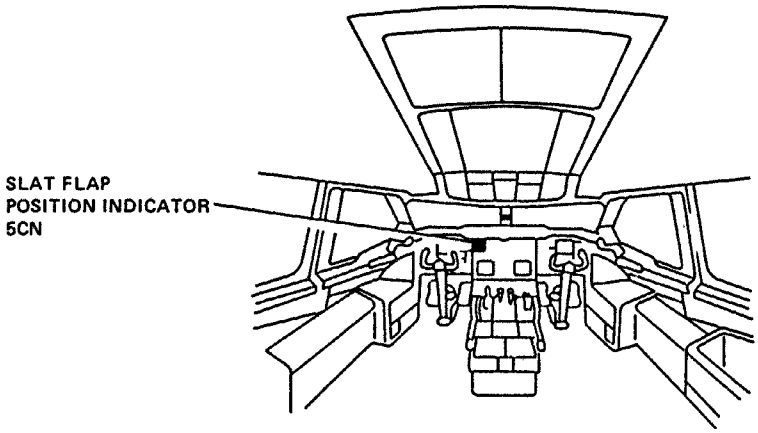
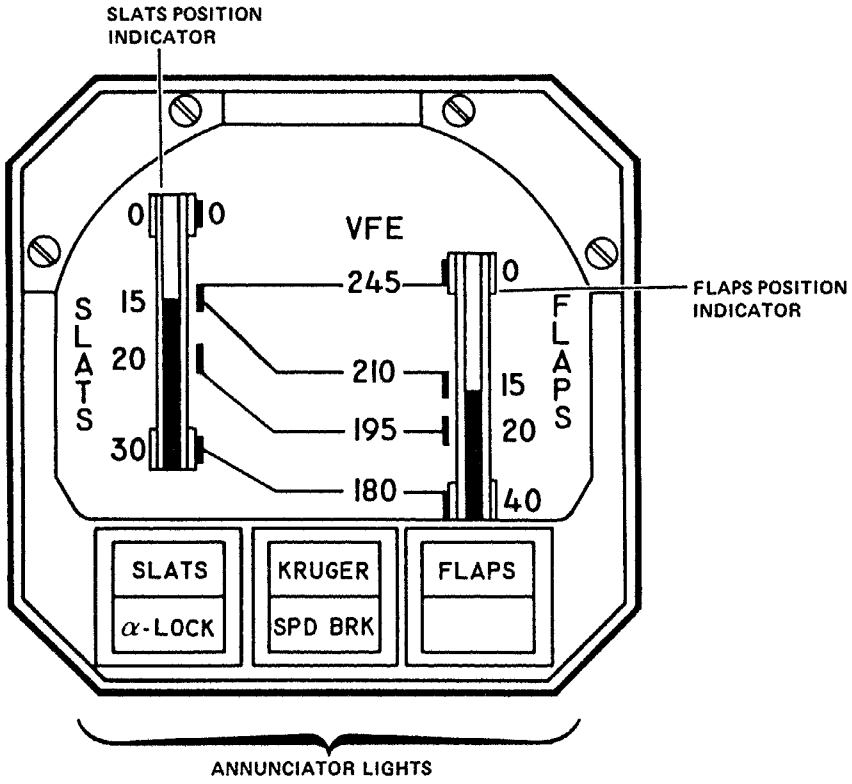
Instrumentation Position Pick-Off Unit
Figure 002





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Slat/Flap Position Indicator
Figure 003

5. Operation
(Ref. Fig. 004)

A. Flap Position Indicator Drive
Flap position synchro signals from the IPPU are applied to the slat/flap position indicator, together with the 26 V AC synchro excitation supply. The synchro signals are fed to a synchro resolver, the rotor of which is driven by the flap indicator servomotor.
The resolver produces an error signal which represents the difference between the surface position and the indicated position.
The error signal is fed to the input of the servo amplifier which drives the indicator servo motor. The motor rotates moving the flap indicator to the new position, reducing the difference and therefore the error signal.
When the indicator correctly represents the surface position, the error signal is null and the indicator stops moving.

B. Flaps Position Signals for Other Systems
The IPPU and both SFCC1 and SFCC2 provide flap position information for other systems (Ref. 27-51-00). The following types of signals are provided:
- Synchro data
- Position discretes
- Digital data

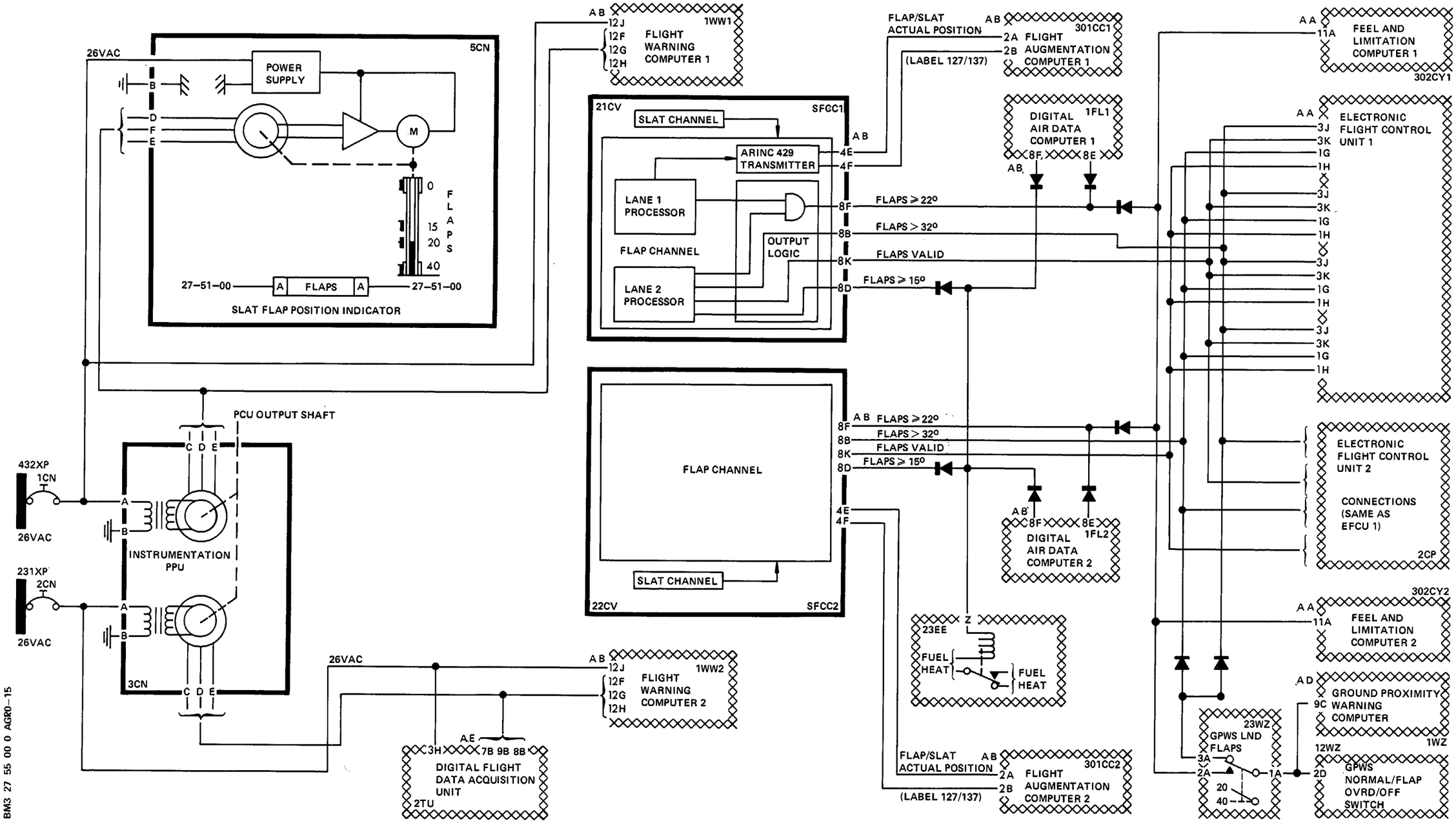
(1)Synchro Data
The two control transmitters in the IPPU provide 3-wire synchro outputs. The synchro connected to the slat/flap position indicator also provides an input to Flight Warning Computer 1 (FWC1).
The remaining synchro provides inputs to FWC2 and the flight data recorder.

(2)Position Discretes
Lane processors 1 and 2 in both SFCC generate flap position discretes based on FPPU input. These discretes are summed using AND logic.
The outputs from SFCC1 and SFCC2 are connected together and distributed to the relevant consumers. In all cases, the SFCC outputs are set to the logic 0 state in the event of SFCC power loss.

(3)Digital Data
(Ref. Fig. 005)
Lane processors 1 in both SFCC provide flap position information, derived from the FPPU. It is converted to ARINC 429 serial digital format and is transmitted to the flight augmentation computers (SFCC1 supplies flight augmentation computer 1, SFCC2 supplies flight augmentation computer 2).

6. Power Supplies
The 26 V AC required by the slat/flap position indicating system is provided by circuit breakers 1CN and 2CN.
1CN provides 26 V AC for:
- IPPU (3CN)
- the slat/flap position indicator (5CN) for the servo system and power supplies
- FWC1 for phase referencing the synchro inputs.

2CN provides 26 V AC for:



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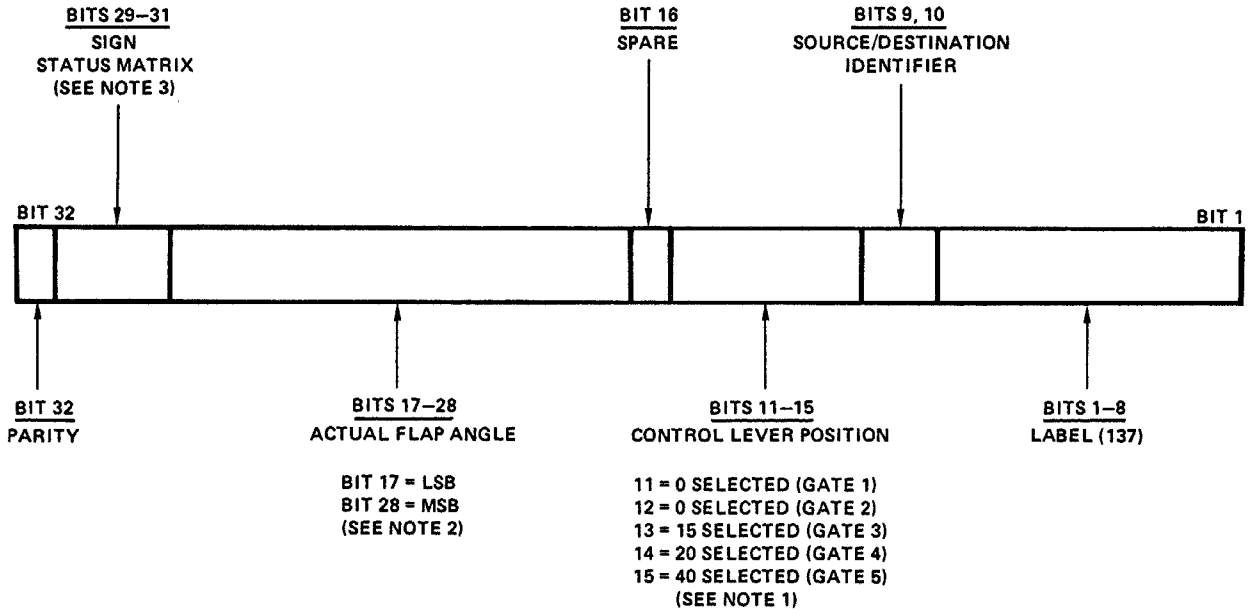
Position Indication - Schematic Diagram
Figure 004



NOTE:

1. GATE 1 IS 0 DEG, FLAP RETRACTED, GATE 2 IS 0 DEG FLAP EXTENDED. IF VALID LEVER POSITION IS NOT AVAILABLE, BITS 11–15 ARE SET TO LOGIC 0.
2. TRANSMITTED IN 2's COMPLEMENT, FRACTIONAL NOTATION; CODED AS 0–179.999 DEG IN 11 BIT RESOLUTION AND ONE SIGN BIT
3. IF NO VALID FLAP ANGLE AVAILABLE, BITS 29–31 ARE SET TO "NO COMPUTED DATA" CODE. IF SFCC FAILURE IS DETECTED, BITS 29–31 SET TO "FAILURE WARNING" CODE. IF BITE IS PERFORMED, BITS 29–31 ARE SET TO "FUNCTIONAL TEST".

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Output Data Word Format
Figure 005

- IPPU (3CN)
- FWC2 and the flight data recorder for phase referencing the synchro inputs.

SLAT/FLAP INDICATOR (5CN) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips and Tags
B.	Electrical Connector Blanking Caps
Referenced Procedure - 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers:

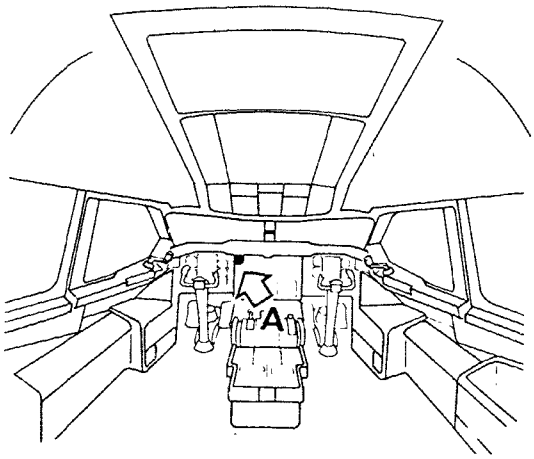
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS AND SLATS/POS/IND	1CN	334/S66
133VU	FLT CTL/FLAPS AND SLATS/POS/ECAM	2CN	334/S65

(2)Gain access to slat/flap indicator in flight compartment, zone 210.

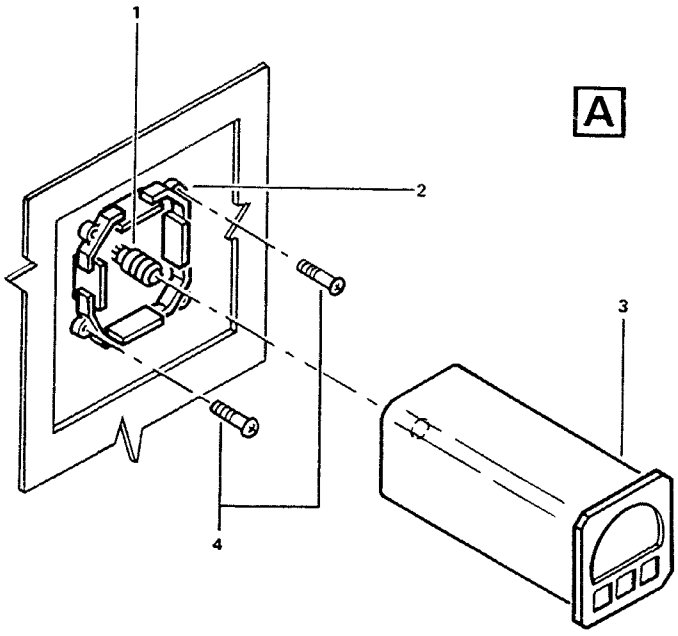
B. Removal

NOTE : Indicator (3) is held in a locking clamp (2). This clamp is secured to the instrument panel by four screws.
Only the two large-head screws are to be loosened.

(1)Unscrew but do not remove the two screws (4).
(2)Disengage indicator (3) and disconnect electrical connector (1).
(3)Fit a blanking cap to elctrical connector of indicator (3).
(4)Remove indicator (3).
(5)Fit a blanking cap to electrical connector (1).



SLAT/FLAP INDICATOR (5CN)



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Slat/Flap Indicator
Figure 401

C. Installation
(1)Check locking clamp (2) and indicator case for correct condition.
(2)Remove blanking caps from both electrical connector (1) and electrical connector of indicator (3).
(3)Position indicator (3) within its housing and connect electrical connector (1).
(4)Engage indicator (3) into locking clamp (2).
(5)Tighten the two screws (4) to secure indicator (3) into clamp (2).
(6)Remove safety clips and tags and close circuit breakers 1CN and 2CN.

D. Test
(1)Carry out operational test (Ref. 27-54-00, P. Block 501).

E. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

INSTRUMENTATION POSITION PICK-OFF UNIT (3CN) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS, OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

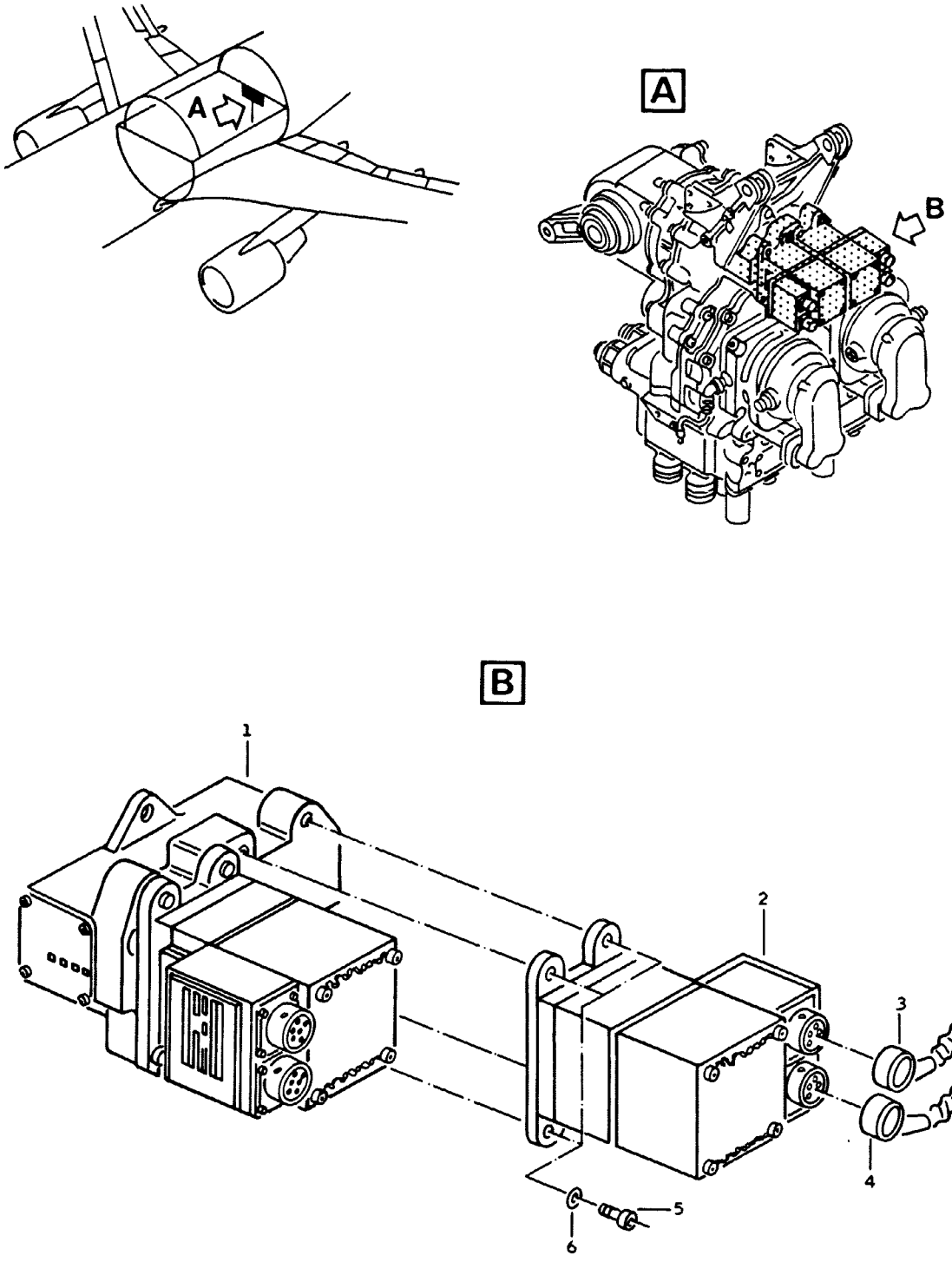
1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.6 m (8 ft. 8 in.)
B.	Torque Wrench, 8.7 to 9.57 Nm (6.4 to 7.0 lbf.ft.)
C.	Ohmmeter 0 to 20 milliohms
D.	Warning Notice - Prohibiting Pressurization of Hydraulic Systems
E.	Safety Barriers
F. Material No. 05-002	Special Materials (Ref. 20-31-00)
G. Material No. 05-054	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-50-00, P. Block 301	Flaps
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)

NOTE : The following procedure describes removal and installation of IPPU set at mechanical and electrical zero, this being the condition new IPPU's are in when delivered. Removal/installation of IPPU's is possible with the system at positions other than zero, due to the IPPU's self-locking facility, provided that the same IPPU is refitted and no movement of the system transmission has occurred between removal and installation of IPPU.



Instrumentation Position Pick-off Unit
Figure 401

A. Job Set-Up
(1)Position safety barriers.
(2)Open main gear main doors (Ref. 32-12-11, P. Block 301).
(3)Position access platform.
(4)Make certain that flaps are in retracted position (Ref. 27-50-00, P. Block 301).
(5)Display a warning notice prohibiting pressurization of the hydraulic systems.
(6)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

CAUTION : INSTRUMENTATION POSITION PICK-OFF UNIT MUST NOT BE REMOVED IF PRESSURE OFF BRAKES HAVE BEEN REMOVED FROM POWER CONTROL UNIT.

B. Removal
(1)Disconnect electrical connectors (3),(4).
(2)Remove screws (5) and washers (6).
(3)Carefully remove instrumentation position pick-off unit (2) from gearbox (1).
(4)Fit blanking caps to electrical plugs, receptacles and exposed holes.
(5)Fit a tie wrap behind the locking plate to prevent retraction of locking plate.

C. Preparation of Installation
(1)Prepare a small quantity of mixture comprising 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. (05-054).
NOTE : Proportions quoted are by weight.
(2)Apply a quantity of a mixture prepared above to area free of anodic finish on IPPU and intermediate gearbox mating surfaces.

D. Installation
CAUTION : A NEW IPPU IS DELIVERED, LOCKED IN THE MECHANICAL AND ELECTRICAL ZERO POSITION. THE SYSTEM MUST ALSO BE IN ITS ZERO POSITION BEFORE THE IPPU IS INSTALLED.
(1)Remove blanking caps and tie wrap.
(2)Position feed back position pick-off unit (2) to intermediate gearbox.
NOTE : Fitting the IPPU requires the simultaneous alignment of the housing keyway, the drive shaft splines, the locating dowel and the securing screw holes, but not more than moderate hand pressure should be required. A slight additional pressure is required to depress the IPPU locking plate and engage the drive fully.

(3)Coat screw threads with anti-corrosion compound (Material No. 05-002).
(4)Install screws (5) and washers (6). TORQUE to between 8.7 and 9.57 Nm (6.4 and 7.0 lbf.ft.).
(5)Measure electrical resistance between IPPU and main bonding point of PCU. Resistance must not exceed 20 milliohms.
(6)Connect electrical connectors (3, 4).

E. Test
(1)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV and 10CV.
(2)Remove warning notice prohibiting pressurization of the hydraulic systems.
(3)Carry out operational test of flap system (Ref. 27-54-00, P. Block 501).

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(4)Remove safety barriers.

ASYMMETRY AND POWER TRANSMISSION MONITORING (FLAPS) - DESCRIPTION AND OPERATION

1. General

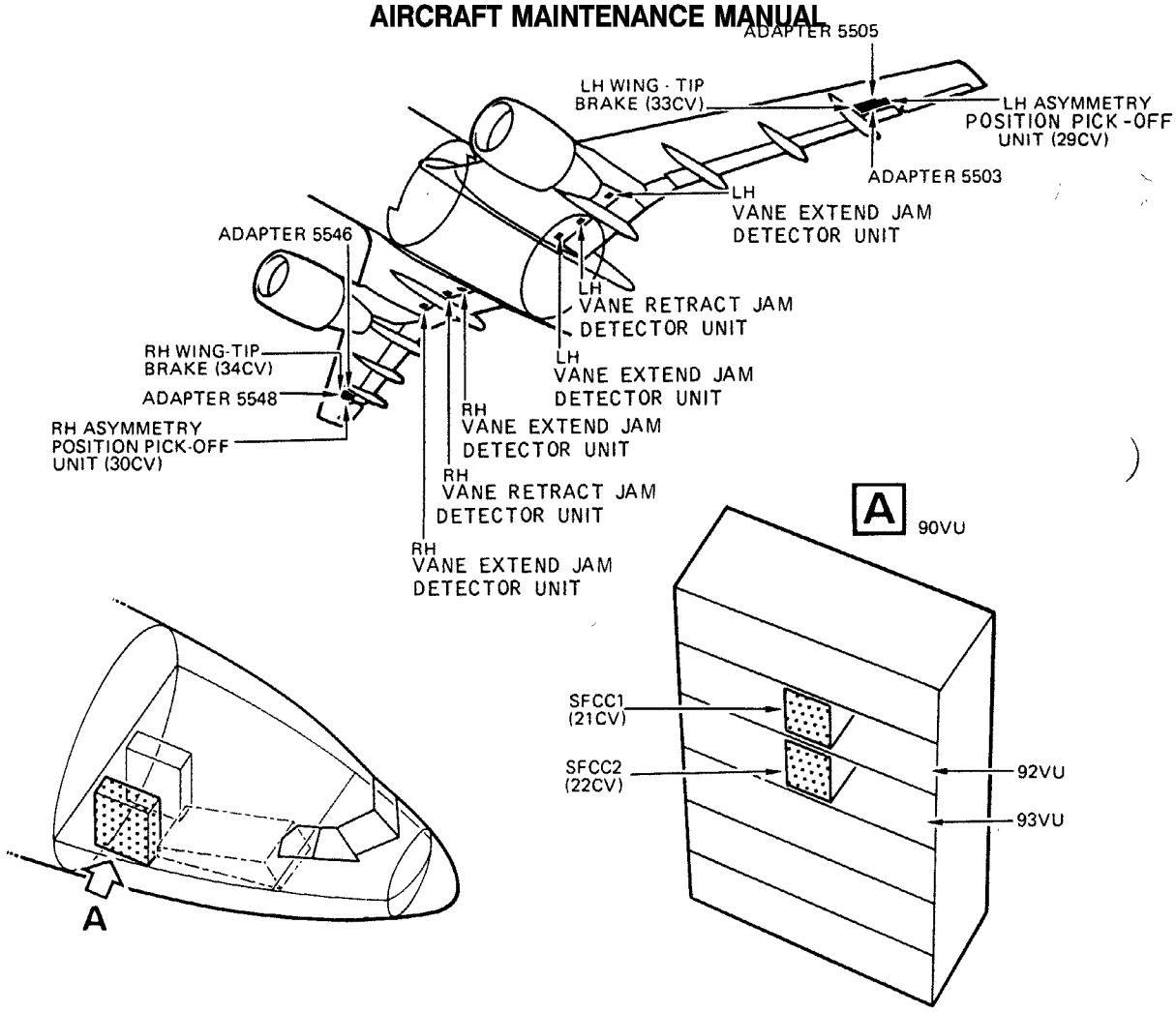
The slat/flap control computers (SFCCs) operate in conjunction with position transducers and microswitches to monitor system performance. If any of the following conditions are detected by both SFCCs, flap drive is arrested:

- Asymmetry
- Symmetrical runaway
- Overspeed
- Inner flap vane jam

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
5503	ADAPTER-WING TIP BRAKE, LH		581	581JB	27-56-14
5505	ADAPTER-ASYMMETRY PPU, LH		581	581JB	27-56-12
5546	ADAPTER-WING TIP BRAKE, RH		681	681JB	27-56-14
5548	ADAPTER-ASYMMETRY PPU, RH		681	681JB	27-56-12
21CV	COMPUTER-SLAT/FLAP CONTROL, 1	92VU	122		27-51-18
22CV	COMPUTER-SLAT/FLAP CONTROL, 2	93VU	122		27-51-18
29CV	POSITION PICK-OFF UNIT, ASYMMETRY LH		581	581JB	27-56-11
30CV	POSITION PICK-OFF UNIT, ASYMMETRY RH		681	681JB	27-56-11
33CV	BRAKE-WING TIP, LH		581	581JB	27-56-13
34CV	BRAKE-WING TIP, RH		681	681JB	27-56-13
37CV-A	POSITION SWITCH-VANE EXTEND LH		572	572DB	27-56-15
38CV-A	POSITION SWITCH-VANE EXTEND RH		672	672DB	27-56-15
39CV-A	POSITION SWITCH-VANE RETRACT LH		572	572DB	27-56-15
40CV-A	POSITION SWITCH-VANE RETRACT RH		672	672DB	27-56-15
41CV-A	POSITION SWITCH-VANE EXTEND LH		572	572BB	27-56-15
42CV-A	POSITION SWITCH-VANE EXTEND RH		672	672BB	27-56-15



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Component Location
Figure 001

3. Description

A. An asymmetry position pick-off unit (APPU) is installed in the flap transmission run in each wing to provide position information for the SFCCs.

B. The vane jam detector units house micro switches and are located in the flap shroud. The micro switches provide inner flap vane jammed discretes for the SFCCs.

C. The wing-tip brakes are installed in the flap transmission run and serve to lock the transmission when commanded by the SFCCs.

D. The SFCCs are installed in electronics rack 90VU.

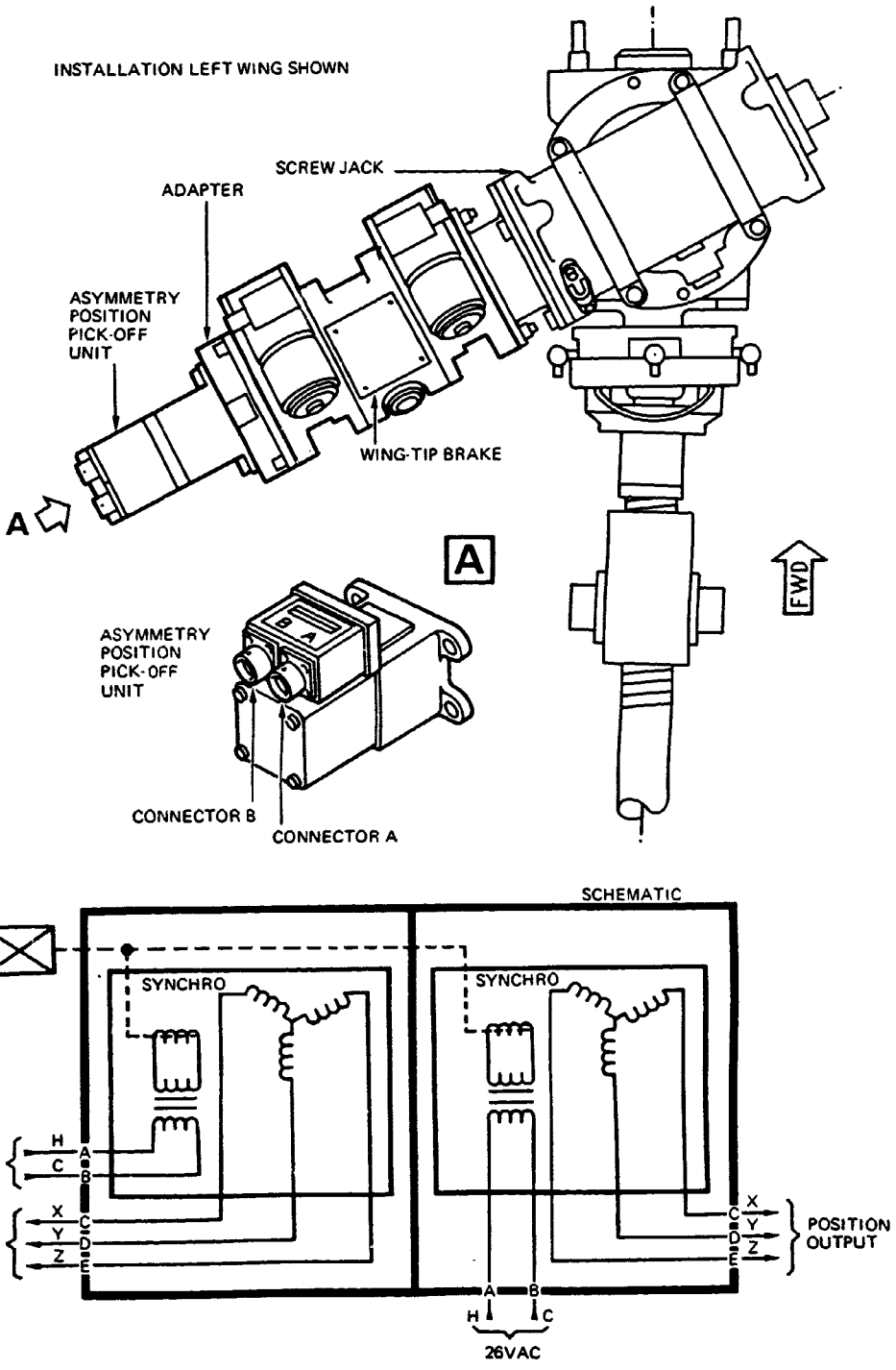
4. Component Description

A. Slat Flap Control Computers (21CV, 22CV)

The SFCCs are described in 27-51-00.

B. Asymmetry Position Pick-Off Units (29CV, 30CV)
(Ref. Fig. 002)
(1) The APPUs are connected to the flap transmission system by means of adapters (5505-LH wing, 5548-RH wing) attached to the wing-tip brakes.
(2) Each APPU contains two size 11, brushless, transformer-coupled synchro transmitters which are mechanically driven by the adapter which, in turn, is driven by the flap drive transmission system. The synchro rotors are connected to the adapter via a gear linkage which ensures that synchro rotation is less than 360 deg. at full flap travel.
(3) The input shaft of the APPU is provided with a self-engaging locking device which allows removal and installation without disturbing rotor/stator alignment. Electrical connections are made via two multi-way connectors at the side of the unit.

C. Wing-tip Brakes (33CV, 34CV)
(Ref. Fig. 003)
(1) The wing-tip brakes are connected to the flap drive transmission system by means of adapters (5503-LH wing, 5546-RH wing) attached to the outboard end of screw jack 4.
(2) Each brake is a pressure-on type, controlled by two solenoid valves. The brake mechanism is a friction disc pack, the discs being unloaded to allow free rotation of the transmission shafts. The discs are manufactured from an organic composite to ensure a constant friction level.
(3) Braking force is applied to the discs by two sets of pistons, located at each end of the disc pack. Each set of pistons is operated by a separate hydraulic system, under control of the associated solenoid valve. The brake is normally supplied by the YELLOW and the



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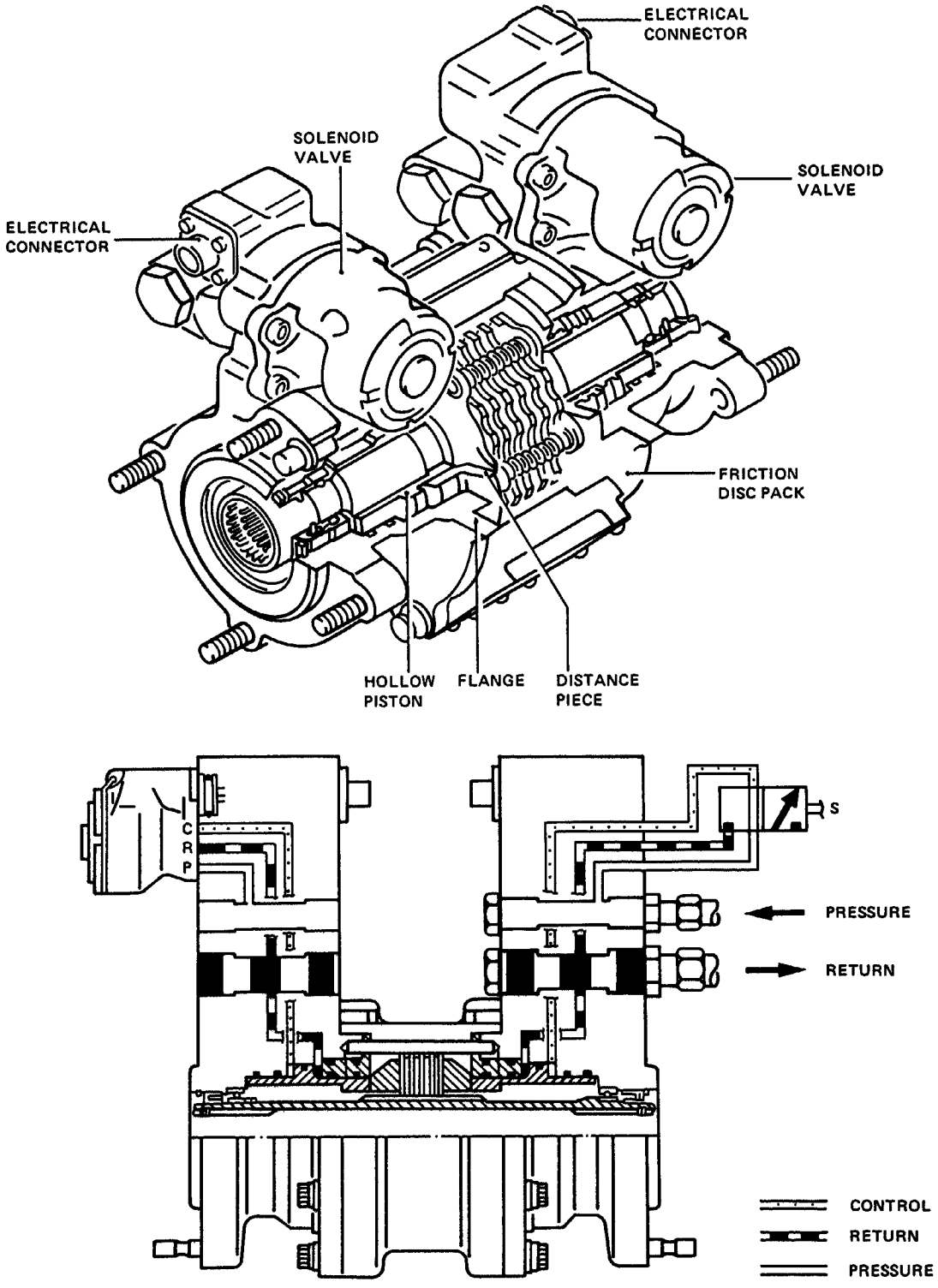
Asymmetry Position Pick-Off Unit
Figure 002



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Wing-tip Brake
Figure 003

BLUE hydraulic systems. In the event of a SFCC or single hydraulic system failure, sufficient holding torque is provided with only one set of pistons operated.

D. Vane Extend Jam Detector Units
(Ref. Fig. 004)

(1) Two vane extend jam detectors are installed in each inner wing shroud box. They detect jamming with the vane in the extended position of the vane operating mechanism so as to prevent structural damage occuring due to the flap being fully retracted with the vane extended.

(2) Each detector unit comprises a housing, to which a vane extend micro switch is attached. The switch is actuated by a buffer, fitted with a pivoting shoe which contacts the vane leading edge. The buffer is attached to the housing by cotter pins. A honeycomb block is fitted between buffer and housing.

(3) The vane extend micro switches (37CV-A, 41CV-A LH wing; 38CV-A, 42CV-A RH wing) are non-latching microswitches with two contact sets. One contact set is connected to SFCC 1 and the other is connected to SFCC 2 to maintain electrical isolation between the two flap channels. The switches are actuated when vane overtravel causes the buffer to crush the honeycomb block. The vane then drives the collapsing buffer against the switch plunger. The honeycomb block absorbs the vane spring-back energy and collapses at a constant load.

E. Vane Retract Jam Detector Units
(Ref. Fig. 005)

(1) One vane retract jam detector is installed in each inner wing shroud box. It detects jamming in the vane retracted position of the vane operating mechanism in order to prevent the flap being fully extended with the vane retracted.

(2) Each detector unit comprises a housing incorporating a spring-loaded lever which terminates in a striker arm. The housing also carries a vane retract micro switch.

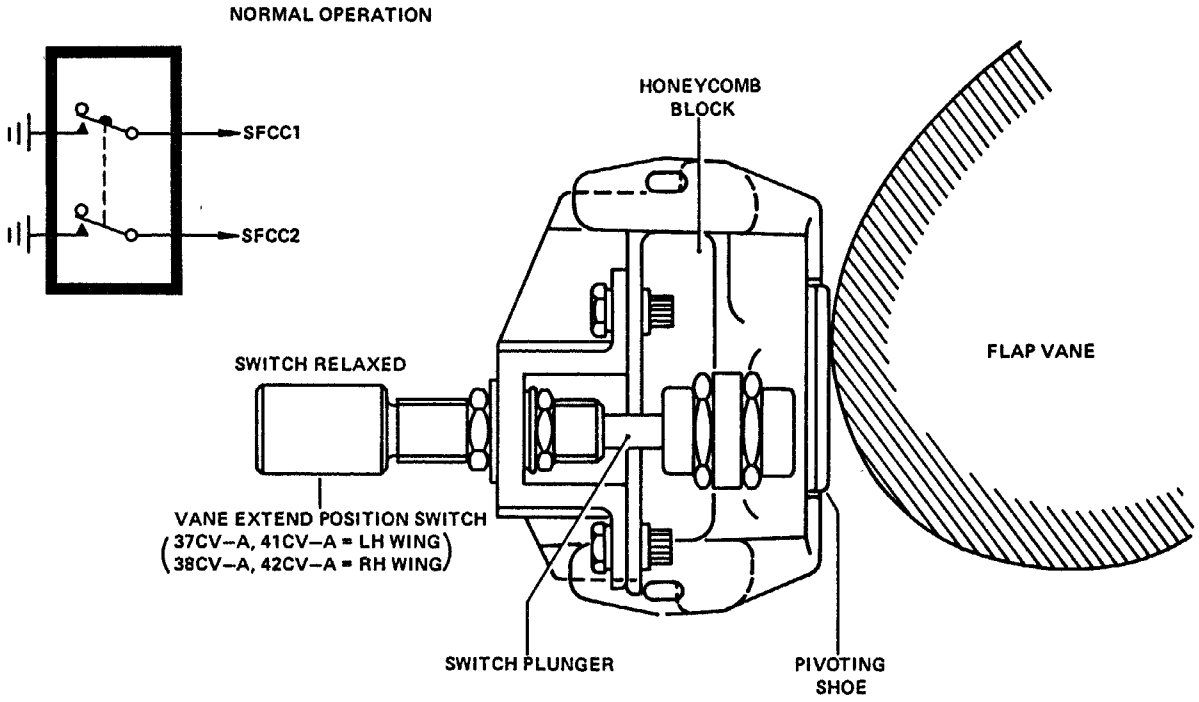
(3) The vane retract micro switches (39CV-A LH wing, 40CV-A RH wing) are the same type microswitches as used in the vane extend detector units and are connected to SFCC 1 and 2 in a similar manner. The switches are actuated when vane movement away from the detector unit causes the lever to pivot by spring force, thus compressing the switch plunger.

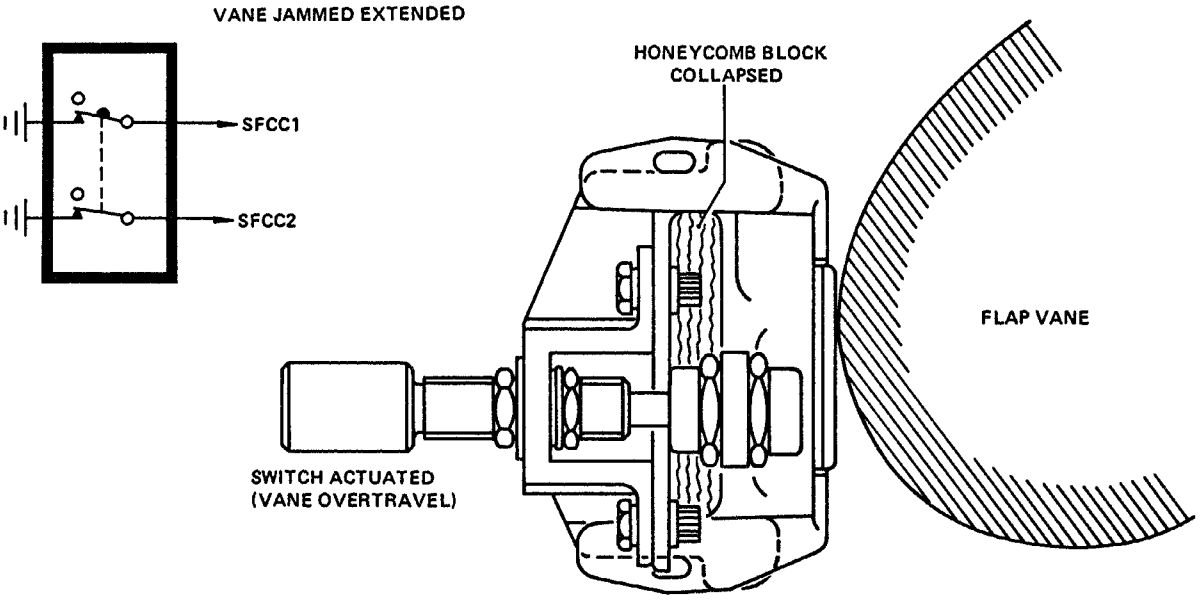
5. Operation
(Ref. Fig. 006)

A. Asymmetry, Runaway and Overspeed Monitoring

(1) Actual flap position information is transmitted to SFCC 1 and 2 flap channels by the feedback position pick-off units (FPPUs) (Ref. 27-51-00), and by the APPUs. Lane processors 1 and 2 monitor and compare the inputs as follows:

- The synchro inputs from the APPUs are compared with each other. If the synchro inputs disagree, a flap asymmetry condition is assumed by the lane processor(s).





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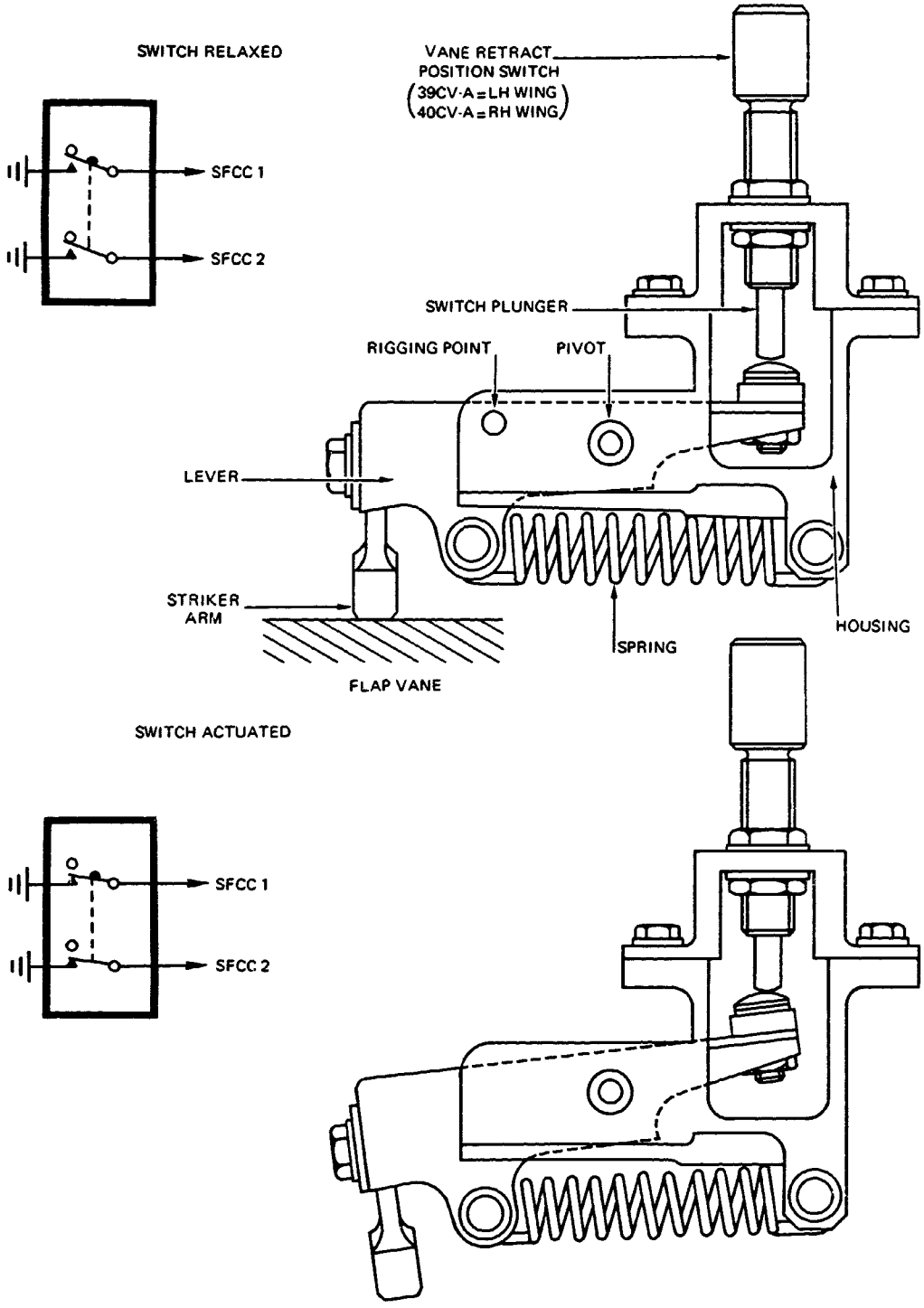
Vane Extend Jam Detector Unit
Figure 004



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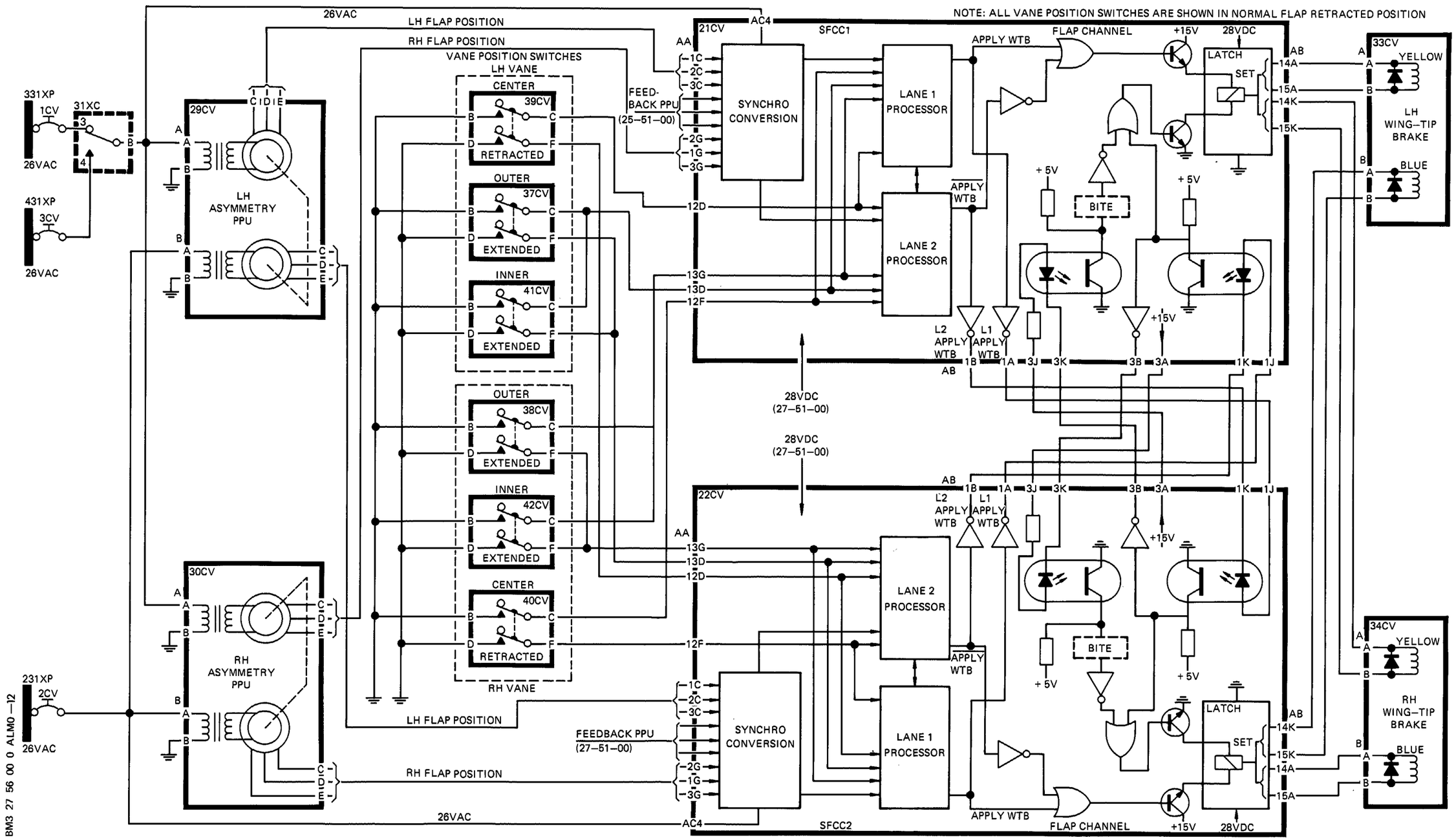
Vane Retract Jam Detector Unit
Figure 005



Asymmetry and Transmission Monitoring - Schematic Diagram
Figure 006

- The inputs from the APPUs are compared with the input from the FPPU. If the APPUs disagree with the FPPU, a symmetrical runaway condition is assumed by the lane processor(s).
- Rate-of-change of position is computed from the APPU inputs. The resultant signals, which represent torque shaft speed, are compared with the demanded value. If a difference in values occurs, an overspeed condition is assumed by the lane processor(s).

(2) Each lane processor generates fault and status signals which are processed by the output logic in both SFCCs (Ref. 27-51-00). If one lane processor detects asymmetry, runaway or overspeed, the following actions are initiated:
- The "enable" drive command for the associated power control unit (PCU) valve block is set to the invalid state to inhibit PCU motor drive (Ref. 27-54-00).
- A "wing-tip brake arm" discrete is transmitted to the flap channel output logic in the other SFCC.
- The "flap fault" warning discrete is generated causing the FAULT caption on the overhead panel fault annunciator (17CV) to come on.
- The "LH ASYM PPU" or "RH ASYM PPU" fault indication code is set on SFCC 1 or 2 front panel, as applicable, and the associated BITE DISPLAY maintenance indicator comes on (Ref. 27-51-00).

(3) If a "wing-tip brake arm" discrete is also received from lane processor 1 or 2 in the other SFCC, the following actions are initiated:
- Non-volatile latches in both SFCCs are set, causing the wing-tip brake solenoid valves to be energized, thereby applying the brakes at the wing extremeties.
- A "flap locked" warning discrete is transmitted to the electronic centralized aircraft monitoring (ECAM) system.
- A "flap locked" indication discrete is transmitted to the slat/flap position indicator, causing the amber FLAPS warning light to come on.
- The appropriate fault indication code ("ASYMMETRY" or "RUNAWAY") is set on SFCC 1 and 2 front panel and the BITE DISPLAY maintenance indicators come on (Ref. 27-51-00).

The non-volatile latches are non-resettable in flight. Once the wing-tip brakes are applied, they can only be released when the aircraft is on the ground.

(4) A "wing-tip brake arm" discrete is generated in the event of a malfunction in the system and will cause the brakes to be applied if the other computing lane also generates a "wing-tip brake arm" discrete. In the event of a computer failure, the "wing-tip brake arm" discrete is automatically set, permitting the other computer to control the brakes.

(5) Each wing-tip brake is supplied by the YELLOW and the BLUE hydraulic systems, each system being enabled by a separate solenoid valve. The YELLOW solenoid valves are enabled by SFCC 1 and the BLUE solenoid valves are enabled by SFCC 2, thus ensuring brake operation if either hydraulic system or either SFCC fails. When a solenoid valve is energized, hydraulic pressure actuates the brake pistons, causing the friction disc pack to lock the flap drive transmission.

B. Wing-tip Brake Testing

(1)The continuous monitoring and interruptive BITE circuits in each SFCC flap channel monitor the operation of the wing-tip brake control circuits within the SFCC, and perform continuity tests on the associated brake solenoids.

(2)The LEFT WING and RIGHT WING pushbuttons on the RH section of SFCC 1 and 2 front panel allow the wing-tip brakes to be tested. If the LEFT WING pushbutton on SFCC 1 front panel is pressed, the flap channel provides the energizing supply for the YELLOW solenoid valve in the LH wing-tip brake. If the brake is functioning normally, subsequent movement of the slat/flap control lever results in non-movement of the flap surfaces (on both wings). The RIGHT WING pushbutton on SFCC 1 provides a similar facility using the YELLOW solenoid valve in the RH wing-tip brake. SFCC 2 provides wing-tip brake test facilities for the BLUE solenoid valves.

C. Inner Flap Vane Jam Monitoring

NOTE: The terms "Vane Jam Extended" and "Vane Jam Retracted" should be interpreted as referring to the position of the vane in relation to the flap and not as referring to flap position. Thus, Vane Jam Retracted indicates that the vane has jammed in its retracted position.

(1)Vane Jam Extended

(Ref. Fig. 007)

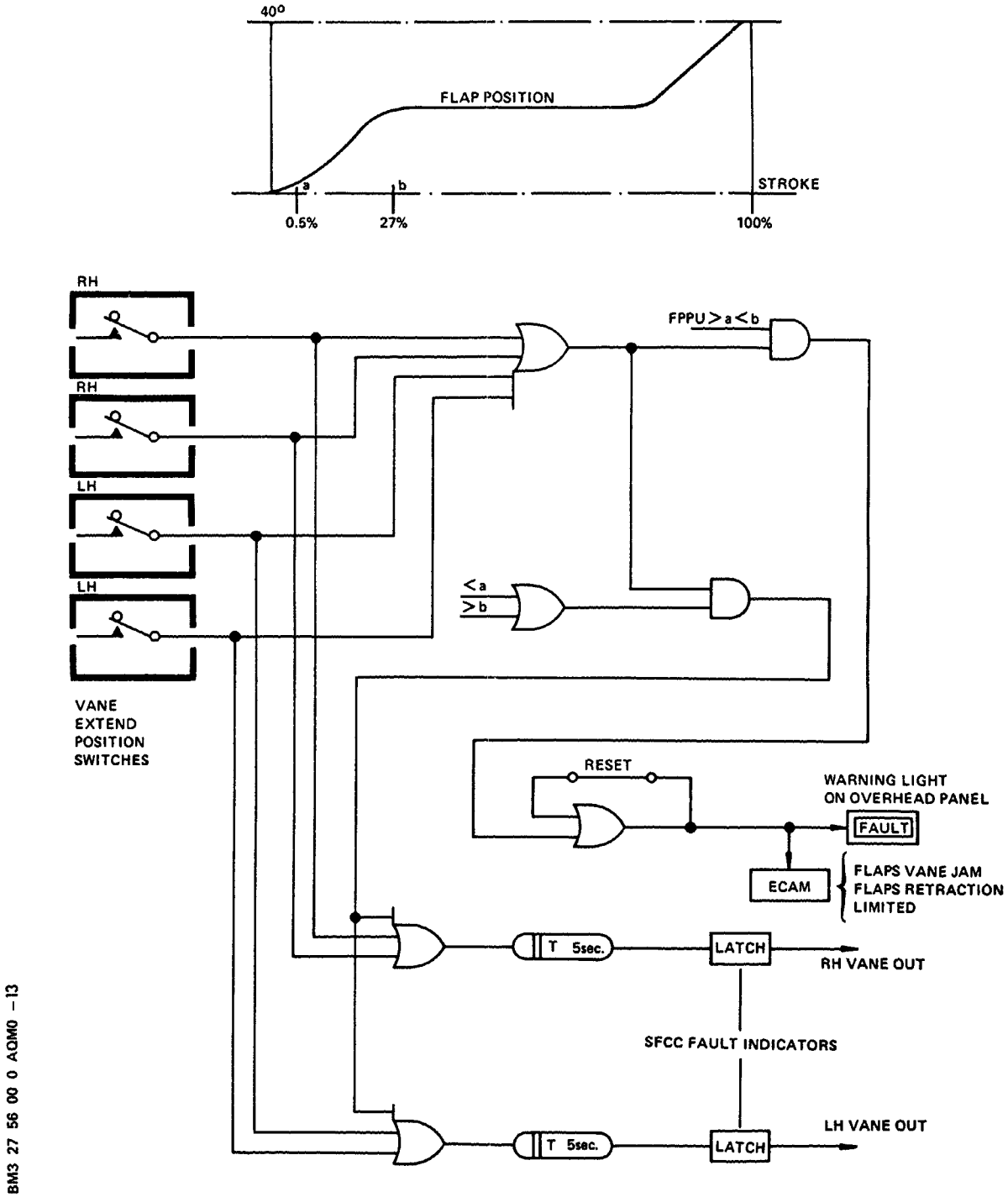
(a)Vane jamming during flap retraction is monitored by SFCC 1 and 2 flap channels in conjunction with the vane extend jam detector units.

(b)If a vane jams during retraction, the transmission system attempts to drive the vane into the flap shroud. Vane overtravel causes the vane leading edge to come into contact with one or both detector units in that wing. The load applied to the detector unit(s) buffer(s) causes the vane extend micro switch to operate.

(c)The two micro switches for each vane are wired in parallel to single SFCC 1 and 2 flap channel inputs, and applied to lane processors 1 and 2 after suitable interfacing. If the flaps are moving, and between 0.5% and 27% full extension (between 1.6 and 87.0 shaft
R revolutions from fully retracted or between 1.6° and 87.4° syncro angle
R at FPPU, 0.88° and 47.3° at IPPU), receipt of a vane extend micro switch input inhibits the "enable" and "retract" outputs to the PCU solenoid valves, thus preventing further flap retraction. Flap movement is arrested within 20 msec of switch actuation, to prevent structural damage. Lane processors 1 and 2 also generate discretes which are combined, and distributed as follows (Ref. 27-51-00):

- A "jam extend" warning discrete is transmitted to the ECAM system.
- The "flap fault" warning discrete is generated, causing the FAULT caption on the overhead panel fault annunciator (17CV) to come on.
- The LH (RH) VANE OUT fault indication code is set on SFCC 1 and 2 front panels and the BITE DISPLAY maintenance indicators come on.

(d)If a vane extend micro switch input is received when the flaps are at less than 0.5% or more than 27% full extension (equivalent to less
R than 1.6 or more than 87.0 shaft revolutions from fully retracted



Vane Jam Extended Logic Diagram
Figure 007

R or 1.6° and 87.4° syncro angle at FPPU, 0.88° and 47.3° at IPPU), the lane processor assume that a switch fault has occurred. Flap extension and retraction capability is maintained, but the appropriate fault indication code (LH (RH) VANE OUT) is set on SFCC 1 and/or 2 front and the BITE DISPLAY maintenance indicator(s) come on.

(2)Vane Jam Retracted
(Ref. Fig. 008)

(a)Vane jamming during flap extension is monitored by SFCC 1 and 2 flap channels in conjunction with the vane retract jam detector units.

(b)During normal flap extension, the flap vane remains in contact with the detector unit striker arm until the vane is parted from the
R the flap (approx. 27% full flap travel or 87.4° syncro angle at
R FPPU, 47.3° at IPPU).
At this point, the vane moves away from the striker arm causing the lever to pivot by spring force. Lever movement causes the vane retract micro switch to operate.

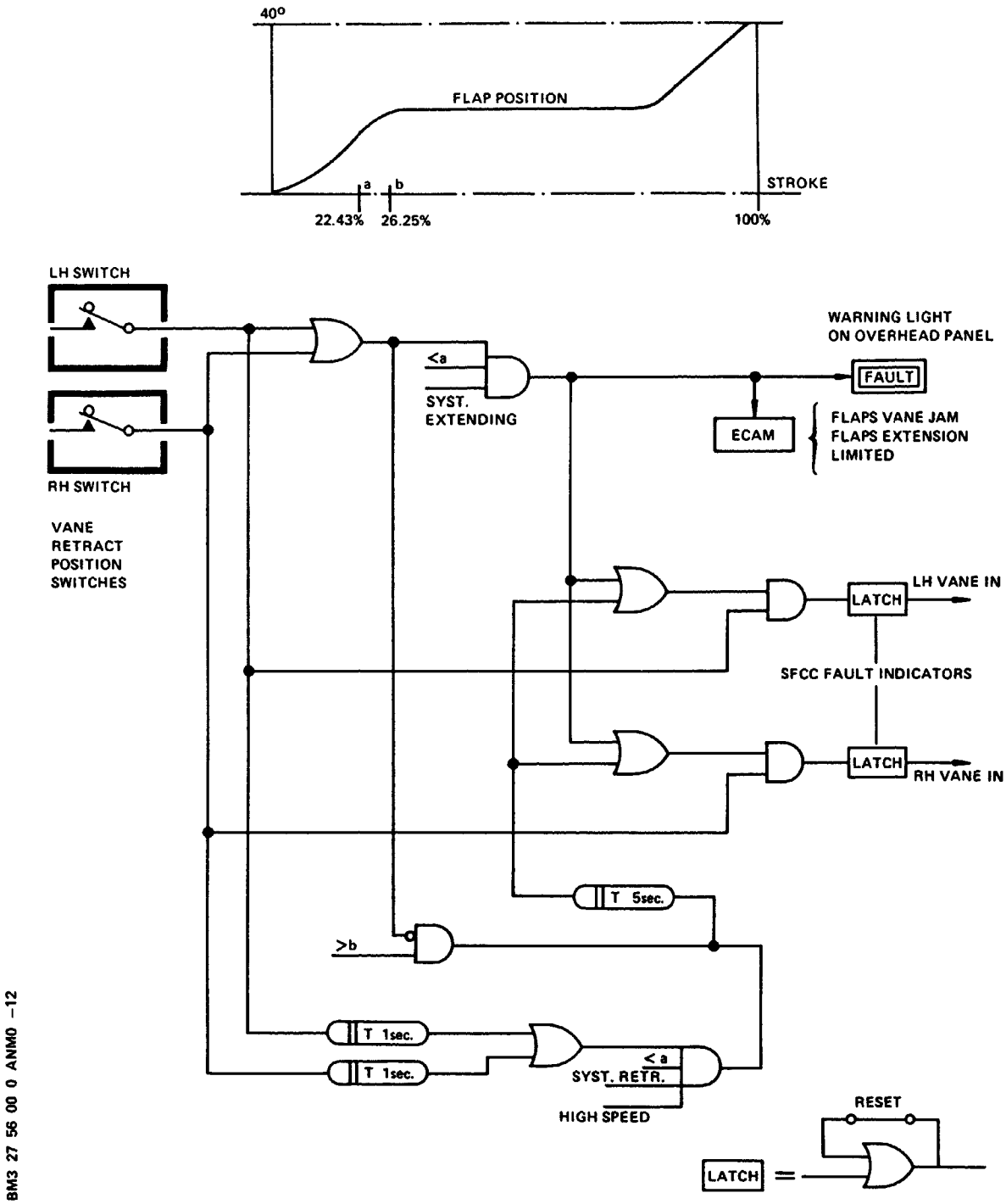
(c)Each micro switch has a dedicated input to SFCC 1 and 2 flap channels. The inputs are fed to lane processors 1 and 2, after suitable interfacing. If the flaps are extending and extension is less than 22,43% full flap (equivalent to 72.3 shaft revolutions from fully retracted
R or 72.6° syncro angle at FPPU, 39.3° at IPPU), receipt of a vane retract position switch input inhibits the "enable" and "extend" outputs to the PCU solenoid, thus preventing further flap extension. Flap retraction is still possible. Lane processors 1 and 2 also generate discretes which are combined, and distributed as follows (Ref. 27-51-00):
- A "jam retracted" warning discrete is transmitted to the ECAM system
- A "flap fault" warning discrete is generated, causing the FAULT caption on the overhead panel fault annunciator to come on.
- The LH (RH) VANE IN 1 or LH (RH) VANE IN 2 fault indication code is set on SFCC 1 and 2 front panels and the BITE DISPLAY maintenance indicators come on.

(d)If a vane retract micro switch input is received when flap extension is greater than 26.25% (equivalent to 84.6 shaft revolutions
R from fully retracted or 85° syncro angle at FPPU, 45.9° at IPPU),
R or if flaps are stationary or retracting, lane processors 1 and 2 assume that a switch fault has occured. Similarly, a switch fault is assumed if only one input is present during extension. Flap extension and retraction capability is maintained and the faulty input is ignored by the lane processors. The appropriate fault indication code LH (RH) VANE IN 1 or LH (RH) VANE IN 2 is set on SFCC 1 and/or 2 front panel and the BITE DISPLAY maintenance indicator(s) come on.

NOTE : Due to characteristics of switch wiring/SFCC connections combined with multiplexing function of SFCC, either a "LH (RH) VANE IN 1" or a "LH (RH) VANE IN 2" fault code may be presented for a vane jammed retracted condition. These indications translate into identical fault conditions, and both originate from the same source (LH (RH) jam detector switch).

(3)System Recovery.

(a)If vane jam extended is detected (during flap retraction),



Vane Jam Retracted Logic Diagram
Figure 008

reverse selection of the slat and flap control lever resets the lane processors to allow flap extension. Similarly, if vane jam retracted is detected (during flap extension), it remains possible to retract the flaps.

(b) If a vane jam retracted condition subsequently clears (e.g. due to melting ice), the system automatically resets and the flaps continue to drive to the selected position. If a vane jam extended condition subsequently clears, flap retraction remains inhibited as the vane extend micro switch(es) remain "in" due to the failed buffer(s). If the micro switches release, flap retraction remains inhibited.

D. Power Supply (Ref. 27-51-00)

(1) Power supplies for the APPUs are normally derived from 26 V AC busbars 331XP and 231XP, via circuit breakers 1CV and 2CV respectively. In the "land recovery" configuration, bus 331XP is replaced by 431XP (via circuit breaker 3CV) by contacts on relay 31XC when the LAND RECOVERY pushbutton is pressed.

(2) Power supplies for the SFCCs are derived from 28 V DC busbars 106PP and 104PP via circuit breakers 5CV and 6CV respectively. In the "land recovery" configuration, bus 106PP is replaced by 305PP (via circuit breaker 10CV) when the LAND RECOVERY pushbutton is pressed. The wing tip brakes are supplied with 28 V DC from busbars 307PP and 104PP via circuit breakers 11CV and 12CV respectively.

ASYMMETRY AND POWER TRANSMISSION MONITORING (FLAPS) - ADJUSTMENT/TEST

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE, CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE. FLIGHT CONTROLS - MAKE CERTAIN GROUND SAFETIES AND NOTICES ARE IN POSITION.

1. Adjustment of Position Pick-Off Units (PPUs)

A. Reason for the Job
(1)Zeroing adjustment of PPUs using zeroing equipment.
(2)Zeroing adjustment of PPUs using voltmeter and cable adapters.
(3)Zeroing adjustment of PPUs using aircraft system and mechanical zero marks.

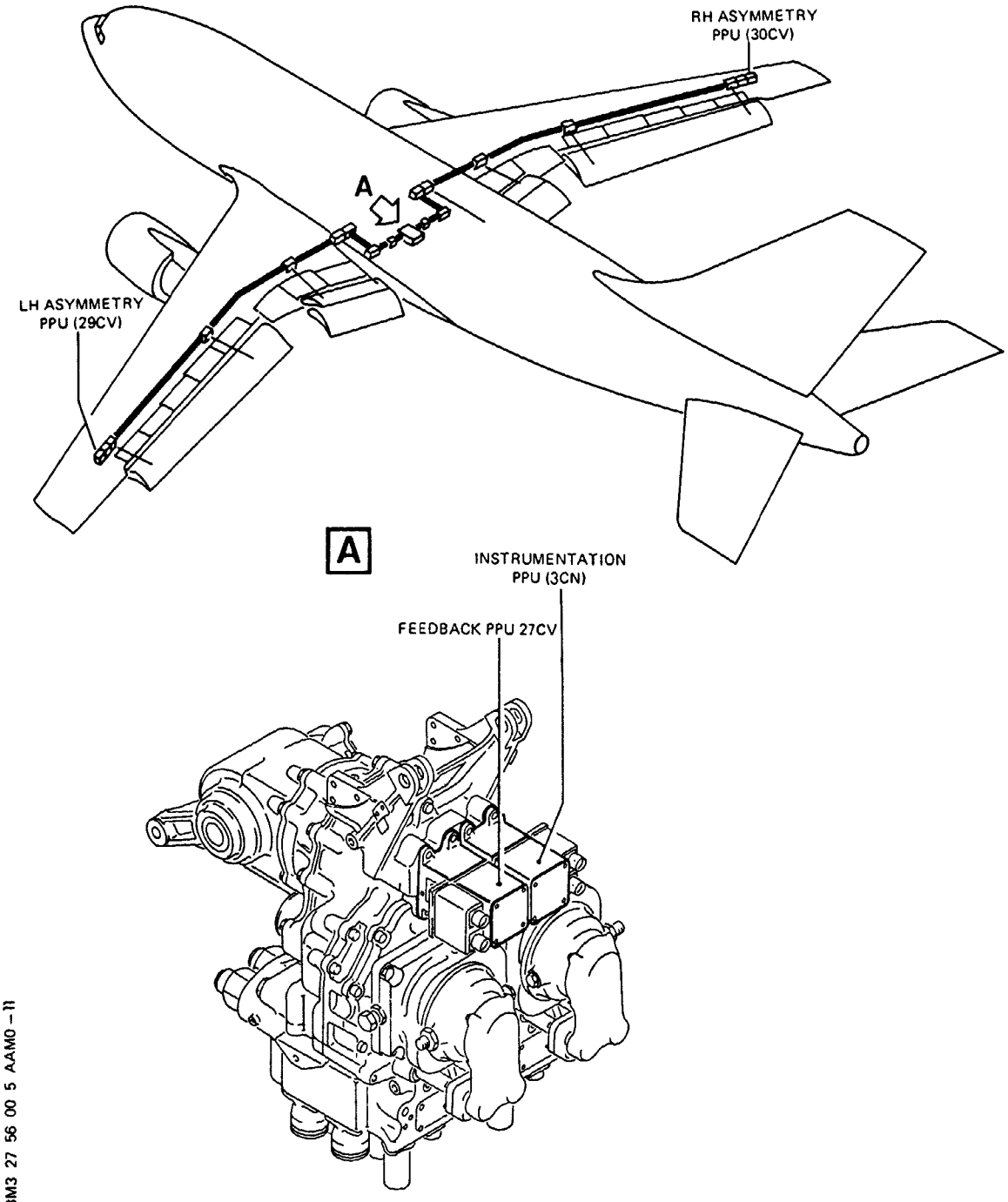
B. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 4.5 m (15 ft.)
	B. 98A27508015000	Check Pin Set - Flap Neutral Setting
	C. 31-590-100	Zeroing Equipment - Synchro-Resolvers Synchro-Transmitters and Wiring
	D.	28 V DC Power Supply
R	E.	AC Voltmeter, Range 1 mV to 1 V
	F.	Cable Adapter
	G.	26 V AC Power Supply
	H.	Circuit Breaker Safety Clips and Tags
	J. Material No. 05-005	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-51-19, P. Block 401	Feedback Position Pick-Off Unit
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-55-12, P. Block 401	Instrumentation Position Pick-Off Unit
- 27-56-11, P. Block 401	Asymmetry Position Pick-Off Unit
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

(Ref. Fig. 501)
(1)Job Set-Up
(a)Position access platform.
(b)Open access doors 581JB for LH and 681JB for RH asymmetry position pick-off units (APPUs).
(c)Open one of the main landing gear doors (Ref. 32-12-11, P. Block 301) for access to feedback and instrumentation pick-off units (FPPU and



Location of Flap-PPUs
Figure 501

IPPU) at flap power control unit.

(d)Remove plug 532BR (632BL) from fairing 2 to gain access to rigging hole.

(e)Retract flaps to zero position (Ref. 27-50-00, P. Block 301) and install check pin from set PN 98A27508015000 in carriage 2.

(f)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	344/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/FLAPS/SYS 1	10CV	335/R67

(g)Remove appropriate APPU (Ref. 27-56-11, P. Block 401), FPPU (Ref. 27-51-19, P. Block 401) or IPPU (Ref. 27-55-12, P. Block 401).

(2)Adjustment of PPUs using Zeroing Equipment

NOTE : Adjustment procedure is identical for all PPUs.

(a)Make certain that selector switch on zeroing equipment is in STAND BY position and that sensitivity selector is in 0 position.

(b)Connect zeroing equipment to 28 V DC supply.

(c)Connect electrical connector from zeroing equipment to receptacle A of PPU to be adjusted.

(d)Select zeroing equipment control switch ON
- AIRCRAFT 28 V DC and INT 26 V, 400 Hz indicator lights come on.

(e)Set selector switch to PPU/POS. TRANS position.

(f)Set sensitivity switch to 30° position.

(g)Unlock shaft locking plate of PPU and turn drive shaft to position galvanometer pointer to zero.

(h)Successively increase sensitivity by placing sensitivity selector in positions 15°, 3°, 15', 3' and adjust drive shaft respectively to maintain galvanometer pointer at zero.

(i)Lock drive shaft with shaft locking plate.

(j)Disconnect zeroing equipment connector from PPU receptacle A and connect to receptacle B.

(k)Make certain that sensitivity selector has remained at 3' and check that galvanometer pointer stays within a range of ±3'.

NOTE : A tolerance of ±15' (sensitivity selector in position 15') is allowed if the galvanometer pointer is out of range of ±3'. If indications are outside the above limitations, the PPU is unserviceable.

(l)Disconnect zeroing equipment connector from PPU receptacle B.

(m)Return sensitivity selector on zeroing equipment to 0 and selector

switch to STAND BY position. Place control switch in OFF position.

(n)Remove power supply from zeroing equipment.

(3)Adjustment of PPUs using Voltmeter and Cable Adapter (ARINC-Procedure). (Ref. Fig. 502)

NOTE : - Adjustment is identical for all PPUs.
- Adjustment is divided into two sections, coarse and fine zero setting.

(a)Make certain that cable adapter is available. If necessary, manufacture cable adapter.

(b)Perform coarse zero setting as follows:

1 Connect cable adapter plug to PPU, receptacle A.

2 Connect voltmeter to cable adapter for coarse zero setting as indicated.

3 Connect 26 V/400 Hz power supply to cable adapter as indicated.

NOTE : If no 26 V/400 Hz external power supply is available, a suitable supply can be obtained from pins A (26 V AC 'hot') and B (26 V AC 'cold') on the PPU aircraft connector, assuming that 26 V AC circuit breakers are closed.

4 Push PPU shaft locking plate to free PPU drive shaft and turn drive shaft in either direction until the voltmeter shows a maximum voltage of approx. 36 V.

5 Remove cable adapter from voltmeter.

(c)Perform fine zero setting as follows:

1 Connect cable adapter to voltmeter for fine zero setting as indicated.

2 Turn PPU drive shaft in either direction until the voltmeter shows a minimum voltage of less than 40 mV.

3 Release locking plate and lock drive shaft with locking plate.

4 Remove cable adapter plug from PPU receptacle A and install on receptacle B.

5 Check reading on voltmeter. If reading exceeds 100 mV, the PPU is unserviceable.

6 Remove cable adapter from PPU power supply and voltmeter.

(4)Adjustment of PPUs using the Aircraft System and Mechanical Zero Marks (Ref. Fig. 503)

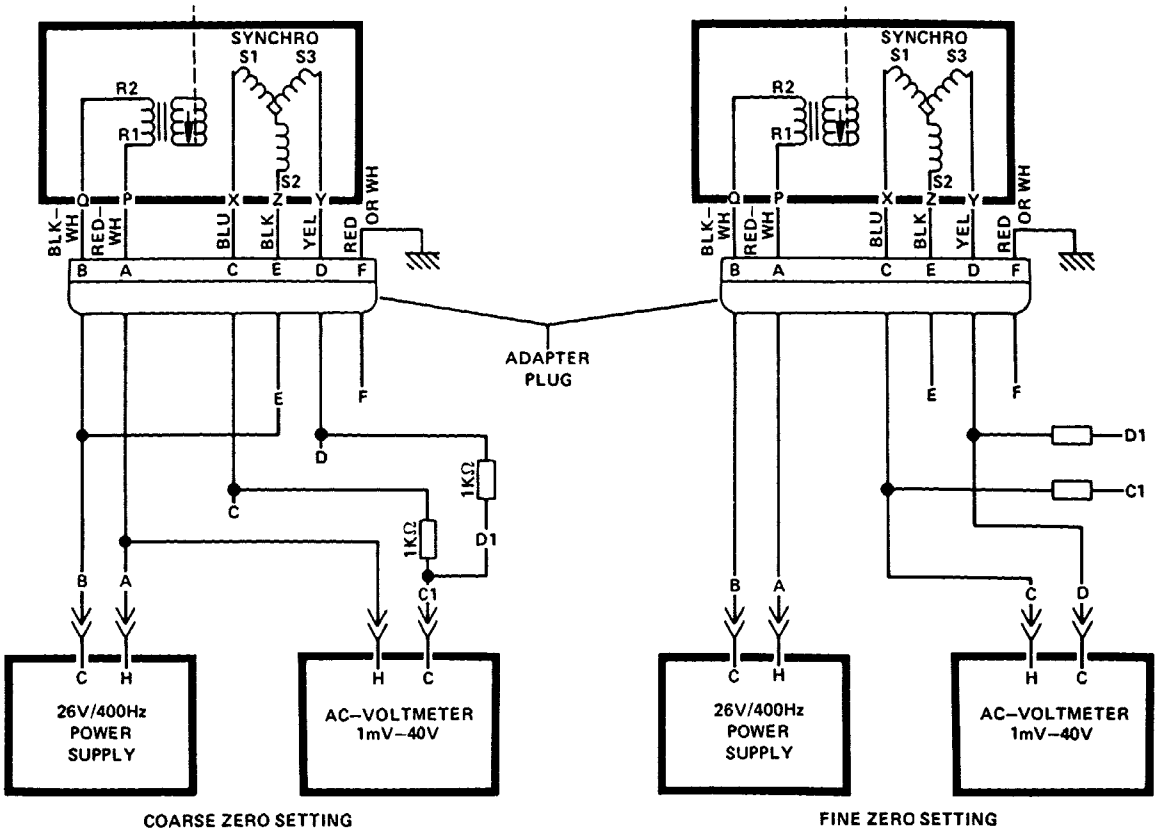
(a)PPU variant A:
Remove lockwire, screws (1) and washers (2) from indicator cover plate of PPU to be adjusted. Remove cover plate.

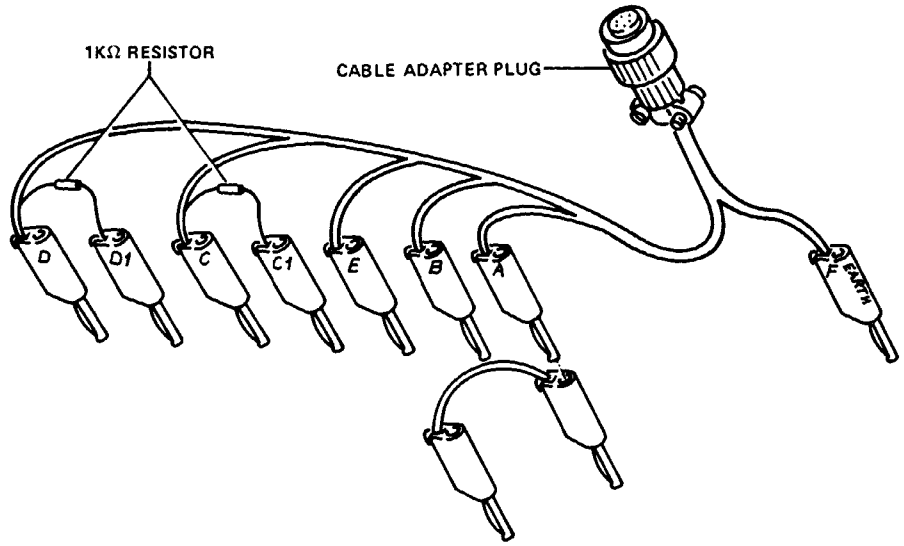
(b)Remove electrical connectors from instrumentation PPU of the slat system (Ref. 27-85-12, P. Block 401).

NOTE : The slat and not the flap system must be used, because the slat position indication is linear and therefore more accurate.

(c)Install the same electrical connectors to the PPU to be adjusted.

(d)Make sure that the following circuit breakers are closed:





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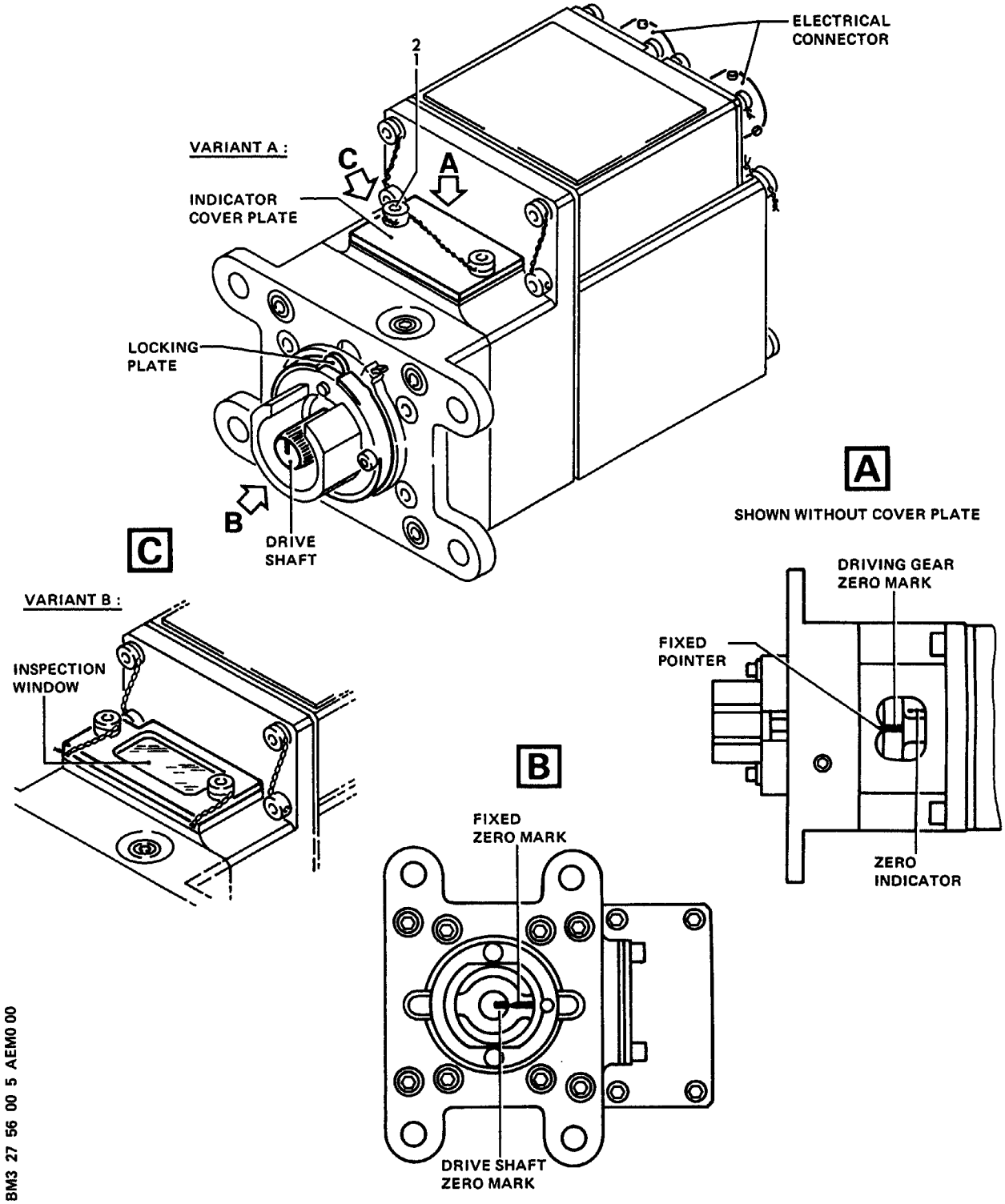
Circuit Diagram of Cable Adapter
Figure 502



Mechanical Zero Marks of the PPU
Figure 503

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS AND SLATS POS IND	1CN	S66
133VU	FLT CTL/FLAPS AND SLATS POS ECAM	2CN	S65

(e)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(f)Make certain that the electronics rack ventilation is correct.
(g)Push locking plate of PPU drive shaft.
(h)Turn drive shaft of PPU until tape of flap/slat position indiator on center instrument panel shows SLAT 0 deg. position.
(i)Check that driving gear zero mark and fixed pointer are aligned. If necessary, turn drive shaft to align.
(j)Check that drive shaft zero mark and fixed zero mark are aligned. If necessary, turn drive shaft to align.
(k)Check that tape on flap/slat position indicator is still on SLAT 0 deg. position.
(l)Variant A:
Install indicator cover plate with washers (2) and screws (1). Apply corrosion preventive (Material No. 05-005) to screws (1).
(m)Variant A:
Safety screws (1) with lockwire, corrosion-resistant steel, dia. 0.8 mm (0.032 in.).
(n)De-energize the aircraft electrical network and disconnect the electrical ground power unit (Ref. 24-41-00, P. Block 301).

(5)Close-Up
(a)Remove rigging pin from track 2 carriage.
(b)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(c)Install appropriate APPU (Ref. 27-56-11, P. Block 401), FPPU (Ref. 27-51-19, P. Block 401) or IPPU (Ref. 27-55-12, P. Block 401).
(d)Remove safety clips and tags and close circuit breakers 1CV,2CV,3CV, 4CV,5CV,6CV,7CV,8CV,9CV and 10CV.
(e)Install plug on fairing 2, close access doors, main gear main door (Ref. 32-12-11, P. Block 301) and remove access platform.
(f)Operate flaps through two full cycles and check system for correct function (Ref. 27-54-00, P. Block 501).

2. Test of Wing Tip Brake (WTB) Static Torque and Test of the Integrity of the Flap Transmission System

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, adjustable to 5 m (16.4 ft.)
B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C. 98A27508058000	Check Tool - Wing Tip Brake, Flap
or	
98A27508063000	
or	
R STANDARD TORQUE MULTIPLIER	
D.	Torque Wrench, 5 to 5.3 m.daN (36.9 to 39.1 lbf.ft.)
E.	Torque Wrench, 10.2 and 12.4 Nm (91 and 110 lbf.in.)
F.	Circuit Breaker Safety Clips and Tags
G.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
H. Material No. 04-004	Common Greases (Ref. 20-31-00)
I. Material No. 05-005	Special Materials (Ref. 20-31-00)
J. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-54-00, P. Block 601	Hydraulic Actuation and Power Transmission (Flaps)
- 27-54-19, P. Block 601	Transmission Shafts
- 27-56-13, P. Block 601	Wing Tip Brake (33CV, 34CV)
- 29-22-00, P. Block 301	Blue Auxiliary Power (Power Transfer Unit)
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure

(Ref. Fig. 504)

(1)Job Set-Up

(a)Position access platform.

(b)Open access panels 572AB and 577AB (672AB and 677AB).

(c)Open the main doors of the main gear (Ref. 32-12-11, P. Block 301).

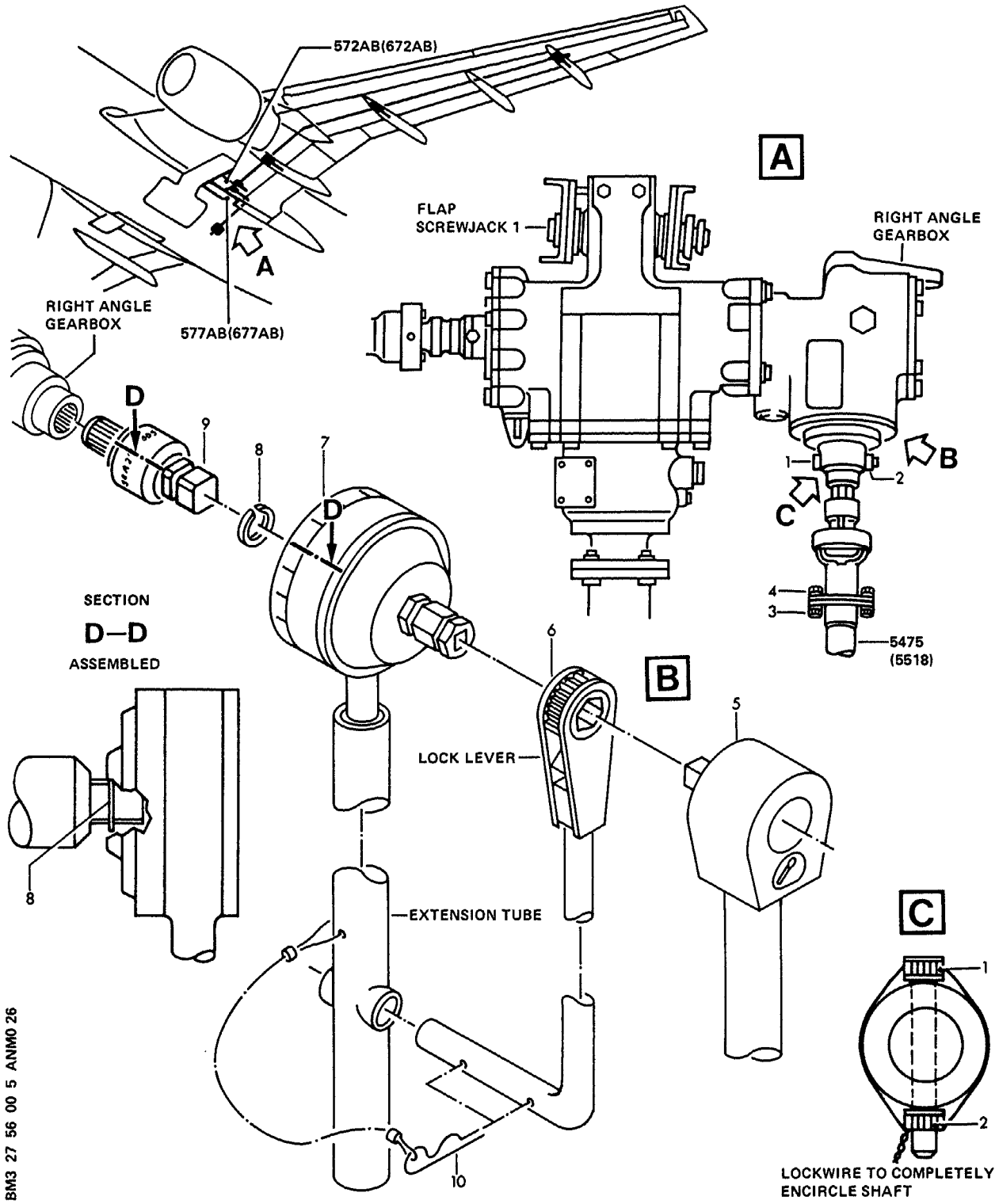
(d)Gain access to the avionics compartment by opening access door 121BL or 211PZ.

(e)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(f)Make certain that electronics racks ventilation is correct.

(g)Extend flaps to 15° position (Ref. 27-50-00, P. Block 301).

(h)Open, safety and tag the following circuit breakers:



Application of WTB-Check Tool
Figure 504

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(i)Install safety guard 98A27503003000 on flap/slat control lever quadrant.
(j)Mark the relative positions of the input connection (rotating part) and the casing of screwjack 4.
(k)Mark the relative positions of the input connection (rotating part) and the casing of the right-angle gearbox 5476 (5519).
(l)Mark the relative positions between carriage 1 and flap track 1.
(m)Disconnect electrical connectors 23CV-A and 24CV-A from the valve blocks of the flap Power Control Unit (PCU).
(n)Remove four nuts (3) and bolts (4) at the splitter flanges of transmission shaft 5475 (5518).
(o)Separate splitter flanges and secure the shaft at the adjacent structure with lockwire.
(p)Remove and discard lockwire from bolt (1) and nut (2).
(q)Remove nut (2) and bolt (1) and withdraw universal joint.

(2)Test

WARNING : BE VERY CAREFUL WHEN APPLYING TORQUE LOAD TO THE TRANSMISSION SYSTEM. THE SYSTEM ACTS AS A TORSION BAR. MAKE SURE THAT THE WRENCHES HAVE NO OIL OR GREASE ON THEM AND ARE CORRECTLY POSITIONED.

NOTE : If the WTB fails or any component in the transmission system becomes damaged during test, replace the appropriate component and repeat the test.

ACTION	RESULT
1. Install the check tool adapter (9) of check tool PN 98A27508058000 or R PN 98A27508063000 or STANDARD TORQUE R MULTIPLIER to the torque multiplier (7) and secure with the circlip (8).	
2. Install the anti-backlash ratchet (6) to the torque multiplier (7) and safety with spring clips (10).	
3. Insert the check tool set in the flap right-angle gearbox input of the LH transmission system.	

ACTION	RESULT
4. Make certain that the extension tube of the torque multiplier (7) rests on the access platform in a safe position to counteract in opposite direction to input force.	
5. Pressurize the BLUE and YELLOW hydraulic systems (Ref. 29-22-00, P. Block 301 and 29-23-00, P. Block 301).	
6. On the FPPU: - disconnect electrical connector 27CV-A.	
7. Remove safety clips and tags and close circuit breakers 1CV, 5CV and 10CV.	On center instrument panel on slat/flap position indicator 5CN: - the FLAPS warning light comes on. The LH and RH wing tip brakes of system 1 are applied.
8. Connect torque wrench (5) to the multiplier (7) and apply a torque of between 5 and 5.3 m.daN (36.9 and 39.1 lbf.ft.) in the anti-clockwise direction to the LH transmission. NOTE : The transmission will be wound up more than half a turn by means of several pulls on the torque wrench. NOTE : The torque output from the torque multiplier (7) is six times greater than the input.	- Left WTB does not rotate. - transmission system withstands the torque loads without slip or failure.
9. Hold the torque with the torque wrench and release the torque load gradually in steps by releasing lock lever and resetting at end of travel.	NOTE : Make certain that the reference marks on the right-angle gearbox and screwjack 4 are still aligned as before. Because of play in the system it may be necessary to turn the transmission slightly to obtain exact alignment of the marks.
10. On the FPPU:	

ACTION	RESULT
- connect electrical connector 27CV-A	
11. In the avionics compartment on the Slat/Flap Control Computer (SFCC) 1: - press RESET pushbutton.	LH and RH wing tip brakes are reset. On the slat/flap position indicator 5CN: - the FLAPS warning light goes off.
12. Open safety and tag circuit breakers 1CV, 5CV and 10CV.	
13. On the FPPU: - disconnect electrical connector 27CV-B.	
14. Remove safety clips and tags and close circuit breakers 2CV and 6CV.	On slat/flap position indicator 5CN: - the FLAPS warning light comes on. The LH and RH wing tip brakes of system 2 are applied.
15. Rebuild the extension tube of the torque multiplier (7) so that it counteracts on the access platform in opposite direcition as before.	
16. Apply a torque of between 5 and 5.3 m.daN (36.9 and 39.1 lbf.ft.) in the clockwise direction to the LH transmission.	- left WTB does not rotate. - transmission system withstands the torque loads without slip or failure.
17. Hold the torque with the torque wrench and release the torque load gradually in steps by releasing lock lever and resetting at end of travel.	NOTE : Ref. step 8
18. On the FPPU: - connect electrical connector 27CV-B	
19. In the avionics compartment On the SFCC 2: - press RESET pushbutton	
20. Open safety and tag circuit breakers 2CV and 6CV.	
21. Remove the complete check tool set from right-angle gearbox of the LH transmission system and insert	

ACTION	RESULT

it in right-angle gearbox of the RH transmission system input connection.

22. Make certain that the extension tube of the torque multiplier (7) rests on the access platform in a safe position to counteract in opposite direction to input force.

23. Perform steps 6 thru 20 for the RH system.

24. Remove the complete check tool set from right-angle gearbox.

25. Depressurize the BLUE and YELLOW hydraulic systems (Ref. 29-22-00, P. Block 301) and 29-23-00, P. Block 301).

(3)Close-Up
(a)Make certain that the transmission system is still in its original position.
(b)Install the transmission shafts and the universal joints as follows:
1 Using white spirit (Material No. 11-002), clean splined surfaces of the universal joints.
2 Apply a smear of grease (Material No. 04-004) to the splined surfaces of universal joint.
3 Insert universal joint in the right-angle gearbox and install the bolt (1) and the nut (2).
4 Safety the bolt (1) and the nut (2) with lockwire.
5 Remove lockwire from adjacent structure and align splitter flanges of shaft 5475 (5518) and universal joint and install bolt (4) and nut (3).
6 TORQUE nut (3) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(c)Apply corrosion preventive (Material No. 05-005) to nuts (2),(3) and bolts (1),(4).
(d)Visually inspect the complete transmission system (Ref. 27-54-19, P. Block 601).
(e)Inspect the universal joints for the presence of the VESPEL bushes (Ref. 27-54-00, P. Block 601).
(f)Inspect WTB (Ref. 27-56-13, P. Block 601).
(g)Connect electrical connectors 23CV-A and 24CV-A to the valve block of the flap PCU.
(h)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV and 10CV.
(i)Press the RESET button on the Slat/Flap Control Computers (SFCC) 1 and 2. Make certain that no fault codes are set.

(j)Make sure that the warning light **FLAPS** on the slat/flap position indicator is off.
(k)Set **ANN LT** switch on maintenance panel **472VU** to **READ** position.
(l)Press **MFA RESET** button on maintenance panel **471VU**. Make certain that the **SFCC 1/BITE DISPLAY** and **SFCC 2/BITE DISPLAY** annunciators are off.
(m)Return the **ANN LT** switch on maintenance panel **472VU** to **OFF** position.
(n)Remove the safety guard from the flap/slat control lever quadrant.
(o)Carry out the operational test of the flap system (**Ref. 27-54-00, P. Block 501**) ending with the flaps in 0° position.
(p)De-energize the aircraft electrical network and disconnect electrical ground power unit (**Ref. 24-41-00, P. Block 301**).
(q)Close access door **121BL** or **211PZ** which was opened previously.
(r)Close the main door of the main gear (**Ref. 32-12-11, P. Block 301**).
(s)Close access panels **572AB** and **577AB** (**672AB** and **677AB**).
(t)Remove access platform.

ASYMMETRY POSITION PICK-OFF UNIT (29CV, 30CV) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 4 m (13 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C.	Torque Wrench, 7.8 Nm (5.8 lbf.ft.) 9.6 Nm (7.1 lbf.ft.)
	D.	Safety Barriers
	E.	Electrical Blanking Caps
	F.	Circuit Breaker Safety Clips and Tags
	G.	Tie-Wrap
	H. Material No. 05-005	Special Materials (Ref. 20-31-00)
	I. Material No. 09-001	Sealants (Ref. 20-31-00)

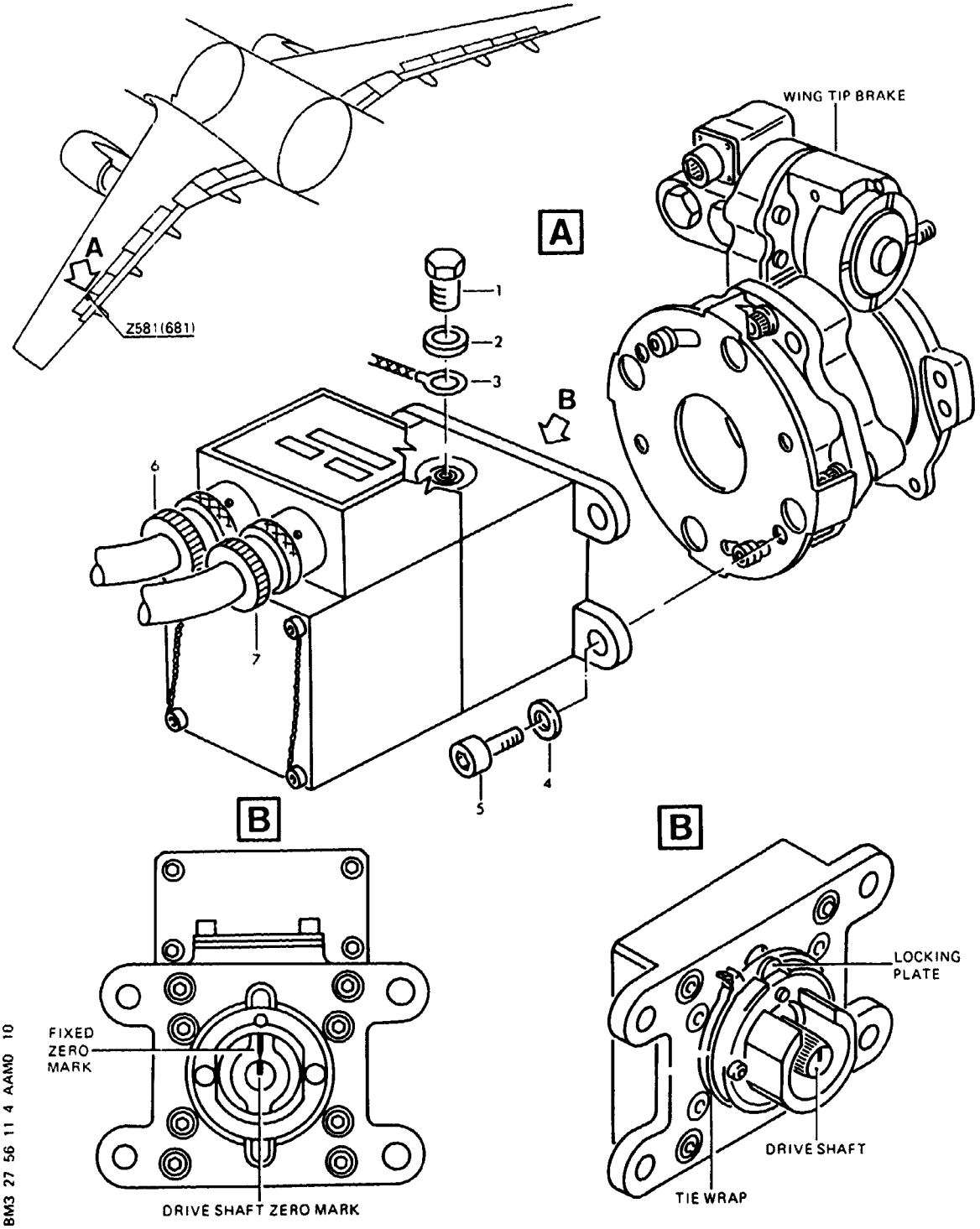
Referenced Procedures

- 20-28-11, P. Block 1	Electrical Bonding
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-50-00, P. Block 301	Flaps

2. Procedure

(Ref. Fig. 401)

NOTE : The following procedure describes removal and installation of a position pick-off unit (PPU) set at mechanical and electrical zero, this being the condition new PPUs are in when delivered. Removal/installation of PPUs is possible with the system other than zero, due to the PPUs self-locking facility, provided that the same PPU is refitted and no movement of the system transmisssion has occured between removal and installation of PPU.



Asymmetry Position Pick-Off Unit
Figure 401

A. Job Set-Up
(1)Fully retract flaps (Ref. 27-50-00, P. Block 301).
R (2)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(4)Position access platform and safety barriers.
(5)Open access door 581JB (681JB).

B. Removal
(1)Disconnect electrical connectors (6) and (7) from asymmetry position pick-off unit (APPU).
(2)Cap electrical connectors.
(3)Remove bolt (1), washer (2) and disconnect bonding strap (3).
(4)Support APPU and remove bolts (5) and washers (4).
(5)Remove APPU.
(6)Fit a tie-wrap behind the locking plate to prevent retraction of locking plate.

C. Preparation for Installation
(1)Remove set screw and sealant from bonding point.

D. Installation
CAUTION: A NEW PPU IS DELIVERED LOCKED IN THE MECHANICAL AND ELECTRICAL ZERO POSITION. THE SYSTEM MUST BE ALSO IN ITS ZERO POSITION BEFORE THE PPU IS INSTALLED.
(1)Check end of drive shaft to make certain that APPU is set to zero position (drive shaft zero mark and fixed zero mark are aligned).
(2)Remove tie-wrap from APPU.
(3)Position APPU; install washers (4) and bolts (5). TORQUE to between 7.8 Nm (5.8 lbf.ft.) and 9.6 Nm (7.1 lbf.ft.).
NOTE : Fitting the PPU requires the simultaneous alignment of the housing keyway, the drive shaft splines, the locating dowel and the securing bolt holes, but not more than moderate hand pressure should be required. A slight additional pressure is required to depress the PPU locking plate and engage the drive fully.
(4)Apply corrosion preventive (Material No. 05-005) to bolts (5) and washers (4).
(5)Position bonding strap (3); install washer (2), bolt (1) (Ref. 20-28-11, P. Block 1).
(6)Apply sealant (Material No. 09-001) to bolt (1) and washer (2).
(7)Remove electrical blanking caps from electrical connectors.

(8)Connect electrical connectors (6),(7) to APPU.
(9)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV and 10CV.
(10)Remove safety guard from flap/slat control lever quadrant.

E. Test
(1)Carry out operational test (Ref. 27-54-00, P. Block 501).

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment and close access door 581JB (681JB).
(2)Remove safety barriers.
(3)Remove access platform.

ASYMMETRY POSITION PICK-OFF UNIT ADAPTER - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 4 m (13 ft.)
R B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C.	Torque Wrench, 7.8 Nm (69 lbf.in.) to 9.6 Nm (85 lbf.in.)
D.	Safety Barriers
E.	Circuit Breaker Safety Clips and Tags
F. Material No. 05-002	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-56-11, P. Block 401	Asymmetry Position Pick-Off Unit
- 27-56-13, P. Block 401	Wing Tip Brake (33CV, 34CV)

2. Procedure

(Ref. Fig. 401)

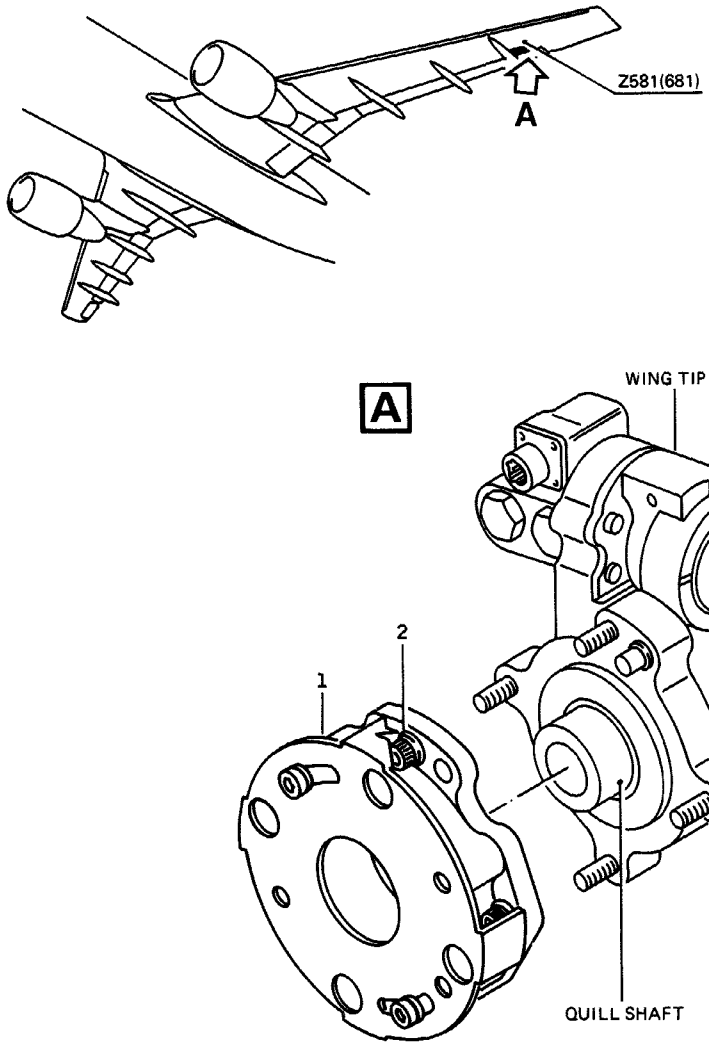
A. Job Set-Up

(1) Fully retract flaps (Ref. 27-50-00, P. Block 301).

R (2) Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(3) Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67



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Asymmetry Position Pick-Off Unit Adapter
Figure 401

(4)Position access platform and safety barriers.
(5)Open access door 581JB (681JB).

B. Removal (Ref. Fig. 401)
(1)Remove asymmetry position pick-off unit (Ref. 27-56-11, P. Block 401).
(2)Rotate cover plate (1) to gain access to nuts (2).
(3)Remove nuts (2).
(4)Remove asymmetry position pick-off unit adapter from studs.
NOTE : Quill shaft remains attached to wing tip brake.
(Removal of quill shaft Ref. 27-56-13, P. Block 401).

C. Preparation for Installation
(1)Remove residual compound from wing tip brake.
(2)Apply anti-corrosion compound (Material No. 05-002) on wing tip brake and adapter mating surfaces.

D. Installation
(1)Position asymmetry position pick-off unit adapter on studs of wing tip brake.
(2)Install nuts (2) and TORQUE to between 7.8 Nm (69 lbf.in.) and 9.6 Nm (85 lbf.in.).
(3)Rotate cover plate (1).
(4)Install asymmetry position pick-off unit (Ref. 27-56-11, P. Block 401).
(5)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV, and 10CV.
(6)Remove safety guard from flap/slat control lever quadrant.

E. Test
(1)Carry out operational test (Ref. 27-54-00, P. Block 501).

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment and close access door 581JB (681JB).
(2)Remove safety barriers.
(3)Remove access platform.

WING TIP BRAKE/SOLENOID VALVE (33CV, 34CV) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SURFACES THEY OPERATE.

1. Reason for the Job

A. Following removal/installation procedures are described:
(1)Wing tip brake solenoid valve.
(2)Wing tip brake assy.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 5.2 m (17 ft.)
B. LL550A017	Alignment Plug
C. LL517A034	Alignment Plug
D. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
E.	Torque Wrench, 2.8 to 3.1 Nm (2.07 to 2.29 lbf.ft.)
F.	Torque Wrench, 10 to 11 Nm (7.4 to 8.1 lbf.ft.)
G.	Safety Barriers
H.	Warning Notice Prohibiting the Pressurization of Hydraulic Systems
I.	Circuit Breaker Safety Clips and Tags
J.	Electrical Blanking Caps
K.	Hydraulic Blanking Caps
L.	Cotter Pins
M.	O-Rings
N.	Wiper Rings
O.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
P.	Ohmmeter 0-20 milliohms
Q. Material No. 04-004	Common Greases (Ref. 20-31-00)
R. Material No. 05-002	Special Materials (Ref. 20-31-00)
S. Material No. 05-005	Special Materials (Ref. 20-31-00
T. Material No. 05-054	Special Materials (Ref. 20-31-00)
U. Material No. 09-015	Sealants (Ref. 20-31-00)
V. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

-	12-12-29, P. Block 1	Hydraulics
-	24-41-00, P. Block 301	AC External Power Control
-	27-50-00, P. Block 301	Flaps
R -	27-54-19, P. Block 601	Inspection of Flap Transmission Shaft
R		Assemblies for Cracks
-	27-56-11, P. Block 401	Asymmetry Position Pick-Off Unit
-	29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
-	29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
-	32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

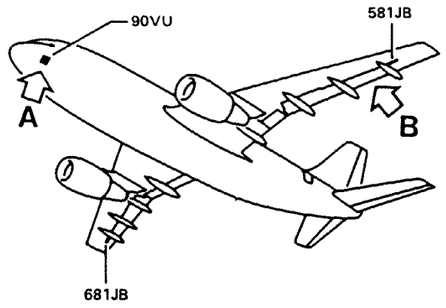
3. Procedure
(Ref. Fig. 401)
(Ref. Fig. 402)

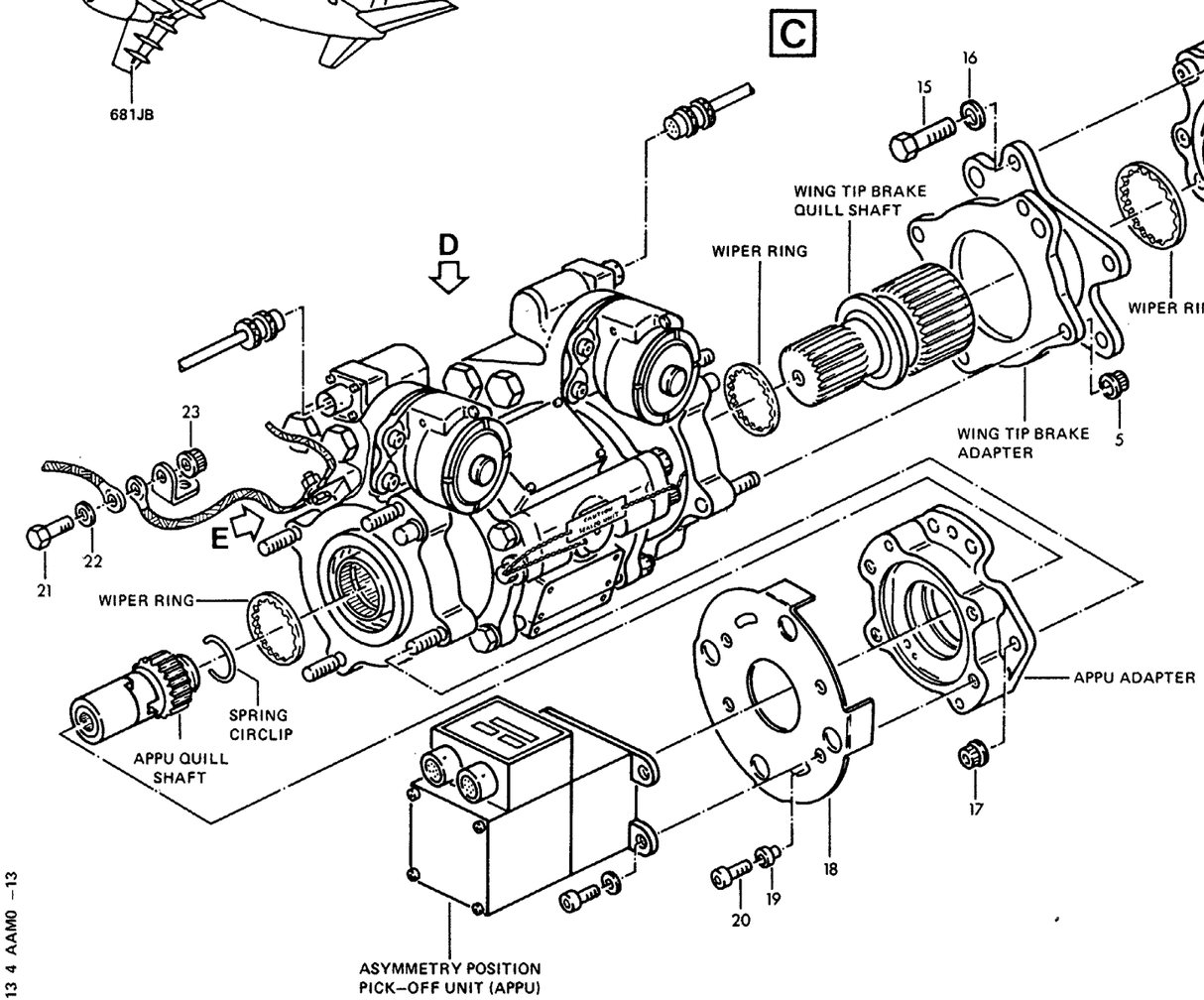
A. Job Set-Up
(1)Position safety barriers.
(2)Extend flaps to 20° position (Ref. 27-50-00, P. Block 301).
(3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)Open one of the main gear main doors (Ref. 32-12-11, P. Block 301).
(5)Depressurize BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(6)Depressurize BLUE and YELLOW hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(7)Position warning notice prohibiting pressurization of hydraulic systems.
(8)Open, safety and tag the following circuit breakers:

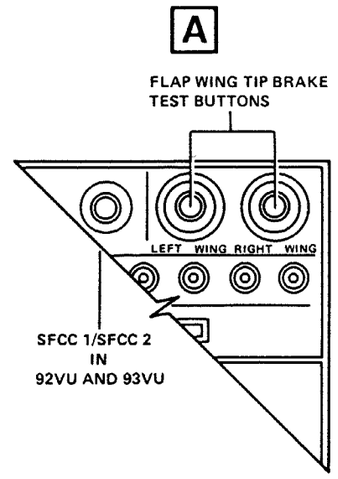
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

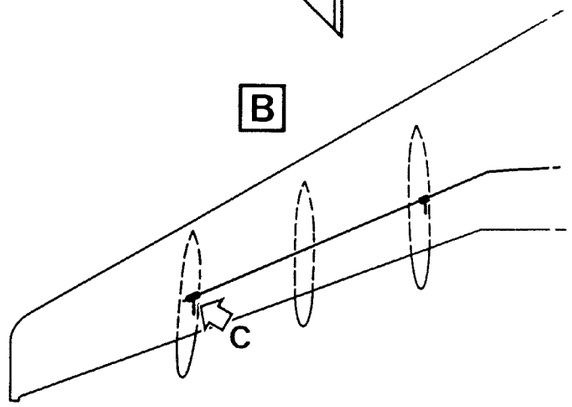
(9)Position access platform.
(10)Open access doors 581JB (681JB) and 121BL.

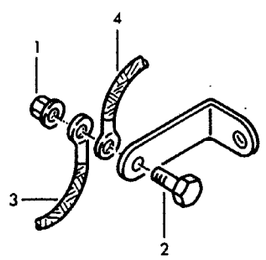
B. Removal
(1)Solenoid Valve
(a)Cut and remove lockwire.
(b)Remove screws (5) and washers (4).
(c)Remove solenoid valve from wing tip brake.
(d)Remove and discard O-rings (1),(2),(3).
(2)Wing Tip Brake

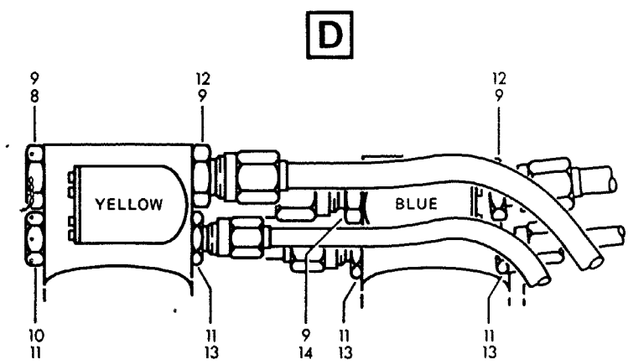












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Wing Tip Brake (Flaps)
Figure 401

EFFECTIVITY: ALL

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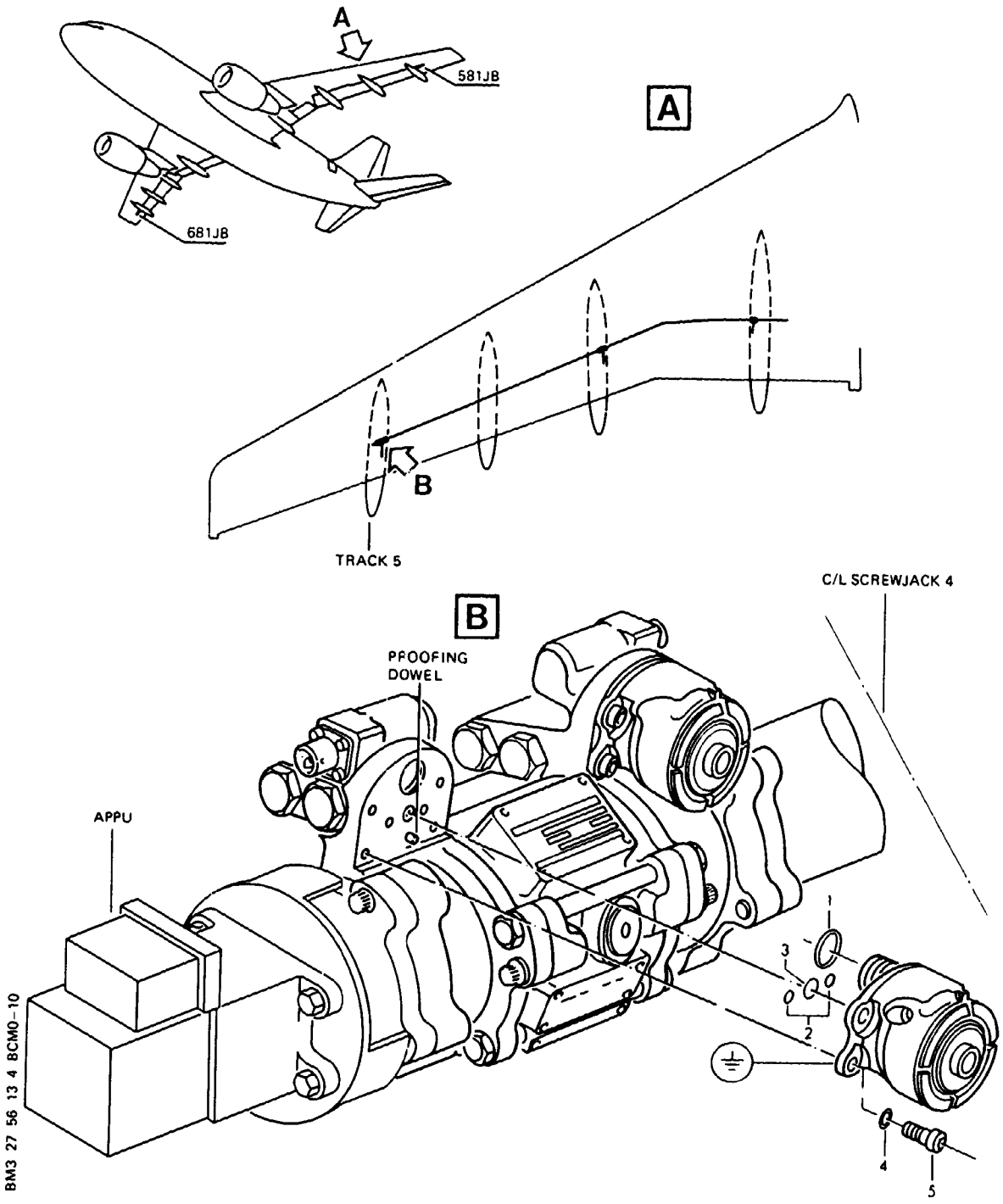

Solenoid Valve
Figure 402

(a)Remove asymmetry position pick-off unit (APPU) (Ref. 27-56-11, P. Block 401).

NOTE : Following steps (b) and (c) are optional. Wing tip brake and APPU adapter may be removed as an assembly.

(b)Loosen screw (20) and collar (19) and rotate cover plate (18) to gain access to nuts (17).

(c)Remove nuts (17) and withdraw APPU adapter from wing tip brake.

(d)Disconnect electrical connectors and cap open ends.

(e)Disconnect hydraulic connections and cap open ends.

(f)Remove nut (23), bolt (21) and washer (22) and disconnect bonding strap from wing structure.

(g)Support wing tip brake and remove bolts (15) and washers (16) from wing tip brake adapter; remove wing tip brake complete with APPU quill shaft and wing tip brake adapter.

C. Preparation of Replacement Component

(1)If a new wing tip brake is to be installed, proceed as follows:

(a)Cut lockwire and remove blanking plugs (8),(10) and fittings (12),(13),(14) with O-rings (9),(11) from removed component. Discard O-rings.

(b)Install blanking plugs (8),(10) and fittings (12),(13),(14) with new O-rings (9),(11) to new component. TORQUE blanking plugs and fittings to between 10 and 11 Nm (7.4 and 8.1 lbf. ft.).

(c)Safety blanking plugs (8),(10) with lockwire 0.8 mm (0.032 in.).

(d)Extract APPU quill shaft from removed component.

NOTE : Considerable force may be required to extract quill shaft as the splined connection incorporates a spring circlip which will remain in wing tip brake splined connection.

(e)Remove spring circlip from locating groove in wing tip brake splined connection.

(f)Lubricate splines on quill shaft with synthetic grease (Material No. 04-004).

(g)Install attached new wiper rings using alignment plug PN LL517A034.

(h)Install spring circlip into locating groove of new wing tip brake.

CAUTION : DURING INSTALLATION OF QUILL SHAFT CARE MUST BE TAKEN TO ENSURE FULL ENGAGEMENT OF QUILL SHAFT IN WING TIP BRAKE AND CORRECT SEATING OF SPRING CIRCLIP IN LOCATING GROOVE.

(i)Install quill shaft in new wing tip brake.

NOTE : Considerable force may be required to engage spring circlip into quill shaft groove.

(j)Remove nut (1) and bolt (2) and disconnect bonding straps (3),(4) from wing tip brake.

(k)Connect bonding straps (3),(4) to new wing tip brake and secure with bolt (2) and nut (1).

(l)Remove nuts (5) from wing tip brake adapter and withdraw adapter from wing tip brake.

(m)Remove residual compound from wing tip brake and APPU adapter mating surfaces.

(n)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of wing tip brake and wing tip brake adapter.

(o)Position wing tip brake adapter on wing tip brake and secure with

nuts (5).

NOTE : The steps (p) thru (t) are not applicable if wing tip brake quill shaft remained in flap screwjack 4.

(p)Remove wing tip brake quill shaft from wing tip brake.

(q)Remove wiper ring from flap screwjack 4.

(r)Clean and lubricate splined connection of wing tip brake quill shaft with grease (Material No. 04-004).

(s)Install new wiper ring in flap screwjack 4 using alignment plug PN LL550A017.

(t)Install wing tip brake quill shaft in flap screwjack 4.

(2)If the removed wing tip brake is to be installed, remove and discard wiper ring at input connection. Clean splined surfaces with white spirit (Material No. 11-002) and install new wiper ring using alignment plug PN LL517A034.

D. Installation

(1)Solenoid Valve

(a)Prepare a small quantity of a mixture composed of 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. 05-054).

NOTE : Proportions quoted are by weight.

(b)Apply a quantity of mixture, prepared above, to area provided for electrical bonding on solenoid valve and wing tip brake.

(c)Apply anti-corrosion compound (Material No. 05-002) to threads of screws (5).

(d)Install new O-rings (1),(2),(3) in solenoid valve.

CAUTION : TO PREVENT INSTALLATION OF INCORRECT SOLENOID VALVES, THE WING TIP BRAKE IS PROVIDED WITH A PROOFING DOWEL. MAKE CERTAIN THAT SOLENOID VALVE TO BE INSTALLED HAS THE CORRESPONDING HOLE IN ITS MOUNTING SURFACE.

(e)Install solenoid valve on wing tip brake.

(f)Install washers (4) and screws (5). TORQUE screws (5) to between 2.8 and 3.1 Nm (2.07 and 2.29 lbf.ft.).

(g)Using an ohmmeter to measure electrical resistance between solenoid valve and wing tip brake housing (at main bonding point), resistance must not exceed 20 milliohms.

(h)Safety screws (5) with lockwire.

(2)Wing Tip Brake

(a)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of wing tip brake adapter and flap screwjack 4.

(b)Position wing tip brake (complete with wing tip brake adapter and APPU quill shaft) on flap screwjack 4, making certain that wing tip brake quill shaft engages correctly.

(c)Install washers (16) and bolts (15).

(d)Install bonding strap using bolt (21), washer (22) and nut (23).

(e)Remove protective caps and connect hydraulic connections.

(f)Remove protective caps and connect electrical connectors.

(g)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of wing tip brake and APPU adapter.

(h)Position APPU adapter on wing tip brake and secure with nuts (17).

(i)Rotate cover plate (18) and tighten screw (20).

(j)Apply corrosion-preventive (Material No. 05-005) on all nuts and bolt heads.
(k)Install APPU (Ref. 27-56-11, P. Block 401).

E. Test
(1)Remove safety clips and tags and close circuit breakers 1CV, 10CV, 5CV, 6CV and 2CV.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
(4)Remove warning notice prohibiting pressurization of hydraulic systems.
(5)Check hydraulic fluid level in YELLOW and BLUE reservoirs and top up if required (Ref. 12-12-29, P. Block 1).
(6)Pressurize YELLOW and BLUE hydraulic reservoirs and top up if required (Ref. 29-14-00, P. Block 301).
(7)Pressurize GREEN, YELLOW and BLUE hydraulic systems (Ref. 29-10-00, P. Block 301).
(8)Bleed hydraulic supplies to wing tip brake.
NOTE : SFCC 1 controls YELLOW hydraulic supply to flap wing tip brakes.
SFCC 2 controls BLUE hydraulic supply to flap wing tip brakes.
(a)On electronics rack 92VU locate SFCC 1; on electronics rack 93VU locate SFCC 2.
(b)ON SFCC 1, press required flap wing tip brake test button, hold for approximately two to three seconds, and release. Wait approximately two to three seconds, press test button again. Repeat operation ten times.
NOTE : Flap wing tip brake in LH wing is operated by pressing flap wing tip brake test button identified as LEFT WING.
Flap wing tip brake in RH wing is operated by pressing flap wing tip brake test button identified as RIGHT WING.
(c)Repeat step (b) using required flap wing tip brake test button on SFCC 2.
NOTE : Bleeding procedure for each hydraulic system should take approximately 40 to 60 seconds.
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65

(10)Remove safety guard from flap/slat control lever quadrant.
(11)Testing of brake function
WARNING : MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.
Initial conditions:
- Torque limiter lock-out indicators of flap screwjacks 3 and 4 are in neutral position
- System torque limiter lock-out indicator is not visible
- Flaps extended to 20° position

ACTION	RESULT
1. On SFCC 1 on electronics rack 92VU - Press flap wing tip brake test button (**LEFT WING** or **RIGHT WING** as required); keep button depressed until steps 2 thru 5 are completed.	On SFCC 1 front panel - Failure code **LH WTB (RH WTB)** appears after approx. 8 s.
2. Wait 10 s.	
3. On center pedestal - Move slat/flap control lever to **SLATS 15/FLAPS 15.**	Flaps do not move. Relevant system torque limiter in main landing gear compartment locks out On overhead panel 428VU - **FLAPS/SYS 1/FAULT** and **FLAPS/SYS 2/ FAULT** lights come on after approx. 4s. On SFCC 2 front panel - Failure code **JAM** appears after approx. 8s.
4. Check that torque limiters at flap screwjacks 3 and 4 are not locked out, if necessary reset lock-out indicator.	
5. On center pedestal - Return slat/flap control lever to **SLATS 20/FLAPS 20.**	On overhead panel 428VU - **FLAPS/SYS 1 FAULT** and **FLAPS/SYS 2/ FAULT** lights go off.
6. On SFCC 1 front panel - Release flap wing tip brake test button.	
7. Reset SFCC 1 and SFCC 2.	On SFCC 1 and SFCC 2 front panel - Failure codes disappear.
8. On center pedestal - Move slat/flap control lever to **SLATS 30/FLAPS 40** and then back to **SLATS 20/FLAPS 20.**	Flaps extend to 40° position and then retract to 20° on further selection.
9. After releasing the wing tip brake test button, the torque limiters of flap screwjacks 3 and 4 may lock out. If necessary reset lock-out indicator.	
10. Reset system torque limiter	

ACTION	RESULT
lock-out indicator.	
11.On SFCC 2 on electronics rack 93VU - Repeat steps 1 thru 10 using relevant flap wing tip brake test button.	As steps 1 thru 10 applicable to system 2.
12.On center pedestal - Move slat/flap control lever to SLATS 0/FLAPS 0.	Flaps move to fully retracted position.
13.ON maintenance panel 472VU - Set ANN LT switch to READ.	On maintenance panel 471VU - SFCC 1 and SFCC 2/BITE DISPLAY and all other memorized fault annunciators having stored a fault come on.
14.Record all indications other than SFCC 1 and SFCC 2/BITE DISPLAY which appear on maintenance panel 471VU.	
15.On maintenance panel 471VU - Press MFA RESET pushbutton switch to clear SFCC 1 and SFCC 2/BITE DISPLAY indication.	
16.On maintenance panel 472VU - Set ANN LT switch to OFF.	

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F. Close-Up

R (1)Inspect flap transmission shaft assemblies for cracks (Ref. 27-54-19, P. Block 601).

R NOTE : Do the inspection only on aircrafts with post SB 27-2092 and pre SB 27-2095.

R (2))Close main gear main door (Ref. 32-12-11, P. Block 301).

R (3)Depressurize GREEN, YELLOW and BLUE hydraulic systems and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).

R (4)De-energize the aircraft electrical network and disconnect electrical
R ground power unit (Ref. 24-41-00, P. Block 301).
R (5)Make certain that work area is clean and clear of tools and mis-
R cellaneous items of equipment.
R (6)Close access doors 581JB (681JB) and 121BL.
R (7)Remove safety clips and tags and close circuit breakers 3CV and 4CV.
R (8)Remove safety barriers.
R (9)Remove access platform.

WING TIP BRAKE (33CV, 34CV) - ADJUSTMENT/TEST

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reasons for the Job

A. To test correct functioning of each wing tip brake.

B. To check BLUE system and YELLOW system hydraulic supply to each wing tip brake.

C. To test bi-directional operation of each system torque limiter.

D. To check lock-out indication on each system torque limiter.

E. To test functioning of reverse selection capability of each system torque limiter.

F. Only applicable to test with wing tip brake (WTB) test tool:
To check for dormant failures of pressure-off brakes (POB).

NOTE : Operational test with test tool applies to flap and slat system.

2. Equipment and Materials

ITEM	DESIGNATION
A. 98A27508053002	Wing Tip Brake Test Tool
B.	Torch
C.	Circuit Breaker Safety Clips and Tags
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-51-00, P. Block 501	Mechanical and Electrical Control (Flaps)
- 27-51-18, P. Block 401	Slat/Flap Control Computer
R - 27-54-19, P. Block 601	Inspection of Flap Transmission Shaft
R	Assemblies for Cracks
- 27-56-13, P. Block 601	Wing Tip Brake (33CV, 34CV)
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)

- 27-86-13, P. Block 601 Wing Tip Brake (35CV, 36CV)
- 29-10-00, P. Block 301 Main Hydraulic Power - Pressurization/ Depressurization
- 32-12-11, P. Block 301 Main Gear Main Door - (Ground Door(s) Opening)

3. Procedure

A. Job Set-Up

(1)Open access door 121BL or 211PZ.

(2)Open one of the main gear main doors (Ref. 32-12-11, P. Block 301).

(3)On test with WTB test tool proceed as follows:

(a)Extend flaps and slats to FLAPS 15, SLATS 15 position (Ref. 27-50-00, P. Block 301 and 27-80-00, P. Block 301).

(b)Open access panel 147BZ.

(c)Position the wing tip brake test tool in the main landing gear bay and route the cable through access door 121BL to the slat/flap control computers 21CV and 22CV (SFCC1 and SFCC2) in electronic racks 92VU and 93VU.

(d)Remove both slat/flap computers (Ref. 27-51-18, P. Block 401).

(e)Connect wing tip brake test tool to aircraft connector 92VU in place of SFCC1.

(4)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(5)Make certain that electronics racks ventilation is correct.

(6)Pressurize GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).

(7)Make certain that following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS & SLATS/POS/ECAM	2CN	334/S65
133VU	FLT CTL/FLAPS & SLATS/POS/IND	1CN	334/S66
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/SLATS/WTB 2	14CV	336/Q64
133VU	FLT CTL/SLATS/WTB 1	13CV	336/Q65
133VU	FLT CTL/FLAPS/WTB 1	11CV	336/Q66
133VU	FLT CTL/FLAPS/WTB 2	12CV	336/Q67

(8)Make sure that pushbutton switches B, G and Y in SERVO CTL section of panel 428VU are pressed in (OFF legends are not on).

B. Operational Test of Flap and Slat Wing Tip Brakes, System Torque Limiters and Pressure-off Brakes with WTB test tool

NOTE : The following procedure is performed with only one hydraulic motor operative at any time.
Simultaneously with the wing tip brake (WTB) test it is possible to detect failures of the pressure-off brake (POB) by observing the following:
A failure of the POB associated with the inoperative motor will be indicated if the system torque limiter does not lock out, coupled with the transmission shafts not rotating (assuming system torque limiter is working correctly). This is due to the drive from the operative motor being transferred via the differential to the inoperative motor. Failure of the system torque limiter lock out, coupled with rotation of the transmission shafts, indicates WTB failure.

ACTION	RESULT
1. Place SELECTOR SWITCH on test tool in FLAP position.	FLAP indicator light on test tool comes on.
2. Note exactly the position of transmission shaft at the system torque limiter relative to fixed housing (Mark torque limiter and transmission shaft).	
3. Place WTB LH switch in ON position.	WTB LH indicator light comes on.
4. Select EXTENSION position of COMMAND SWITCH and maintain selection until torque limiter locks out.	Transmission shaft rotates (less than one revolution) until torque limiter locks out. No judder should occur within the power control unit and transmission shafts.
5. Select RETRACTION position of COMMAND SWITCH and maintain selection until shafts return to marked position. Reset the torque limiter lock-out indicator.	Marks made on torque limiter and transmission shafts are aligned.
6. Select RETRACTION position of COMMAND SWITCH and maintain selection until torque limiter locks out.	Transmission shaft rotates (less than one revolution) until torque limiter locks out. No judder should occur within the power control unit and transmission shafts.
7. Select EXTENSION position of COMMAND	Marks made on torque limiter and

ACTION	RESULT
SWITCH and maintain selection until shafts return to marked position. Reset the torque limiter lock-out indicator.	transmission shafts are aligned.
8. Place **WTB LH** switch in **OFF** position.	**WTB LH** indicator light goes off.
9. Repeat steps 2. thru 8. for **RH** wing tip brake.	
10. Place **SELECTOR SWITCH** on test tool in **SLAT** position.	**SLAT** indicator light comes on.
11. Taking test tool, enter air conditioning compartment.	
12. Repeat steps 2. thru 9. for slat system.	
13. Leave the test tool in air conditioning compartment.	
14. Open, safety and tag circuit breakers **1CN, 2CN, 1CV, 2CV, 3CV, 4CV, 5CV, 6CV, 7CV, 8CV, 9CV** and **10CV**.	
15. Disconnect test tool connector from **92VU** and connect to **93VU** (from **SFCC1** to **SFCC2**).	
16. Remove safety clips and tags and close circuit breakers **1CN, 2CN, 1CV, 2CV, 3CV, 4CV, 5CV, 6CV, 7CV, 8CV, 9CV** and **10CV**.	
17. Repeat steps 2. thru 9. for slat system.	
18. Place **SELECTOR SWITCH** on test tool in **FLAP** position.	**FLAP** indicator light comes on.
19. Repeat steps 2. thru 9. for flap system.	

C. Operational Test of Flap Wing Tip Brakes and System Torque Limiters with Slat/Flap Control Computers (SFCCs)
Initial Conditions:
- Torque limiter lock-out indicators of flap screwjacks 3 and 4 are in

neutral
- System torque limiter lock-out indicator is not visible
- SFCCs on electronic racks 92VU and 93VU are clear

ACTION	RESULT
1. Open, safety and tag circuit breakers 3CV and 4CV.	On overhead panel 428VU - SLATS/SYS 1/FAULT and SLATS/SYS 2/FAULT lights come on.
2. Extend flaps to 20° position (Ref. 27-50-00, P. Block 301).	
3. On SFCC 1 on electronic rack 92VU - Press flap wing tip brake test button LEFT WING; keep button depressed until steps 4 thru 7 are completed.	On SFCC 1 front panel - Failure code LH WTB appears after approx. 8s.
4. Wait 10s.	
5. On center pedestal - Move slat/flap control lever to SLATS 15/FLAPS 15.	Flaps do not move. Left system torque limiter in main landing gear compartment locks out. On overhead panel 428VU - FLAPS/SYS 1/FAULT and FLAPS/SYS 2/FAULT lights come on after approx. 4s. On SFCC 2 front panel - Failure code JAM appears after approx. 8s.
6. Check that torque limiters of left flap screwjacks 3 and 4 are not locked out, if necessary reset lock-out indicator.	
7. On center pedestal - Return slat/flap control lever to SLATS 20/FLAPS 20.	On overhead panel 428VU - FLAPS/SYS 1/FAULT and FLAPS/SYS 2/FAULT lights go off.
8. On SFCC 1 front panel - Release flap wing tip brake test button.	
9. Reset SFCC 1 and SFCC 2.	On SFCC 1 and SFCC 2 front panel - Failure codes disappear.
10. On center pedestal	Flaps extend to 40° position

ACTION	RESULT
- Move slat/flap control lever to SLATS 30/FLAPS 40 and then back to SLATS 20/FLAPS 20.	and then retract to 20° position on further selection.
11. After releasing the wing tip brake test button, the torque limiters of flap screwjacks 3 and 4 may lock out, if necessary reset lock-out indicator.	
12. Reset left system torque lock-out indicator.	
13. On SFCC 2 on electronic rack 93VU - Press flap wing tip brake test button LEFT WING; keep button depressed until steps 14 thru 17 are completed.	ON SFCC 2 front panel - Failure code LH WTB appears after approx. 8s.
14. Wait 10s.	
15. On center pedestal - Move slat/flap control lever to SLATS 30/FLAPS 40.	Flaps do not move. Left system torque limiter locks out. On overhead panel 428VU - FLAPS/SYS 2/FAULT and FLAPS/SYS 1/FAULT lights come on after approx. 4s. On SFCC 1 front panel - Failure code JAM appears after approx. 8s.
16. Check that torque limiters of left screwjacks 3 and 4 are not locked out, if necessary reset lock-out indicator.	
17. On center pedestal - Return slat/flap control lever to SLATS 20/FLAPS 20.	On overhead panel 428VU - FLAPS/SYS 2/FAULT and FLAPS/SYS 1/FAULT lights go off.
18. On SFCC 2 front panel - Release flap wing tip brake test button.	
19. Reset SFCC 1 and SFCC 2.	On SFCC 1 and SFCC 2 front panel

ACTION	RESULT
	- Failure codes disappear.
20. On center pedestal - Move slat/flap control lever to SLATS 15/FLAPS 15 and then back to SLATS 20/FLAPS 20.	Flaps retract to 15° position and then extend to 20° position on further selection.
21. After releasing the wing tip brake test button, the torque limiters of left flap screw-jacks 3 and 4 may lock out, if necessary reset lock-out indicator.	
22. Reset left system torque limiter lock-out indicator.	
23. Repeat steps 3 thru 22 for RH flap half system.	
24. Fully retract flaps (Ref. 27-50-00, P. Block 301).	
25. Remove safety clips and tags and close circuit breakers 3CV and 4CV.	On overhead panel 428VU - SLATS/SYS 1/FAULT and SLATS/SYSTEM 2/FAULT lights go off.
26. ON maintenance panel 472VU - Set ANN LT switch to READ.	On maintenance panel 471VU - SFCC 1 and SFCC 2/BITE DISPLAY and all other memorized fault annunciators having stored a fault come on.
27. Record all indications other than SFCC 1 and SFCC 2/BITE DISPLAY which appear on maintenance panel 471VU.	
28. On maintenance panel 471VU - Press MFA RESET pushbutton switch to clear SFCC 1 and SFCC 2/BITE DISPLAY indication.	
29. On maintenance panel 472VU - Set ANN LT switch to OFF.	

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R C. Close-Up
R (1)Inspect flap transmission shaft assemblies for cracks (Ref. 27-54-19, P. Block 601).
R NOTE : Do the inspection only on aircrafts with post SB 27-2092 and pre SB 27-2095.
R (2)Inspect wing tip brakes for leaks, cracks and security (Ref. 27-56-13, P. Block 601 and 27-86-13, P. Block 601).
R (3)After test with WTB test tool, proceed as follows:
R (a)Open, safety and tag circuit breakers 1CN, 2CN, 1CV, 2CV, 3CV, 4CV, 5CV, 6CV, 7CV, 8CV, 9CV and 10CV.
R (b)Disconnect WTB test tool connector from 93VU and install SFCC1 and SFCC2 (Ref. 27-51-18, P. Block 401).
R (c)Remove WTB test tool from aircraft.
R (d)Check that slat/flap control lever on center pedestal corresponds with slat/flap position.
R (e)Remove safety clips and tags and close circuit breakers 1CN, 2CN, 1CV, 2CV, 3CV, 4CV, 5CV, 6CV, 7CV, 8CV, 9CV and 10CV.
R (f)Check that all slat/flap FAULT lights on overhead panel are extinguished.
R (g)Carry out a BITE test for SFCC1 and SFCC2 (Ref. 27-51-00, P. Block 501).
R (h)Check operation of flaps and slats by extending or retracting to next selectable position.
R (j)Return flaps and slats to 0° position.
R (k)Close access panel 147BZ.
R (4)Close main gear main door (Ref. 32-12-11, P. Block 301).
R (5)Depressurize GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
R (6)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
R (7)Close access panel 121BL or 211PZ.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. General Visual Check

A. Reason for the Job

(1)General visual check of wing-tip brake, attachments and connections.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.9 m (13 ft.)
R (2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
(3)	Safety Barriers
(4)	Circuit Breaker Safety Clips and Tags

Referenced Procedure

- 27-50-00, P. Block 301 — Flaps

C. Procedure

(Ref. Fig. 601)

(1)Job Set-Up

(a)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).

R (b)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(c)Position access platform.

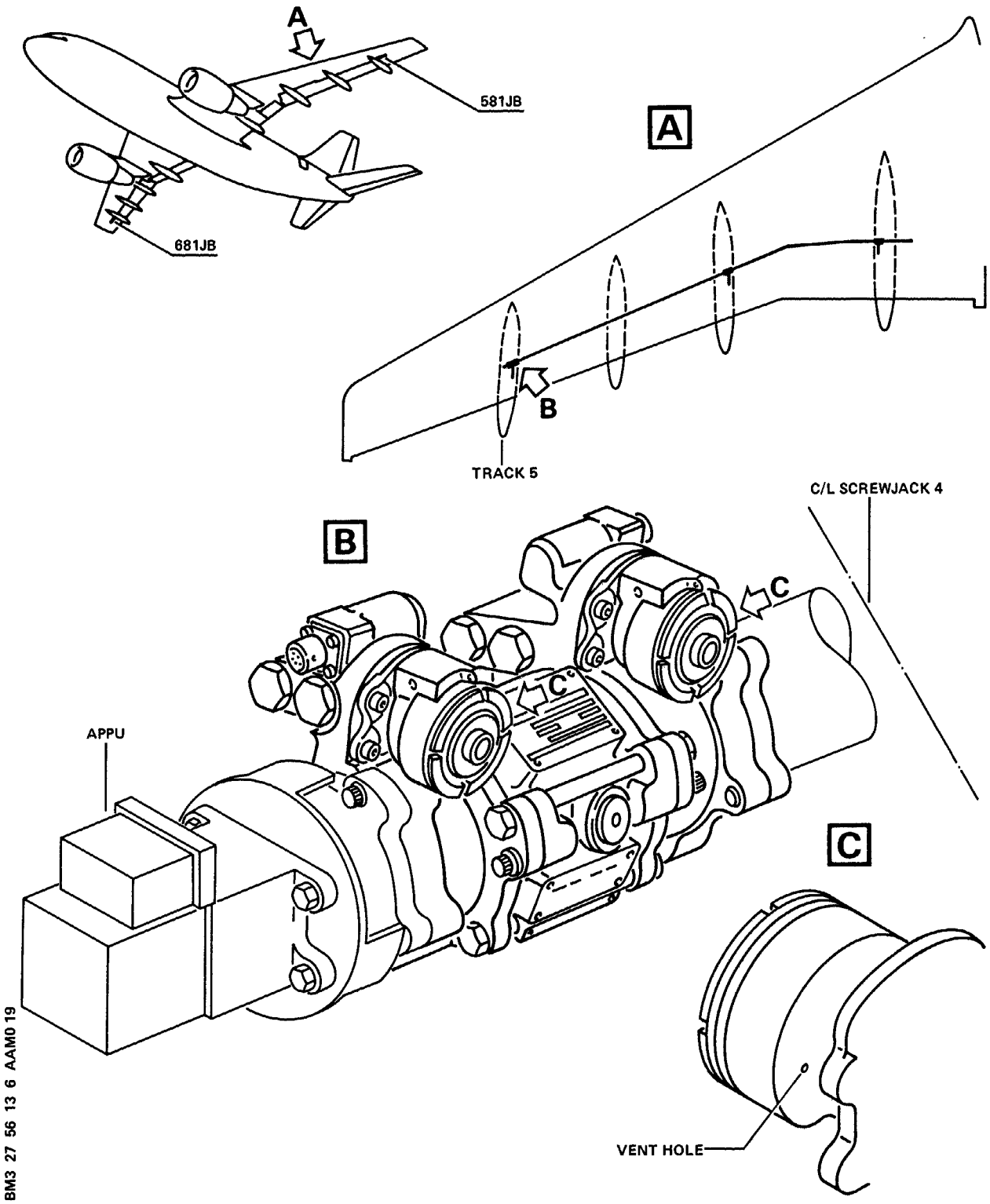
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(e)Open access doors 581JB (681JB).

(2)Inspection/Check

(a)Inspect wing-tip brakes for satisfactory condition (absence of



Wing Tip Brake
Figure 601

corrosion, cracks or other damage).

(b)At attachment points check that:
- all nuts and bolts are properly tightened
- all nuts, bolts and studs are in satisfactory condition (absence of corrosion).

(c)Check that bonding straps and attachment points are in satisfactory condition (absence of fraying or corrosion) and are correctly earthed.

(d)Check that electrical connectors are in satisfactory condition and are properly connected.

(e)Check that hydraulic connections are in satisfactory condition and are properly connected, and that there is no leakage of hydraulic fluid. Especially check vent hole in solenoid valves. Any fluid leakage at vent hole renders the solenoid valve unserviceable.

(f)Check for evidence of lubricant leakage. Any lubricant leakage renders the unit unserviceable.

(3)Close-Up

(a)Remove access platform.

(b)Remove safety clips and tags and close circuit breakers 5CV, 6CV and 10CV.

(c)Remove safety guard from flap/slat control lever.

(d)Retract Flaps to 0° position (Ref. 27-50-00, P. Block 301).

(e)Make certain that work area is clean and clear of tools and miscellaneous items of equipment, and close access doors 581JB (681JB).

(f)Remove safety barriers.

WING TIP BRAKE ADAPTER - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 5.2 m (17 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. LL517A034	Alignment Plug
	D. LL550A017	Alignment Plug
	E.	Safety Barriers
	F.	Circuit Breaker Safety Clips and Tags
	G. Material No. 04-004	Common Greases (Ref. 20-31-00)
	H. Material No. 05-002	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-56-11, P. Block 401	Asymmetry Position Pick-Off Unit
- 27-56-13, P. Block 401	Wing Tip Brake (33CV, 34CV)

2. Procedure

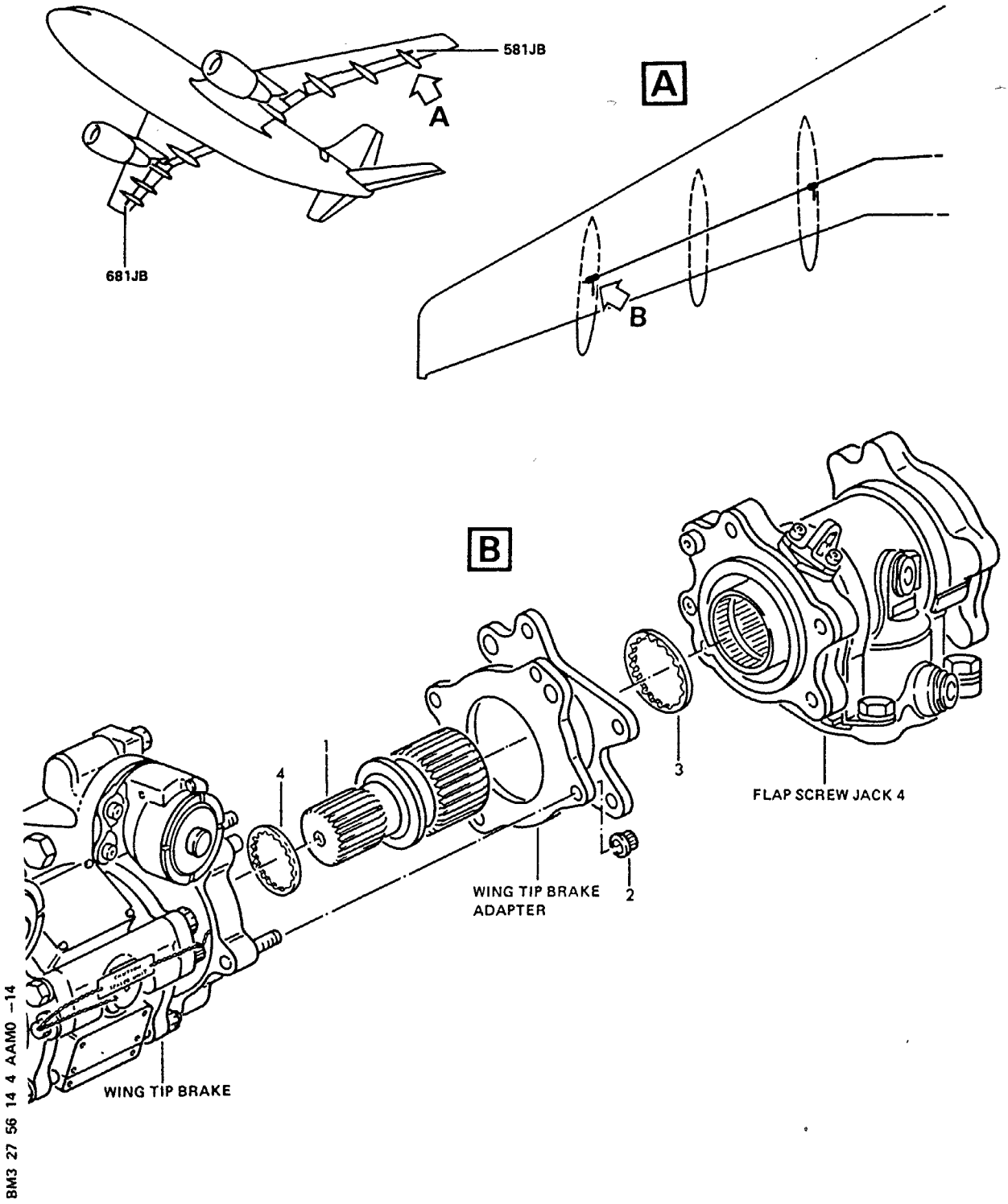
(Ref. Fig. 401)

A. Job Set-Up

(1)Position safety barriers.

(2)Extend flaps to 40° position (Ref.27-50-00, P. Block 301).

R (3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.



Adapter - Wing Tip Brake (Flaps)
Figure 401

(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(5)Position access platform.
(6)Open access doors 581JB (681JB)

B. Removal
(1)Remove asymmetry position pick-off unit (PPU) (Ref. 27-56-11, P. Block 401).
(2)Remove wing tip brake complete with PPU adapter and wing tip brake adapter (Ref. 27-56-13, P. Block 401).
(3)Remove nuts (2) and wing tip brake adapter from wing tip brake.
(4)Withdraw adapter quill shaft (1) from screwjack 4 or wing tip brake, remove adapter quill shaft (1).
(5)Remove and discard wiper rings (3),(4) from wing tip brake and flap screwjack 4.

C. Installation
(1)Install new wiper ring (4) in wing tip brake using alignment plug PN LL517A034.
(2)Install new wiper ring (3) in flap screwjack 4 using alignment plug PN LL550A017.
(3)Apply anti-corrosion compound (Material No. 05-002) to wing tip brake and wing tip brake adapter mating surfaces.
(4)Position wing tip brake adapter on wing tip brake and install nuts (2).
(5)Lubricate splines of adapter quill shaft with synthetic grease (Material No. 04-004).
(6)Install adapter quill shaft (1) in screwjack 4.
(7)Install wing tip brake complete with PPU adapter and wing tip brake adapter (Ref. 27-56-13, P. Block 401).
(8)Install asymmetry PPU (Ref. 27-56-11, P. Block 401).

E. Close-Up
(1)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 5CV, 6CV and 10CV.
(2)Remove safety guard from flap/slat control lever quadrant.
(3)Retract flaps to 0° position (Ref. 27-50-00, P. Block 301).
(4)Make certain that work area is clean and clear of tools and miscellaneous items of equipment and close access doors.
(5)Remove safety barriers.
(6)Remove access platform.

VANE JAM DETECTOR UNIT (37CV-A,38CV-A,39CV-A,40CV-A,41CV-A,42CV-A) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTANT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3.5 m (11 ft.)
	B. 98A27508036000	Rigging Pin - Vane Jam In Detector
R	C. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	D.	Safety Barriers
	E.	Electrical Blanking Caps
	F.	Circuit Breaker Safety Clips and Tags
	G.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	H. Material No. 05-002	Special Materials (Ref. 20-31-00)
	I. Material No. 05-005	Special Materials (Ref. 20-31-00)
	J. Material No. 09-005	Sealants (Ref. 20-31-00)

Referenced Procedures

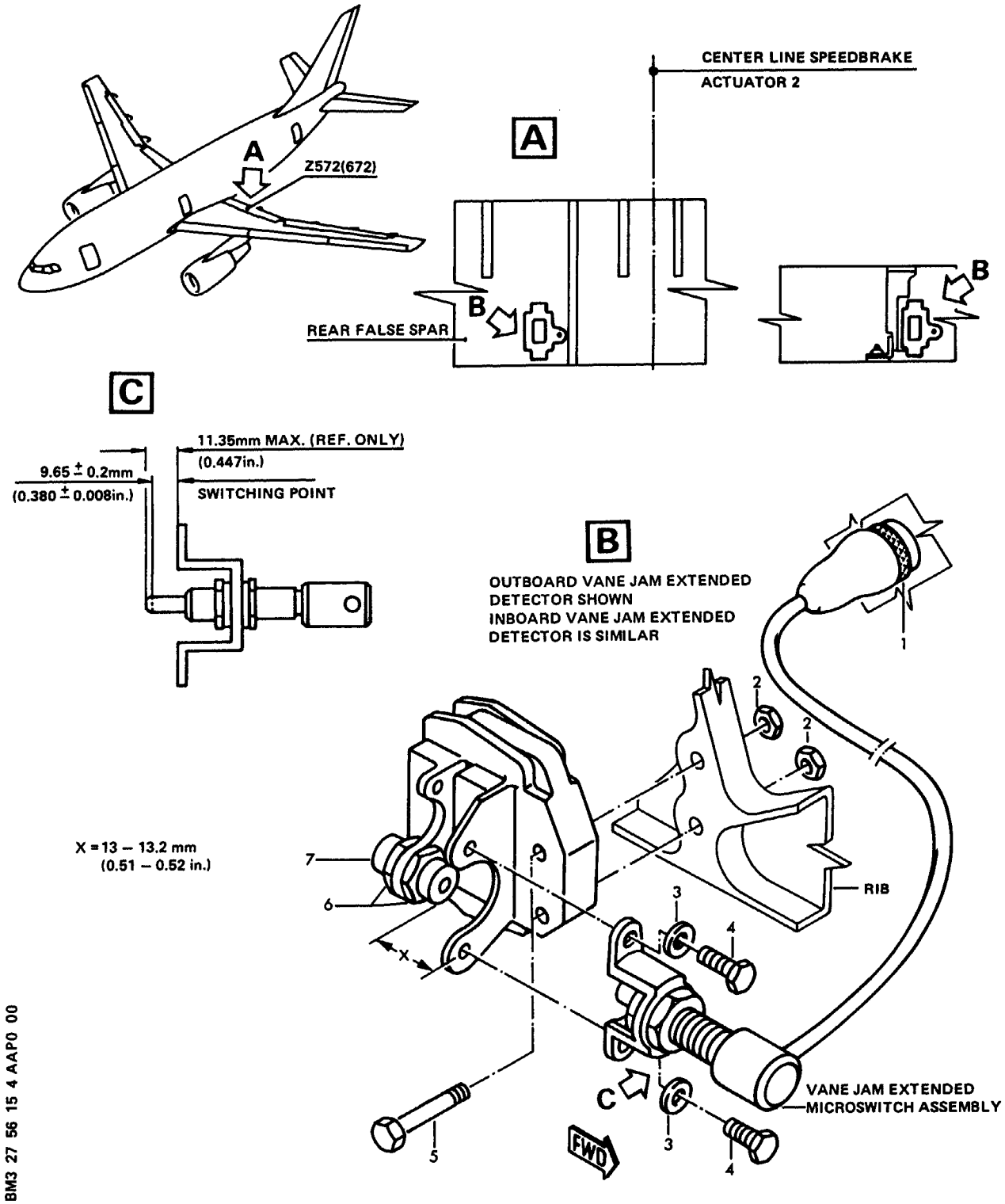
- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-54-00, P. Block 501	Hydraulic Actuation and Power Transmission (Flaps)
- 27-56-15, P. Block 501	Vane Jam Detector Unit

2. Procedure

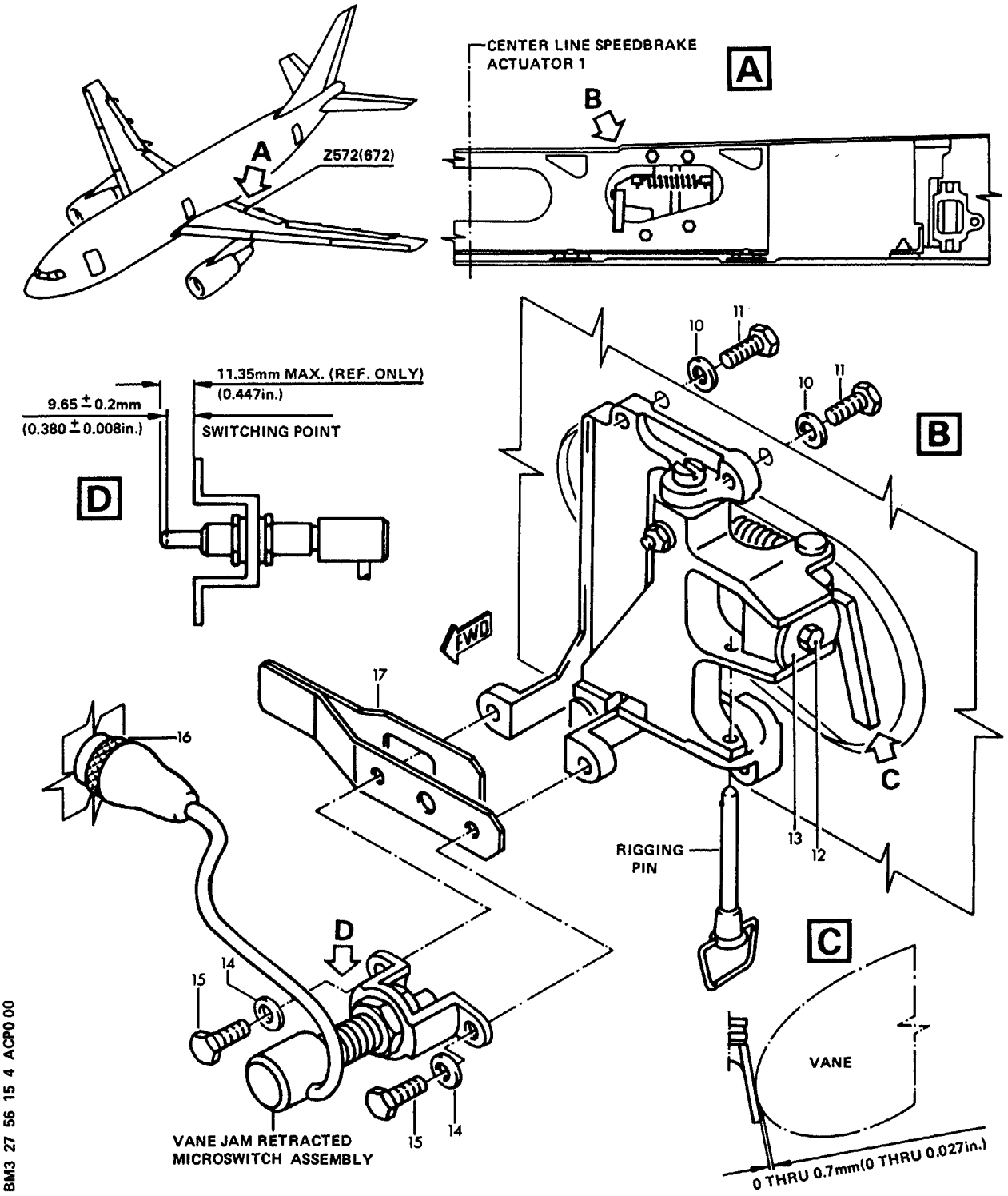
(Ref. Fig. 401)
(Ref. Fig. 402)

A. Job Set-Up

(1)Position safety barriers.
(2)Extend flaps to 15° position (Ref. 27-50-00, P. Block 301).
R (3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)Open, safety and tag the following circuit breakers:



Vane Jam Extended Detector Units
Figure 401



Vane Jam Retracted Detector Unit
Figure 402

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(5)Remove access panels 572CB (672CB), 572DB (672DB) and 574AB (674AB).

B. Removal of Inboard and Outboard Vane Jam Extended Detectors
(1)Disconnect electrical connector (1) and fit blanking caps.
(2)Remove bolts (5) and nuts (2).
(3)Remove vane jam extended detector.

C. Installation of Inboard and Outboard Vane Jam Extended Detectors
NOTE : Nuts must be installed on inboard side of rib.
(1)Position vane jam extended detector on rib.
(2)Install bolts (5) and nuts (2) and tighten.
(3)Remove electrical blanking caps and connect electrical connector (1).

D. Removal of Vane Jam Retracted Detector Complete
(1)Disconnect electrical connector (16) and fit blanking caps.
(2)Remove bolts (11) and washers (10).
(3)Remove vane jam retracted detector.

E. Installation of Vane Jam Retracted Detector Complete
(1)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of vane jam retracted detector.
(2)Position vane jam retracted detector on spar and install rigging pin PN 98A27508036000.
(3)Install washers (10) and bolts (11) and tighten.
(4)Remove electrical blanking caps and connect electrical connector (16).

F. Removal of Vane Jam Retracted Microswitch Assembly Only
(1)Disconnect electrical connector (16) and fit blanking caps.
(2)Remove bolts (15) and washers (14).
(3)Remove microswitch with bracket complete and sheet metal (17).

G. Installation of Vane Jam Retracted Microswitch Assembly Only
(1)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of vane jam retracted microswitch.
(2)Position microswitch complete with bracket and sheet metal (17) on detector assembly.
(3)Install washers (14) and bolts (15) and tighten.
(4)Remove blanking caps and connect electrical connector (16).

H. Removal of Vane Jam Extended Microswitch Assembly Only
(1)Disconnect electrical connector (1) and fit blanking caps.
(2)Remove bolts (4) and washers (3).
(3)Remove microswitch and bracket complete.

J. Installation of Vane Jam Extended Microswitch Assembly Only

(1)Measure dimension 'X' (13 - 13.2 mm (0.51 - 0.52 in.)). If dimension is out of limits proceed as follows:

(a)Loosen lock nuts (6) and turn bush (7) to achieve dimension 'X'.

(b)Tighten lock nuts (6) and safety with lockwire corrosion resistant steel, dia. 0.8 mm (0.032 in.).

(c)Apply sealant (Material No. 09-005) to the lock nuts (6) and bush (7).

(2)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of vane jam extended microswitch.

(3)Position microswitch complete with bracket on detector assembly.

(4)Install washers (3) and bolts (4) and tighten.

(5)Remove blanking caps and connect electrical connector (1).

K. Adjustment/Test

R (1)Vane Jam Detectors

(a)Check that the clearance between the vane and the vane jam retracted detector is between 0.0 and 0.7 mm (0.0 and 0.027 in.). If necessary, adjust as written below.

R 1 Cut and remove lockwire if necessary.
R 2 Loosen bolt (12) and disengage serrated washer (13).
R 3 Position detector fully back.
R 4 Engage serrated washer (13) and hand-tighten bolt (12).
R 5 Remove rigging pin PN 98A27508036000.
R 6 Remove safety clips and tags and close circuit breakers 5CV, 6CV, and 10CV.
R 7 Remove safety guard from flap/slat control lever quadrant.
R 8 Retract flaps to "0" position (Ref. 27-50-00, P. Block 301).
R 9 Install rigging pin PN 98A27508036000.
R 10 Adjust clearance between vane and vane jam retracted detector to between 0.0 and 0.7 mm (0.0 and 0.027 in.).
R 11 Tighten bolt (12).
R 12 Apply corrosion preventive (Material No. 05-005) to bolt (12).
R 13 Safety with lockwire.
R 14 Remove rigging pin PN 98A27508036000.

R (b)If not removed before, remove rigging pin PN 98A27508036000.

R (c)Carry out operational test of appropriate vane jam extended detector (Ref. 27-56-15, P. Block 501).

R (d)Carry out operational test of flaps system (Ref. 27-54-00, P. Block 501).

R (2)Vane Jam Retracted and Vane Jam Extended Microswitch Assemblies Only

NOTE : The microswitch/bracket assemblies are delivered preset for installation without further adjustment. Adjustment information is included for reference (Ref. Fig. 401, 402).

(a)Carry out operational test of flap system (Ref. 27-54-00, P. Block 501).

(b)For vane jam extended microswitch only:
Carry out operational test of appropriate vane jam extended detector (Ref. 27-56-15, P. Block 501).

L. Close-Up
(1)Install access panels.
(2)Remove access platform.
(3)Remove safety barriers.

VANE JAM DETECTOR UNIT (37CV-A,38CV-A,39CV-A,40CV-A,41CV-A,42CV-A) - ADJUSTMENT/TEST

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SURFACES THEY OPERATE.

1. Reason for the Job

A. Perform operational test to make certain there are no dormant faults in the vane jam out detection system.

2. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3.5 m (11 ft.)
	B. 98A27508035000	Test Plunger - Vane Jam Out Detector
R	C. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	D.	Safety Barriers
	E.	Warning Notice Prohibiting Pressurization of Hydraulic System

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps

3. Procedure

A. Job Set-Up

(1)Position safety barriers.

(2)Extend flaps to 15° position (Ref. 27-50-00, P. Block 301).

R (3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(4)Position warning notice prohibiting pressurization of hydraulic systems.

(5)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(6)Make certain that electronics racks ventilation is correct.

(7)Make certain that following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(8)Position access platform.

(9)Open access door 121BL or 211PZ.

B. Operational Test

ACTION	RESULT
1. On electronic rack 90VU - Press and release RESET button on SFCC 1 and SFCC 2. (Record any fault codes).	On electronic rack 90VU - All fault codes on SFCC 1 and SFCC 2 clear.
2. On maintenance panel 472VU - Set ANN LT switch to READ position.	On maintenance panel 471VU - If any fault codes were present at step 1, SFCC 1 and SFCC 2/ BITE DISPLAY indicators come on.
3. On maintenance panel 471VU - Press and release MFA RESET button.	On maintenance panel 471VU - SFCC 1 and SFCC 2/BITE DISPLAY indicators go off.
4. Insert test plunger in the socket of LH inboard buffer and depress microswitch.	On maintenance panel 471VU - SFCC 1 and SFCC 2/BITE DISPLAY indicators come on. On electronic rack 90VU - LH VANE OUT fault codes appear on SFCC 1 and SFCC 2.
5. Release microswitch and remove test plunger.	
6. On electronic rack 90VU - Press and release RESET button on SFCC 1 and SFCC 2.	On electronic rack 90VU - LH VANE OUT fault codes on SFCC 1 and SFCC 2 clear.
7. On maintenance panel 471VU - Press and release MFA RESET button	On maintenance panel 471VU - SFCC 1 and SFCC 2/BITE DISPLAY indicators go off.
8. Repeat steps 4 thru 7 for: - LH outboard switch - RH inboard switch - RH outboard switch.	Analog results to steps 4 thru 7
9. On maintenance panel 472VU - Set ANN LT switch to OFF position.	

C. Close-Up
(1)Remove safety guard from flap/slat control lever quadrant.
(2)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(3)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(4)Close access door 121BL or 211PZ.
(5)Remove safety barriers.
(6)Remove warning notice.
(7)Remove access platform.

VANE JAM DETECTOR UNIT (37CV-A,38CV-A,39CV-A,40CV-A,41CV-A,42CV-A) - INSPECTION/CHECK

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.7 m (9 ft.)
B.	Safety Barriers
R C. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
D.	Circuit Breaker Safety Clips and Tags

Referenced Procedures

- 27-50-00, P. Block 301	Flaps
- 27-56-15, P. Block 401	Vane Jam Detector Unit

2. Procedure

A. Job Set-Up

(1)Position safety barriers.

WARNING : MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.

(2)Extend flaps to 15° position (Ref. 27-50-00, P. Block 301).

R (3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(4)Position access platform.

(5)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

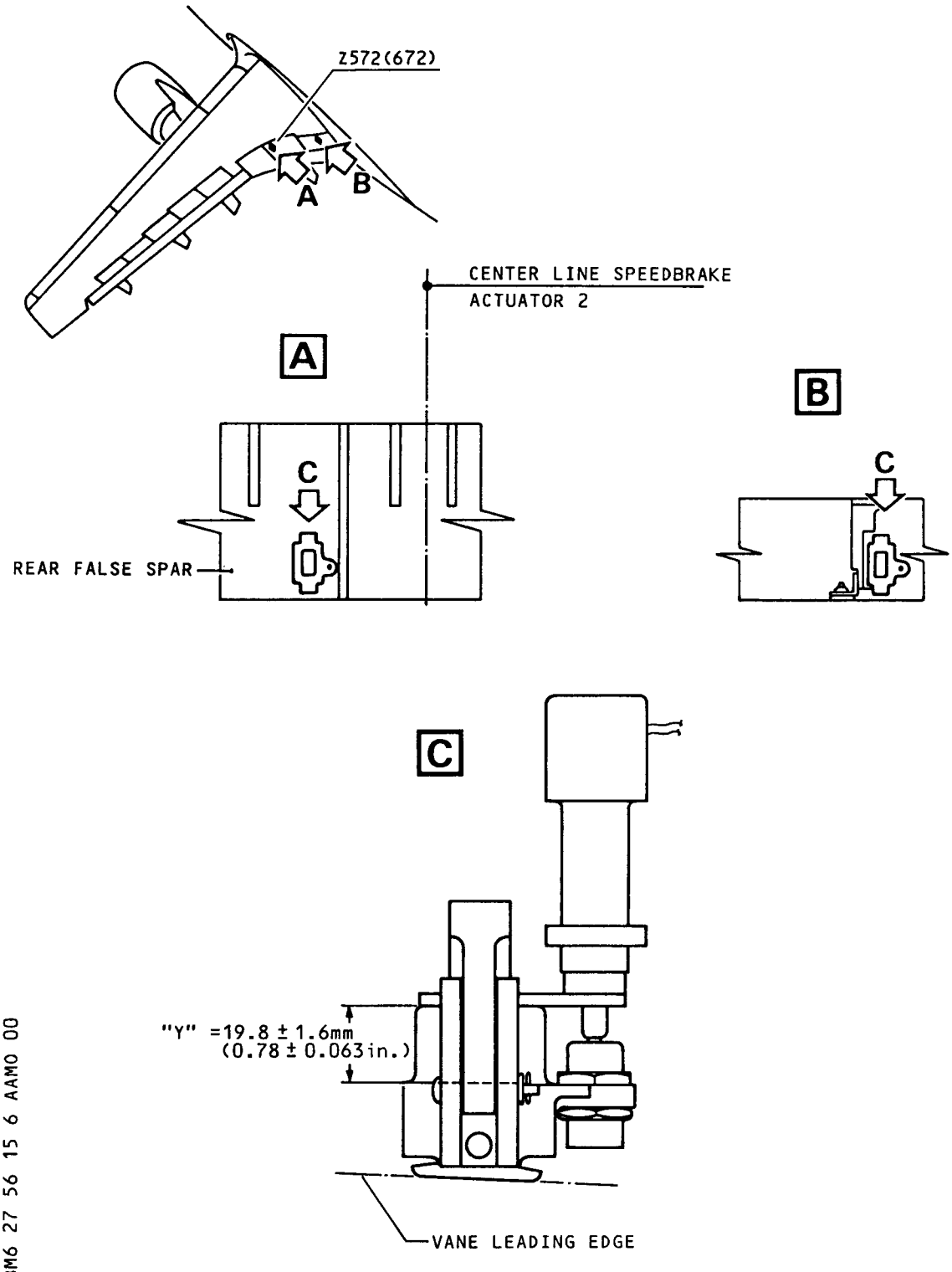
B. Inspection

(1)Inspect vane jam detector units for satisfactory condition (no corrosion, cracks or other damage).
R (2)For vane jam extended detector units:
R (Ref. Fig. 601)
R (a)Measure gap 'Y' = 19.8±1.6mm (0.78±0.063 in.).
R (b)If gap 'Y' is out of limits replace vane jam extended detector units (Ref. 27-56-15, P. Block 401).
R (3)At attachment points check that:
R - all nuts and bolts are properly tightened and safetied
R - all nuts and bolts are in satisfactory condition (no corrosion).
R (4)Check detector linkages for satisfactory condition (no corrosion, cracks or other damage).
R (5)Check that the electrical connectors are in satisfactory condition and properly connected.

R C. Close-Up
R (1)Close circuit breakers 5CV, 6CV and 10CV.
R (2)Remove safety guard from flap/slat control lever quadrant.

R WARNING : MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.

R (3)Retract flaps (Ref. 27-50-00, P. Block 301).
R (4)Remove access platform.
R (5)Remove safety barriers.
R (6)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.



BM6 27 56 15 6 AAM0 00

Vane Jam Extended Detector Units
Figure 601

R

SPOILERS AND SPEED BRAKES - OPERATION AND DESCRIPTION

1. General

(Ref. Fig. 001, 002)

Seven spoilers numbered 1 through 7 inboard to outboard are provided on the upper surface of each wing. They are used for three functions : roll, speed brake and ground spoiler.

Spoilers 3 through 7 assist the ailerons in roll control (ref. 27-11).

Spoilers 1 through 4 ensure speed brake control (Ref. 27-61).

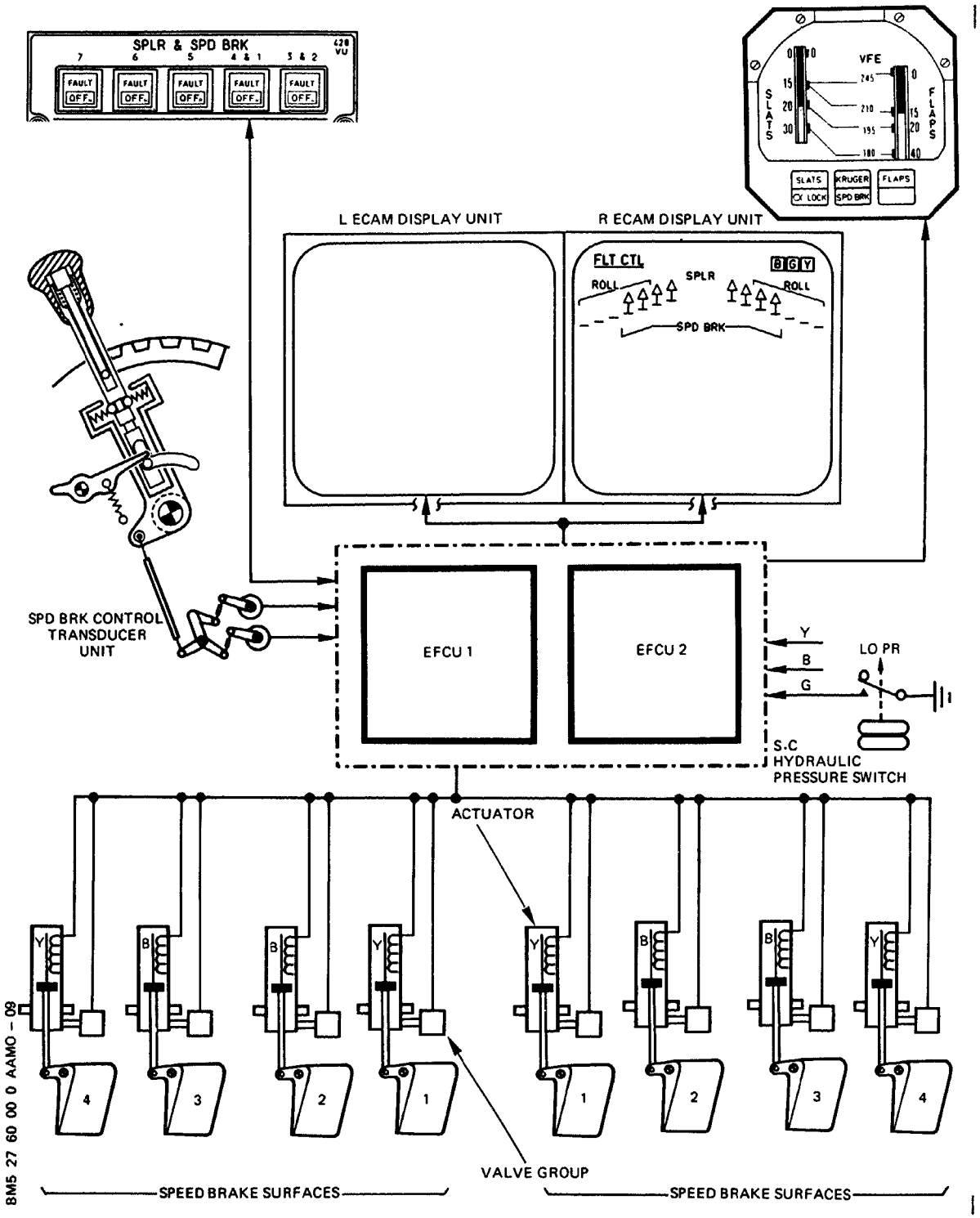
All the spoilers are used for ground spoiler control (Ref. 27-61).

Speed brake control is initiated by means of a control lever on the center pedestal. The lever transmits commands to the EFCU through a transducer unit.

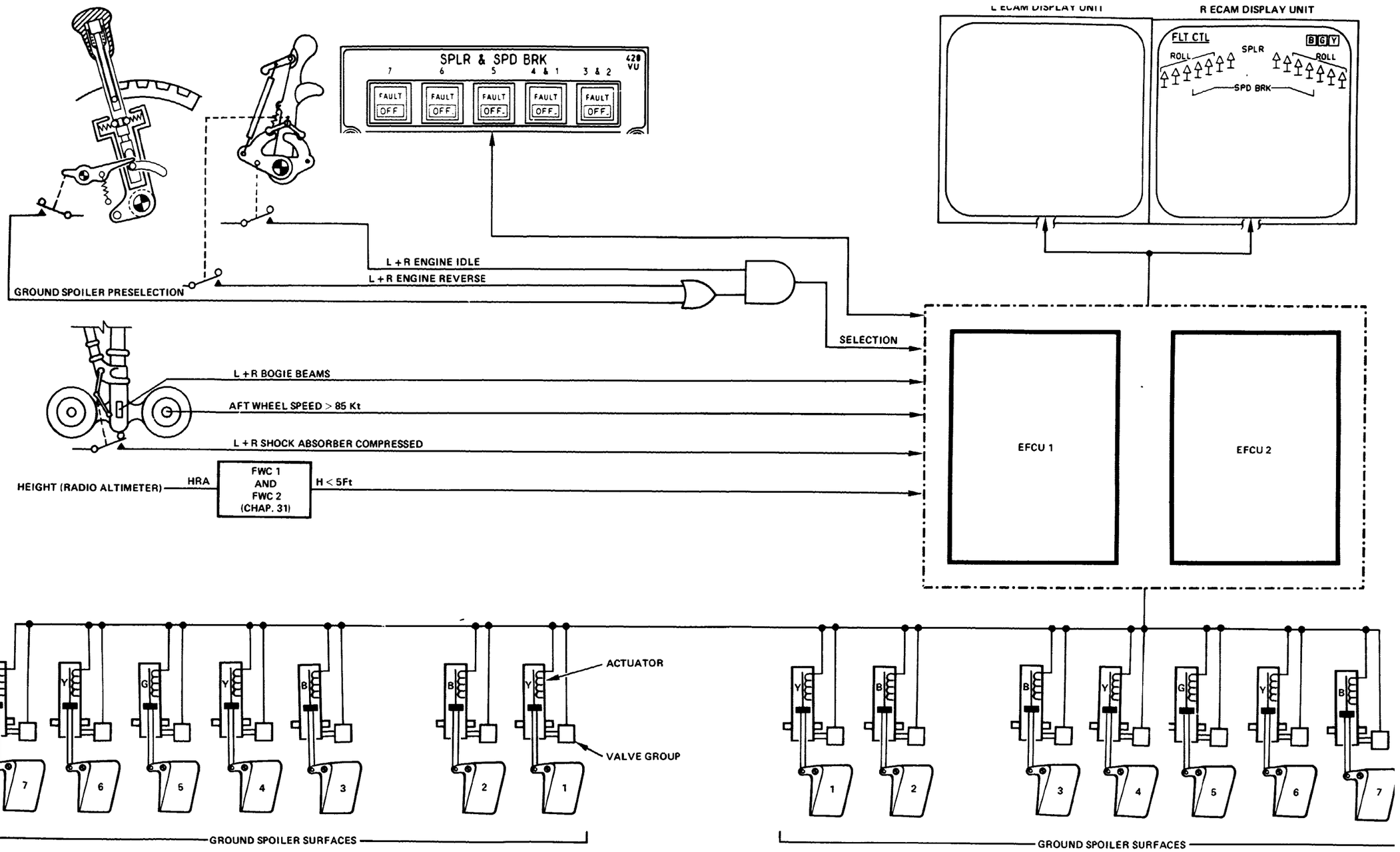
Ground spoiler control is entirely automatic.

All spoilers are electrically controlled (Ref. 27-61), and are each hydraulically actuated by a servo control consisting of an actuator and valve group (Ref. 27-64).

The position of all surfaces is indicated on the right ECAM display unit (Ref. 27-65).



Speed Brake - Block Diagram
Figure 001



Ground Spoiler - Block Diagram
Figure 002

1. Extension - Retraction of Spoilers

A. Reason for the Job
Extension of spoilers for maintenance purposes.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27608013000	Safety Collar Set - Spoiler/Actuator Piston
(2)98A27608014000	Safety Collar Set - Airbrake Actuator Piston
(3)	Access Platform 6 m (19 ft. 8 in.)
(4)	Warning Notices
Referenced Procedures	
- 27-50-00, P. Block 301	Flaps.
- 27-64-12, P. Block 401	Valve Group-Spoiler
- 27-64-13, P. Block 401	Valve Group-Spoiler

C. Procedure
(1)Spoilers extension
(a)Fully extend flaps (Ref. 27-50-00, P. Block 301)
CAUTION : MAKE CERTAIN THAT GREEN, BLUE AND YELLOW HYDRAULIC POWER SYSTEMS ARE DEPRESSURIZED AND THAT GREEN ELECTRIC PUMPS ARE OFF.
(b)Display warning notices.
(c)Position access platform
(d)Open access doors as applicable.

SPOILER	ACCESS DOOR
- Spoiler 1	572BB(672BB)
- Spoiler 2	572DB(672DB)
- Spoiler 3	581CB(681CB)
- Spoiler 4	581DB(681DB)
- Spoiler 5	581FB(681FB)
- Spoiler 6	581GB(681GB)
- Spoiler 7	581JB(681JB)

(e)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLAPS/SYS1/26VAC	1CV	335/R61
133VU	FLAPS/SYS2/26VAC	2CV	334/S62
133VU	SFCC/NORM/SUPPLY/FLAPS/SYS1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SY2	6CV	331/V61
133VU	SFCC/LAND RECOVERY/SUPPLY/FLAPS/SYS1	10CV	335/R67
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR 2 & 3	5CP	335/R63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/ 6 & 7	7CP	335/R62
133VU	EFCU/NORM/SUPPLY/SPLR 2 & 3	8CP	333/T62

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/LAND RECOVERY/NORM SUPPLY/SPLR 6 & 7	9CP	333/T66
133VU	EFCU/NORM/SUPPLY/SPLR 6 & 7	10CP	332/U62
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR 1 & 4	53CP	334/S63
133VU	LAND/RECOVERY/SUPPLY/SPLR 1 & 4 & 6 & 7	54CP	334/S67
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/5	55CP	334/S64
133VU	EFCU/NORM/SUPPLY/SPLR5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM/SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	EFCU/LAND RECOVERY/SUPPLY/SPLR 1 & 4	72CP	333/T67

(f)Turn maintenance device on applicable valve group to maintenance position M (Ref. 27-64-12 and 27-64-13, P. Block 401).
NOTE : Maintenance device will return to normal operating position when hydraulic system is pressurized.
(g)Manually extend applicable spoiler.
(2)Installation of safety collar set
(a)Install tool 98A27608013000 on spoiler actuator (5 to 7)
(b)Install tool 98A27608014000 on spoiler actuator (1 to 4).

D. Close-Up
(a)Remove tool 98A27608013000 from each spoiler actuator (5 to 7)
(b)Remove tool 98A27608014000 from each spoiler actuator (1 to 4).
(c)Fully retract spoilers by hand.
(d)Remove safety clips and tags and close circuit breakers opened in step C(e).
(e)Close access doors opened in step C(d).
(f)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(g)Remove warning notices.
(h)Remove access platform.

WARNING: CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. General Visual Inspection of Actuators and Hydraulic Lines

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2 to 6 m (6 ft. 7 in. to 19 ft. 8 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-00, P. Block 601	Mechanical Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics racks ventilation is correct.

(b)Pressurize Green hydraulic system
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green electric pumps (Ref. 29-21-00, P. Block 301)

WARNING: MAKE CERTAIN THAT FLAP AND SLAT TRAVEL RANGE IS CLEAR.

(c)Place flap and slat control lever in fifth notch position.

(d)Depressurize Green hydraulic system.

(e)Install access platform.

(f)Open one main gear door (Ref. 32-12-11, P. Block 301).

(g)Open access doors 572(672)CB, 572(672)GB, 581(681)CB, 581(681)DB, 581(681)EB, 581(681)FB, 581(681)HB, 581(681)JB, 581(681)BB.

(2)Check

Note : Each spoiler is actuated by one actuator, which receives control inputs from one valve group.
Each valve group is installed separated from its actuator, the hydraulic connection being made by two rigid pipes.
All elements shall be inspected, actuator, valve group and pipes.

(a)At all attachment and hinge fittings, check that:
- all nuts and bolts are fully tightened
- all safetying devices (cotter pins, lock plates, lockwire) are correctly installed.

(b)Check that pins, bolts, washers, nuts are in satisfactory condition (no oxidation).

(c)Make certain that identification placards are correctly fixed.

(d)Make certain that bonding jumpers are in fully satisfactory condition.

(e)Check hose clamps for correct diameter, satisfactory condition and correct installation. Check that there are no signs of wear on hoses at any attachment points due to vibration, pressure surges, etc...

(f)Check that hoses are correctly positioned:
- that there is no friction with other lines, bulkheads or components
- that hoses are not twisted.

(g)Check pipes for deformation, incipient cracks and dents especially at elbows and at unions connecting pipes to components.

(h)Check that there is no possibility of metal parts, clamps or rails causing damage to pipes at attachment points.

(j)Make certain that pipe supports and clamps are correctly tightened.

(k)Check condition of hydraulic equipment attach fittings and of safety devices.

(l)Check for fluid leakage in the areas where hydraulic equipment is installed.

(m)Check condition of fork and eye joints on components actuated mechanically.

(3)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Close access doors and remove access platform.

(c)Pressurize Green hydraulic system.

WARNING: MAKE CERTAIN THAT FLAP AND SLAT TRAVEL RANGE IS CLEAR.

(d)Place flap and slat control lever in first notch position.

(e)Close main gear door (Ref. 32-12-11, P. Block 301).

(f)Shut down pressurization of Green hydraulic system. If applicable, disconnect hydraulic ground power cart.

(g)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

ELECTRICAL AND MECHANICAL CONTROL (SPOILERS AND SPEEDBRAKES) DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001)

A. Spoiler Functions

The fourteen spoilers are electrically signalled. They are used for :

(1)Roll control (spoilers 3 through 7)

(2)Speed brake control (spoilers 1 through 4)

(3)Ground spoiler control (all spoilers, 1 through 7).

Each spoiler is servoed by one servo control consisting of an actuator and a separate valve group (Ref. 27-64).

B. Control Input

The Captain's and First Officer's control wheels each drive a roll control transducer unit (Ref. Para. 4).

The SPEED BRAKE control lever drives (Ref. Para. 5) :

(1)A speed brake control transducer unit

(2)Ground spoiler preselection microswitches.

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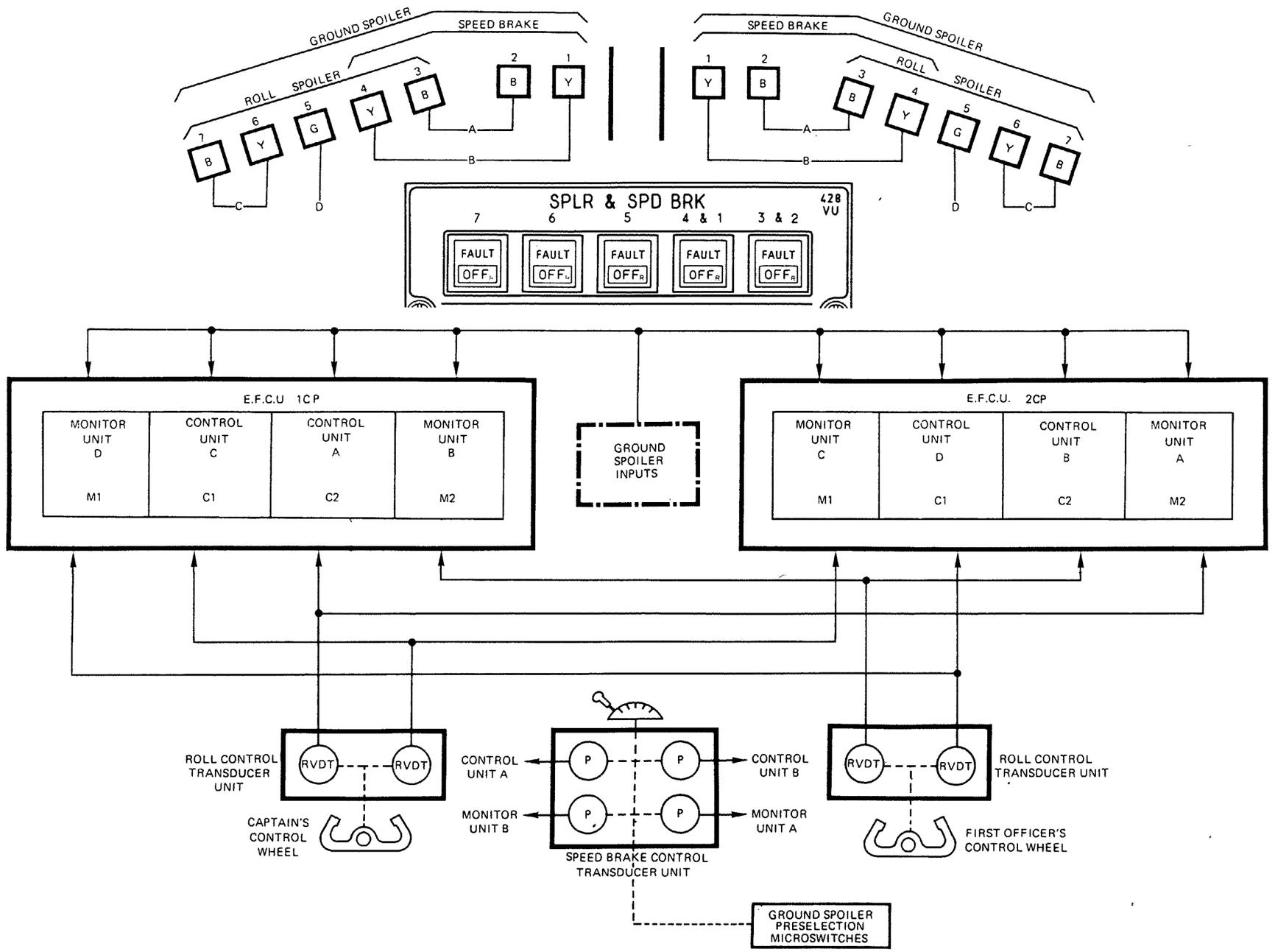

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Electrical Flight Control System Arrangement
Figure 001

C. Electrical Flight Control Units (EFCU) (Ref. Fig. 002)

(1)Two identical digital computers designated Electrical Flight Control Units (EFCU) control and monitor all the servo controls. Each EFCU is composed of two control units and two monitor units.
Each unit controls or monitors one group (A, B, C, D) of servo controls. For a given group of servo controls, the control unit is located in one EFCU, the monitor unit in the other EFCU.
In addition, the EFCUs achieve :

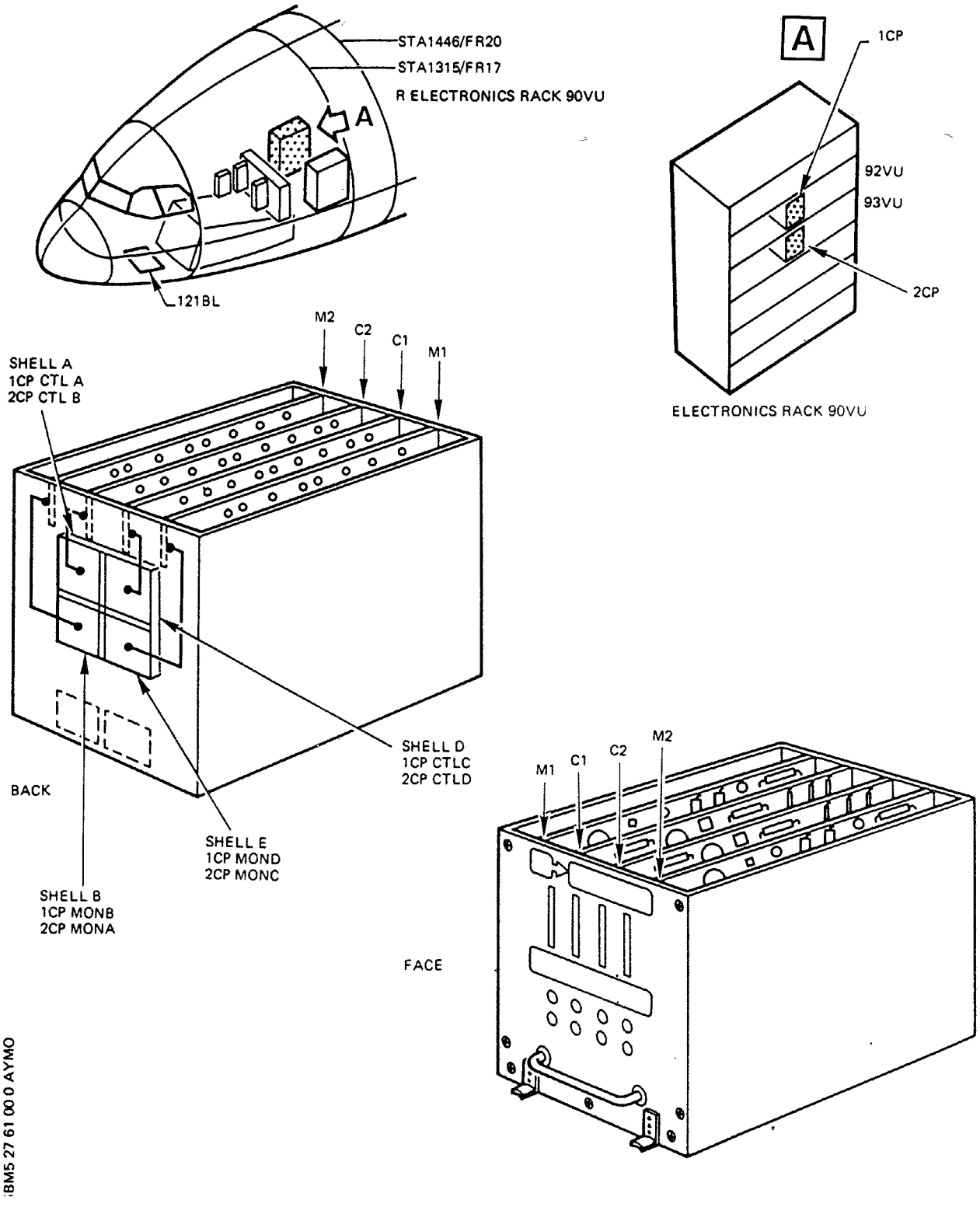
(a)Rudder trim reset (Ref. 27-22)

(b)Pitch uncoupling solenoid control (Ref. 27-31).

UNIT INVOLVED	EFCU 1CP	EFCU 2CP
Control Unit C2	Group A Control	Group B Control
Control Unit C1	Group C Control	Group D Control + Rudder Trim Reset
Monitor Unit M2	Group B Monitor	Group A Monitor
Monitor Unit M1	Group D Monitor + Rudder Trim Reset + Pitch uncoupling solenoid control	Group C Monitor + Pitch uncoupling solenoid control

(2)Each control or monitor unit is composed of a single board digital computer. All the control unit boards are identical and all the monitor unit boards also.
The specific functions performed by each board depend on its location inside the EFCU and location of the EFCU itself (Pin programming).
Each board is connected to an ARINC 600 connector shell by a specific wire bundle (no electrical connection between boards inside the EFCU).

(3)Each EFCU aids maintenance to identify failed spoiler system components by means of LED lights on the EFCU face (Ref. para. 6).



EFCU Installation and Arrangement
Figure 002

D. Control Panel

Five pushbutton switches are located on the overhead panel.
Each pushbutton switch is associated with one or two pairs of symmetrical spoilers :

- spoilers 1 and 4, left and right
- spoilers 2 and 3, left and right
- spoiler 5, left and right
- spoiler 6, left and right
- spoiler 7, left and right

Each pushbutton switch is of the push on/push off type (mechanical latching) with two legends, FAULT and OFF/R.
There are two lamps per legend.
Operation :
The pushbutton switches are normally in :

(1) If a failure is detected either by a control unit or a monitor unit, the corresponding FAULT legend comes on; simultaneously the servo controls involved are disengaged.

(2) If the operator presses the switch to release it, the FAULT legend goes off (if previously on) and the OFF/R legend comes on.
Simultaneously the servo controls involved are disengaged.
For spoilers 1 and 2 solenoid valve is activated even when servo controls are disengaged and spoiler surfaces are secured in retracted position.

(3) If the operator presses the pushbutton switch in again a safety BITE test is triggered by the control and monitor units involved.

(4) If the failure is no longer detected by the EFCU, the servo controls are re-engaged.
FAULT and OFF signals are sent to the ECAM system.

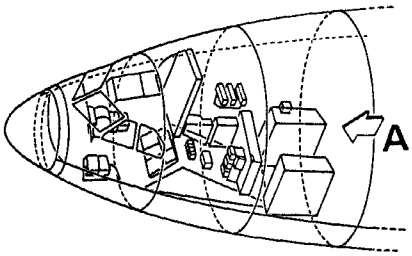
E. Spoiler Wire Routing

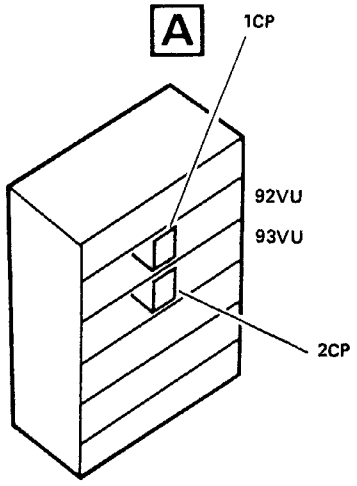
Group A and C wiring is routed in route 1, group B and D wiring in route 2.

- Spoiler wire routing is diverted up through the upper part of the fuselage from FR33 to FR47, to prevent loss of the electrical control simultaneously with the other mechanical controls in the event of an engine burst.
- Protection of wiring against lightning :
  . All the signals between the servo controls and the EFCUs are routed by twisted pairs of wires, without using the airframe as a current return (including 26VAC transducer supply).
  . In the wing leading edge, not all the wiring is totally enclosed inside the aluminum structure. It is consequently routed in metallic conduits which are electrically bonded to the structure at both ends.

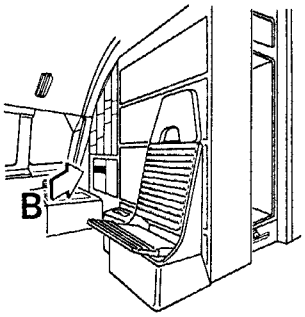
2. Component Location
(Ref. Fig. 003, 004)
(Ref. Fig. 005)

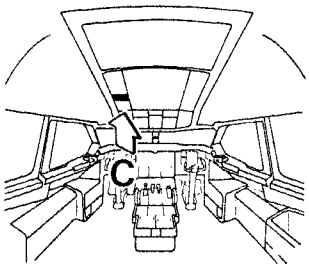
	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
		CONTROL LEVER-SPEEDBRAKE	9VU	211		27-61-11
		SPOILER1-L		573		27-61-54
		SPOILER1-R		673		27-61-54
		SPOILER2-L		578		27-61-54
		SPOILER2-R		678		27-61-54
		SPOILER3-L		582		27-61-51
		SPOILER3-R		682		27-61-51
		SPOILER4-L		583		27-61-51
		SPOILER4-R		683		27-61-51
		SPOILER5-L		584		27-61-53
		SPOILER5-R		684		27-61-53
		SPOILER6-L		585		27-61-53
		SPOILER6-R		685		27-61-53
		SPOILER7-L		586		27-61-53
		SPOILER7-R		686		27-61-53
	1CP	EFCU-1	92VU	122		27-61-34
	2CP	EFCU-2	93VU	122		27-61-34
	3CP	TRANSDUCER UNIT-ROLL CTL, CAPT		121	121BL	27-61-33
	17CP	P/BSW-SPLR & SPD BRK/382	428VU	211		
	18CP	P/BSW-SPLR & SPD BRK/6	428VU	211		
	20CP	P/BSW-SPLR & SPD BRK/7	428VU	211		
	41CP	ANNUNCIATOR-EFCU/BITE DISPLAY	471VU	212		
	56CP	P/BSW-SPLR & SPD BRK/481	428VU	211		
	58CP	P/BSW-SPLR & SPD BRK/5	428VU	211		
	74CP	TRANSDUCER UNIT-ROLL CTL, F/O		122	121BL	27-61_33
R	3CS	SWITCH-FLIGHT CONTROLS TEST SELECTOR	471VU	212		
	4CS	MSW-PRESEL OR THRUST REVERSER OPERATED		211		27-61-43
	5CS	P/BSW-PTT	471VU	212		
	6CS	ANNUNCIATOR-TEST RESULT	471VU	212		
	7CS	TRANSDUCER UNIT-SPD BRK CTL		211		27-61-46
	41CS	MSW-PRESEL OR THRUST REVERSER OPERATED	9VU	211		27-61-43
	47CS	ANNUNCIATOR-GND SPLR/SEL LANE	471VU	212		

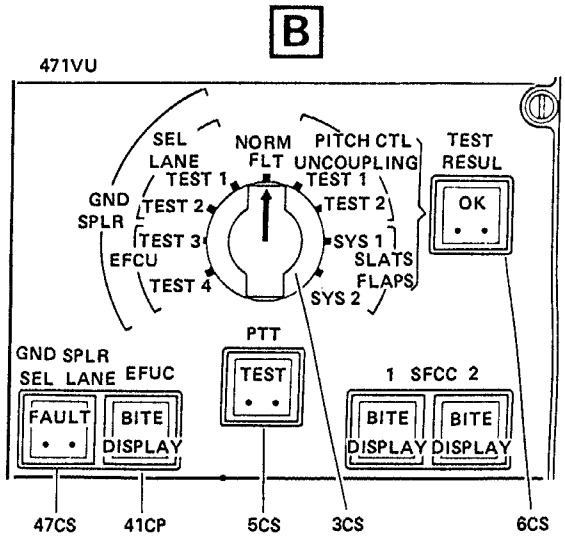


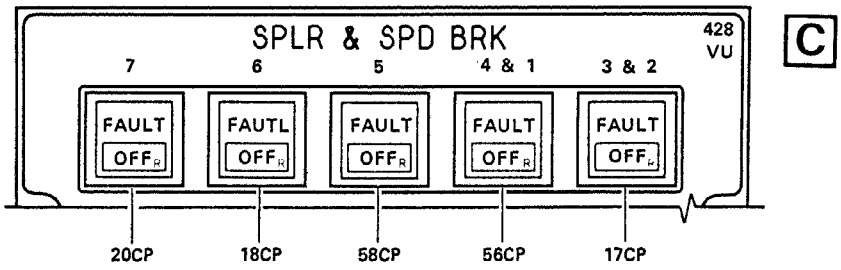


ELECTRONICS RACK 90VU









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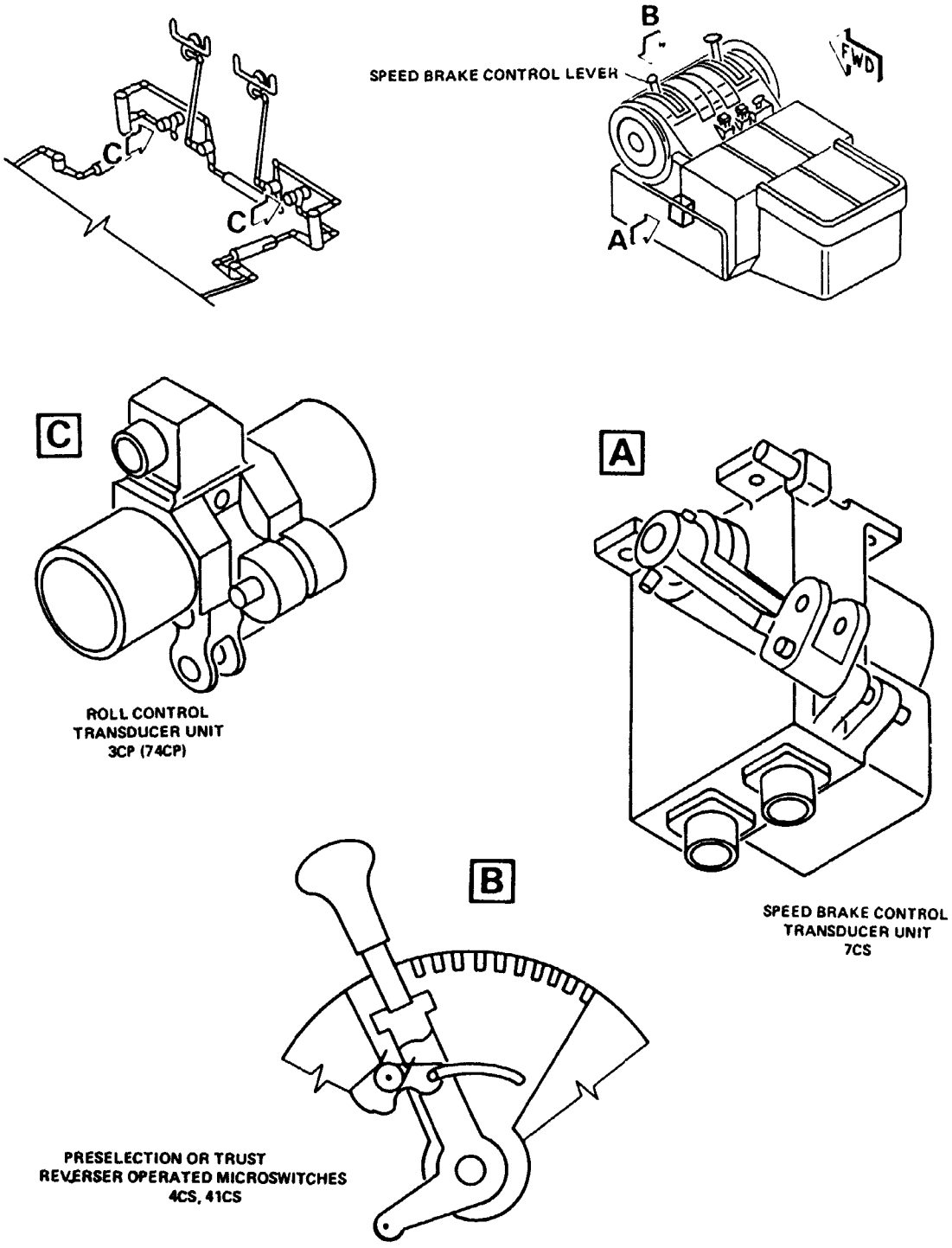
Component Location
Figure 003



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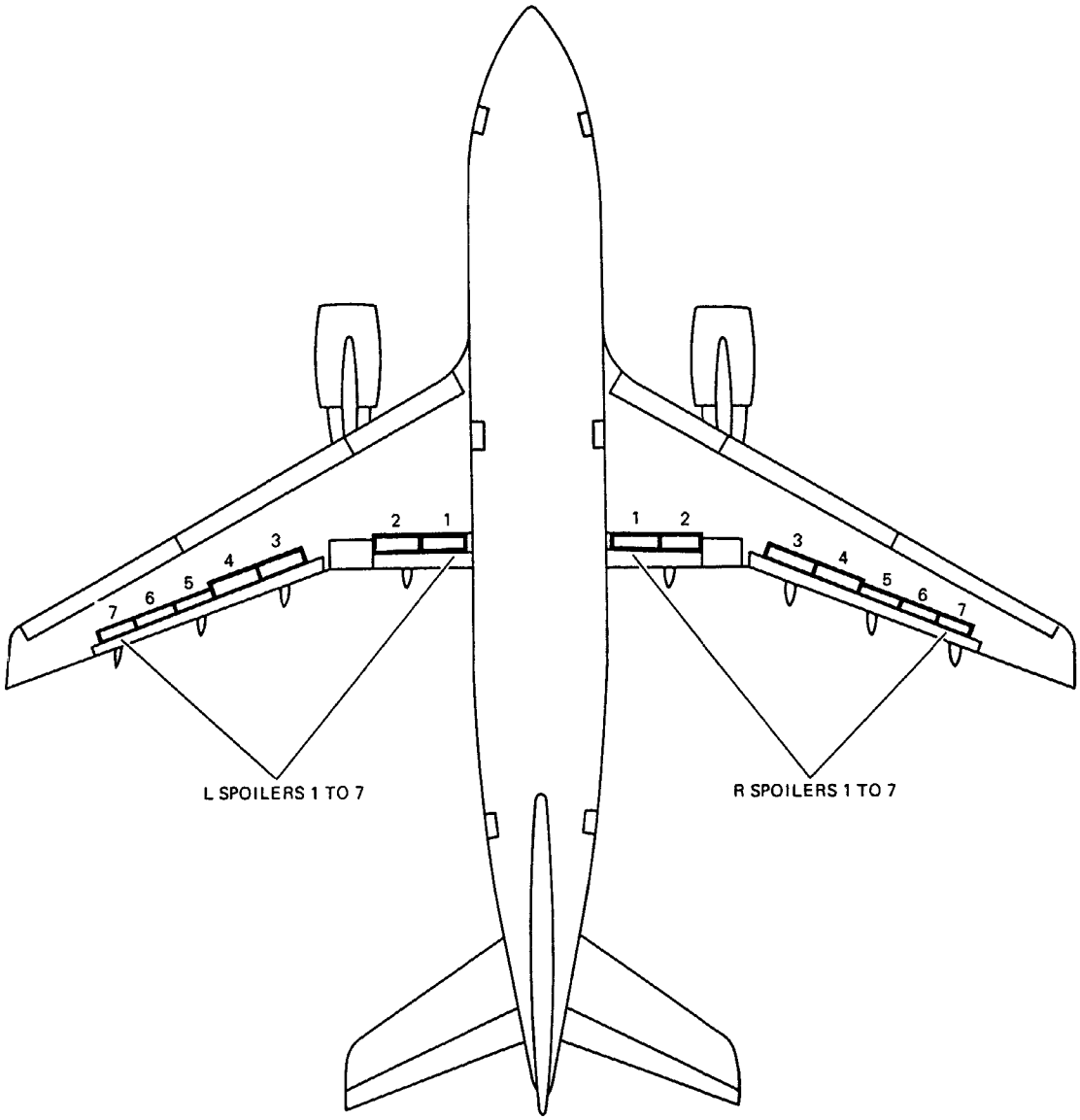
Component Location
Figure 004



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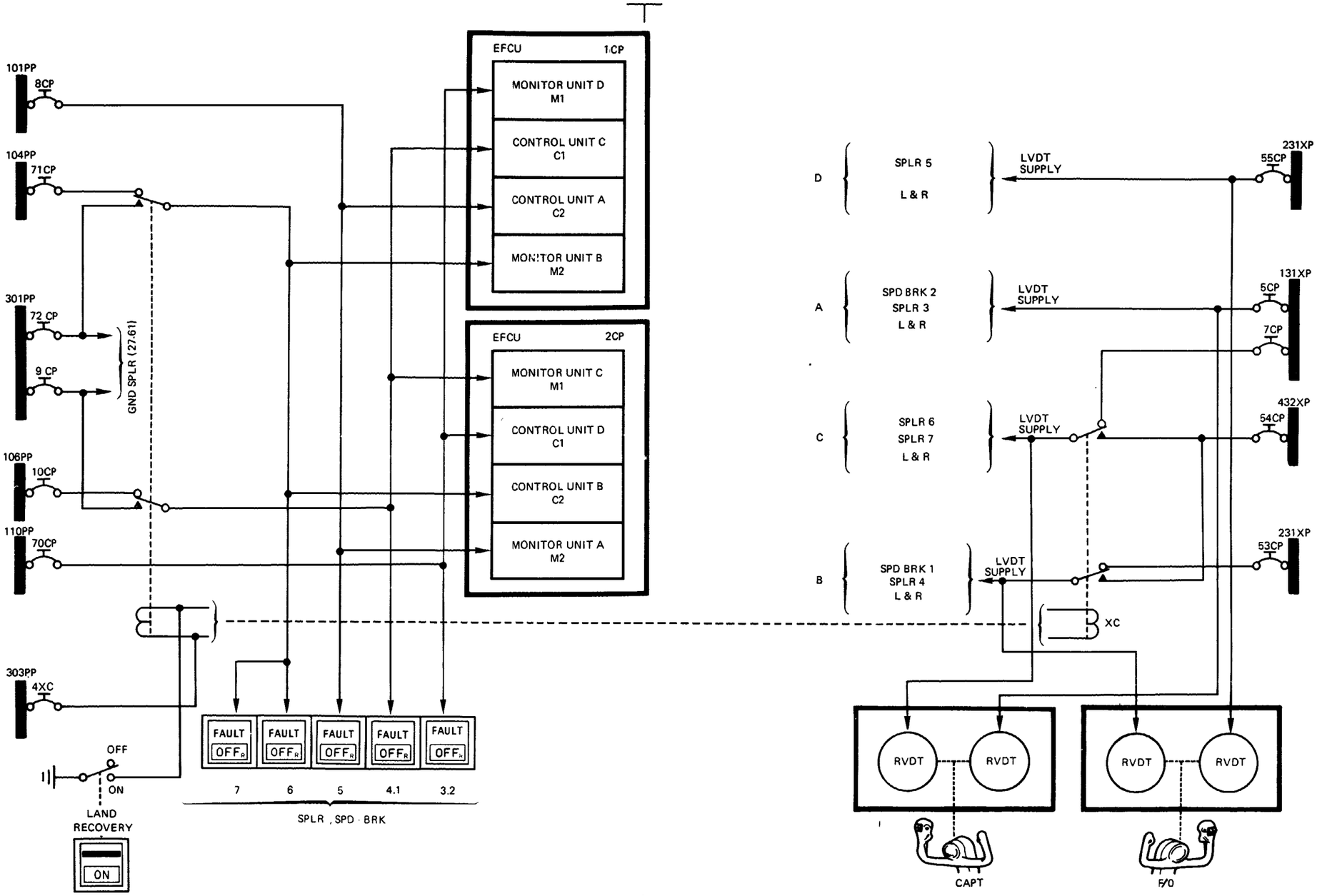
Component Location
Figure 005

3. Electrical Power Supply Distribution (Ref. Fig. 006, 007)

A. The EFCUs are supplied with 28VDC, the inductive transducers with 26VAC. The FAULT legends are illuminated by 28VDC supplied from a different bus than the associated EFCU unit : if a given control or monitor unit does not receive its 28VDC power supply, the associated FAULT legend will therefore be illuminated.

B. Normal Operation
The spoiler system is supplied from normal bus bars 1PP (28VDC) and 131XP and 231XP (26VAC).

C. Land Recovery Procedure
In the event of smoke detection or an emergency situation, power supply to the normal buses may be cut off and consequently the servo controls de-activated.
Before landing, power is supplied again to two spoiler groups by pressing the LAND RECOVERY pushbutton switch on the overhead panel.



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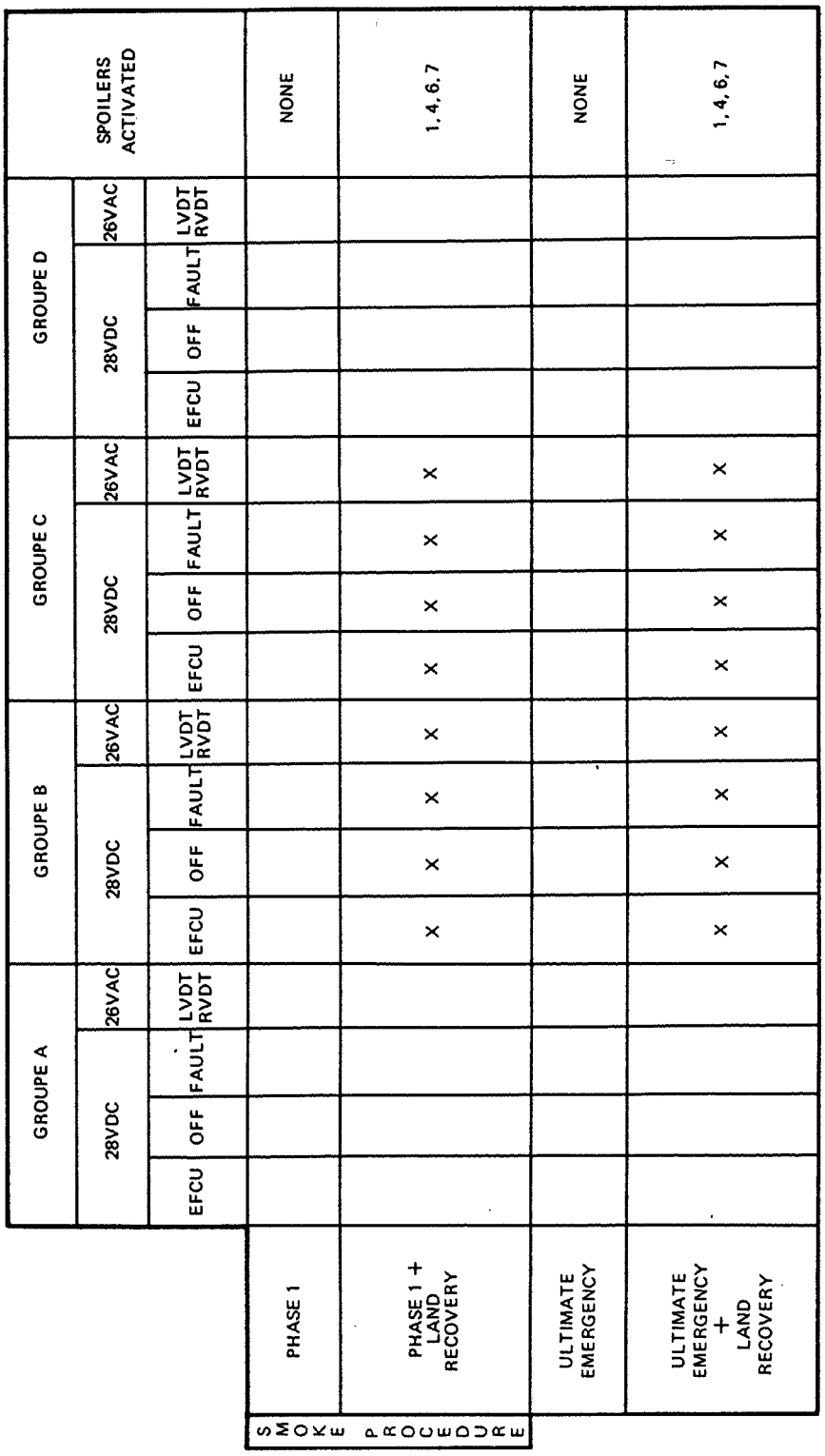
Electrical Power Supply Distribution
Figure 006



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Spoilers Activated After Land Recovery Selection
Figure 007

4. Spoiler Operation

NOTE : In the following chapters, the servo control positions are given in surface degrees.
Relation between servo control travel and surface deflections.

55/50 mm	2.16/50 in.	deg. surface for spoiler 1
71/50 mm	2.79/50 in.	deg. surface for spoilers 2 thru 7

A. Servo Controls - Control and Monitoring

(1)Whatever the function achieved by the spoilers (roll, speed brake or ground spoiler), the servo controls are controlled and monitored as follows.
Each servo control consists of :
- an actuator, including a feedback transducer (LVDT)
- a valve group including in particular :
  . a servovalve
  . a closing valve
  . a solenoid valve (for spoilers 1 and 2).

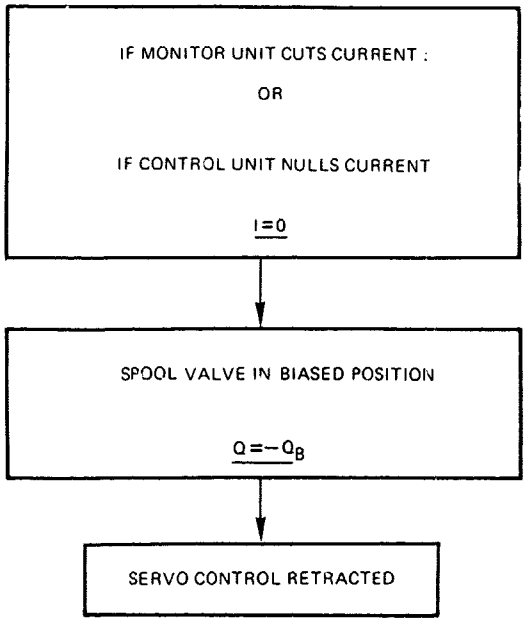
(a)Feedback transducer (LVDT) :
Each transducer measures actuator position and transmits this signal to both the associated control and monitor units in the EFCU.

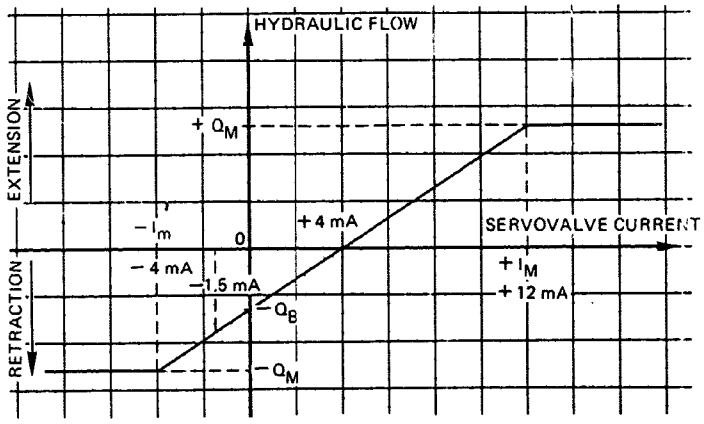
(b)Servovalve :
(Ref. Fig. 008)
If a failure is detected either by a control unit or a monitor unit I (SV) will be nulled and consequently the actuator will be fully retracted.

(c)Closing valve :
Prevents extension of the actuator if the hydraulic pressure supply is cut off.

(d)Solenoid valve :
This is used to override mechanical jamming of the servovalve spool valve. When the solenoid valve is energized, the actuator is fully retracted.

NOTE : For a detailed description of the spoiler servo control actuators and valve groups, refer to 27-64.





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Spoiler Servovalve Characteristics
Figure 008

(2)Control (Ref. Fig. 009)

Each control unit performs the following processes for each servo control it drives :

(a)Computation of deflection angle θc in keeping with the

. roll command (Ref. Para 4.C)

. speed brake command (Ref. Para 4.B)

. ground spoiler command (Ref. Para 4.D)

The rate of θc is limited to $\pm$ 30°/s

(b)Encoding of servo control position Xc

(c)Computation of error signal ϵ = θc - Xc

(d)Computation of servovalve current

$I_{SV} = G(SV) \times \epsilon + Io$

with Io = Bias current = 4 mA

G(SV) = XmA/mm

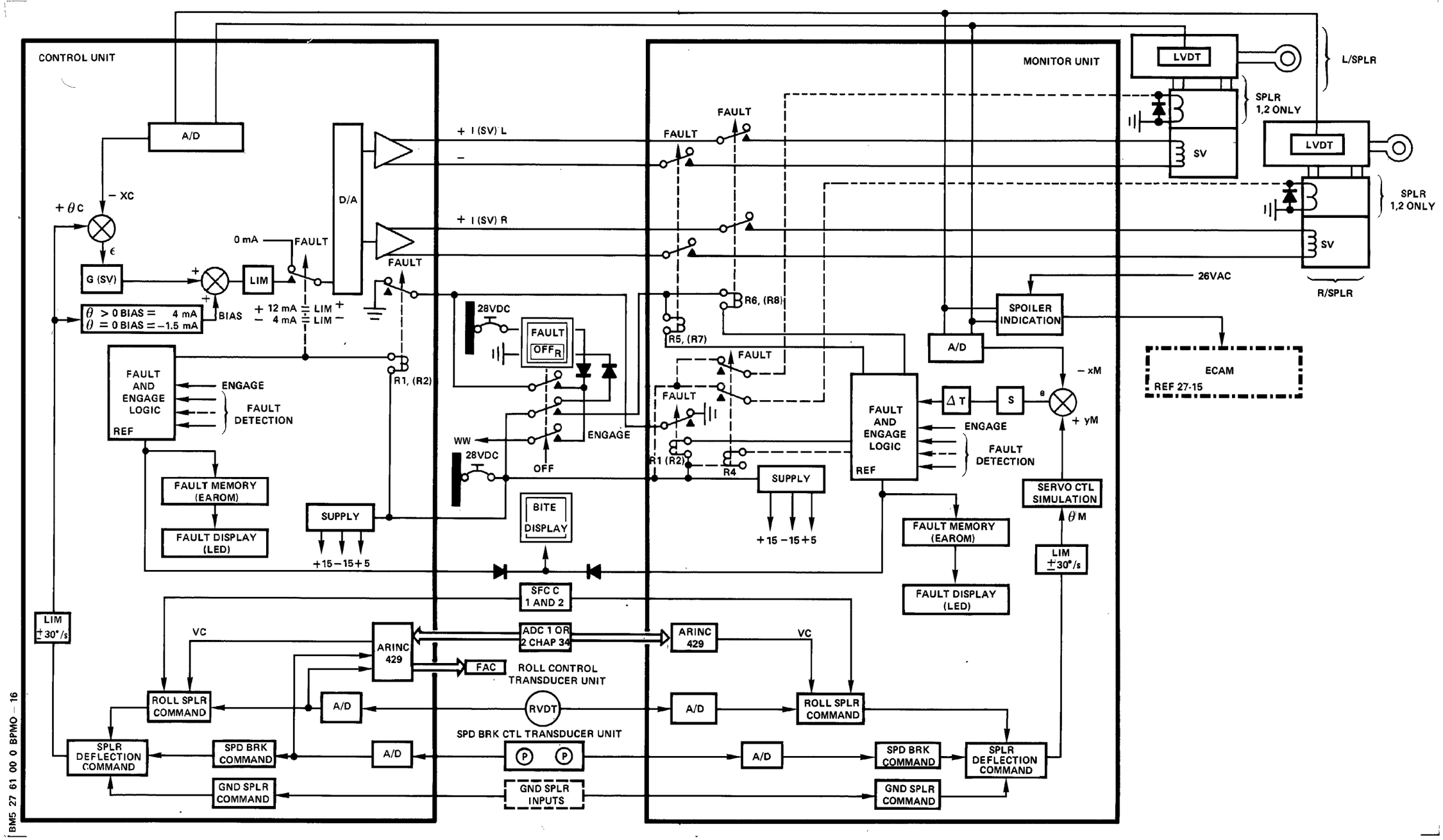
(e)Limitation of servovalve current (- 4mA, + 12 mA)

If the deflection command is nulled for at least 1 s, the bias current is progressively decreased to -1.5 mn in 1 s.

The actuator is consequently fully retracted and the surface is applied firmly against the wing.

If a control unit detects a failure it sends :

- A null current to the servovalve in order to fully retract the actuator involved.
- A fault signal to the control panel.



Spoiler Control and Monitoring - Block Diagram
Figure 009

(3)Monitoring (Ref. Fig. 009)

(a)Each monitor unit computes the deflection angle θM in he same manner as the associated control unit, but by a different digital process. Servo control nominal position YM is subtracted from θM by simulating the servo control transfer function, and is compared to the true servo control position XM :

$$e = YM - XM$$

If e is greater than a threshold S for ΔT the monitor unit deactivates the faulty servo control and indicates the failure (fault signal sent to the control panel).

At the same time, the symmetrical servo control(s) (i.e. the servo controls which are engaged from the same pushbutton switch) is (are) also deactivated even if not failed.

1 Threshold values :

Aircraft not on ground (i.e. shock absorbers extended) :

S = 13° if actual position is less than deflection command (50° if Vc > 365 Kts)

S = 2.5° if actual position is greater than deflection command.

Aircraft on ground (i.e. shock absorbers compressed) :

S = 2.5° in both directions

2 Time delay values :

ΔT = 2 s. If roll spoiler laws are "low speed"

ΔT = 1 s. If roll spoiler laws are "high speed"

(b)Deactivation of servo controls :

1 The last stage of the monitor unit consists of output relays. The contacts of these can cut the liaisons between the control unit amplifier corresponding to the servovalve involved, and the windings of the servovalve itself.

If the monitor unit detects a failure the corresponding output relays are de-energized. In this case, servovalve current is nulled and the actuator is consequently fully retracted.

2 For spoilers 1 and 2 only

Each solenoid valve is controlled by one output relay of the monitor unit.

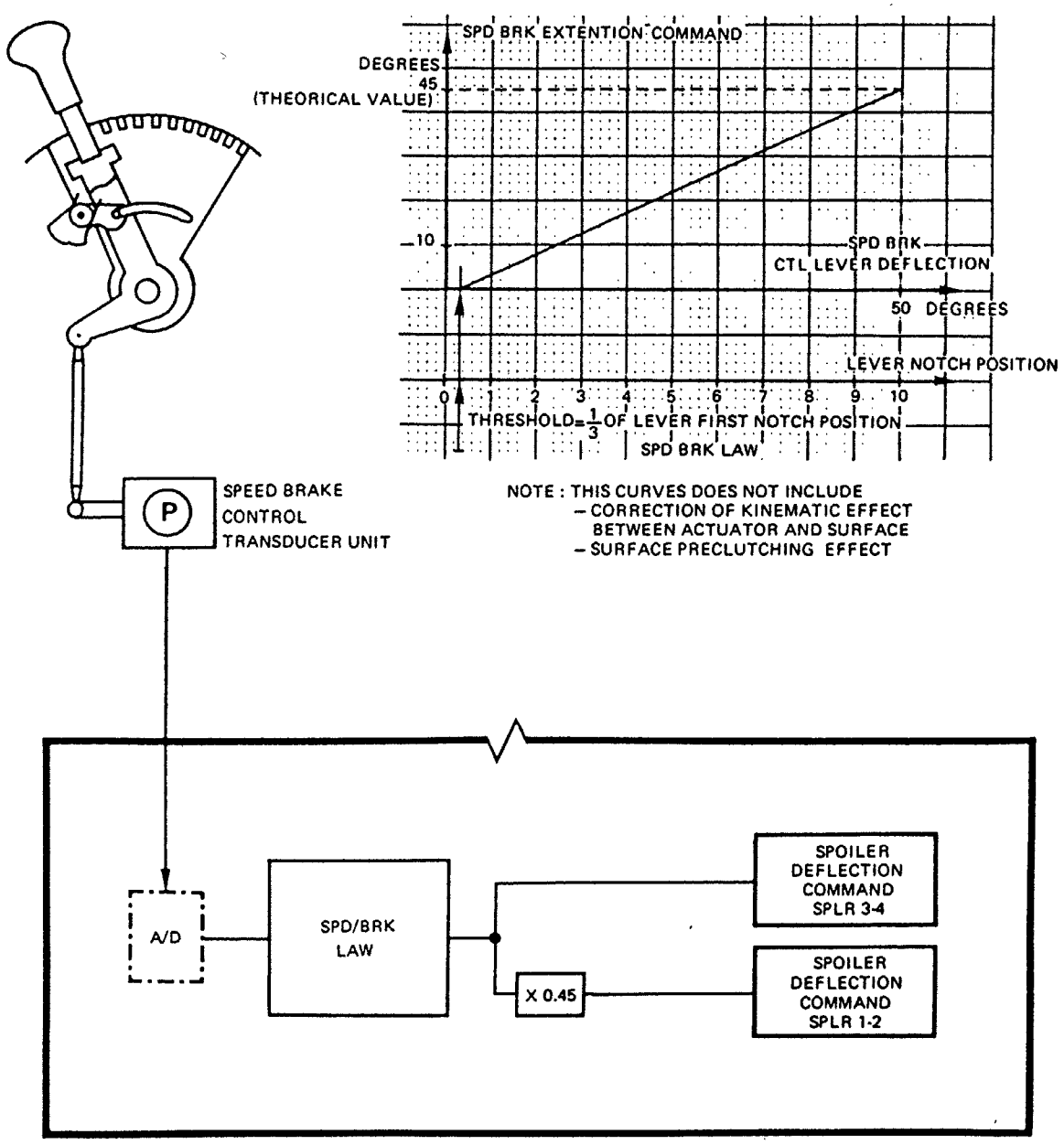
In the event of failure, the relay is de-energized and power is supplied to the solenoid valves.

B. Speed Brake Commands (Ref. Fig. 010)

(1) Each unit receives speed brake control inputs from one plastic track potentiometer located in the speed brake control transducer unit. Each potentiometer is supplied by its associated control or monitor unit (nominal value : 12VDC).

(2) Speed brake law is proportional to the position of the **SPEED BRAKE** control lever with a threshold in order to avoid surface drift when the lever is in **RET** position (full retraction).
Extension of spoilers 1 and 2 is 0.45 times the extension in speed brake mode of spoilers 3 and 4.

(3) Interconnection with **FAC**
SPEED BRAKE control lever position signal is sent to the **FAC** via **ARINC** bus (Ref. 22-23).



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Speed Brake Extension Command - Block Diagram
Figure 010

C. Roll Spoiler Commands (Ref. Fig. 011, 012)

(1)Each unit receives roll control inputs from one inductive transducer (RVDT) located in the Captain's or First Officer's roll control transducer unit. The same RVDT is used by the control and monitor unit of the same group.
The principle of RVDT encoding and monitoring is described in Para. 4.F. and 5.A.

(2)The roll spoiler laws depend on the following conditions :

(a)Spoiler number : roll spoiler laws are different for spoilers 3, 4 (i.e group A, B) and spoilers 5, 6, 7 (i.e group C, D).

(b)Calibrated air speed (Vc) or slat position

1 Roll spoiler laws are "low speed" if :
- Vc < 250 kts when Vc increases
- Vc < 245 kts when Vc decreases
ADC 1 is connected to EFCU groups A and C, ADC 2 to EFCU groups B and D.

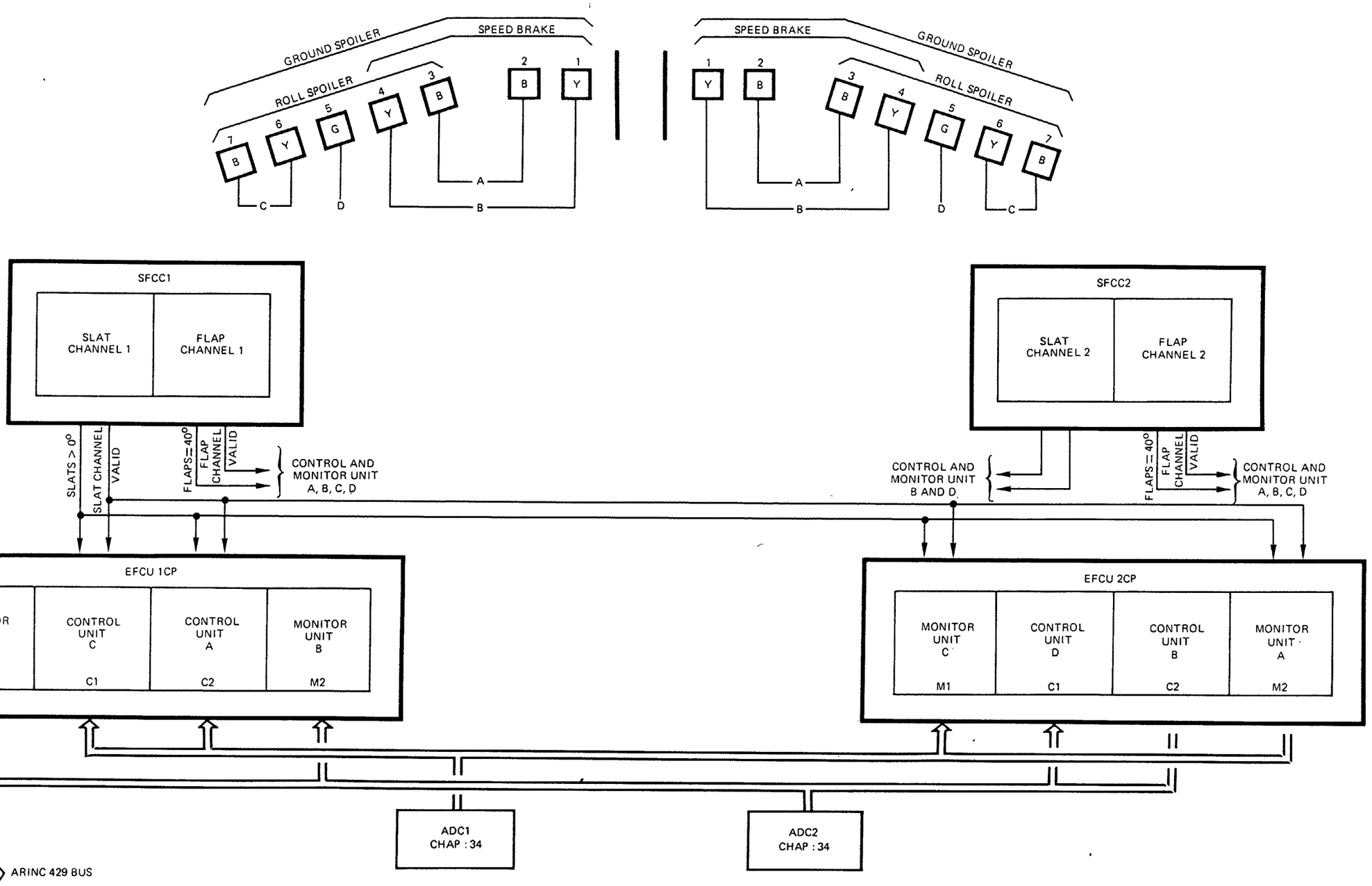
2 If one Vc signal is invalid (Ref. para. G.(2)(f)) the associated units use discrete signals from SFCC slat channels in place of Vc. Roll spoiler laws are "low speed" when the slats are not retracted.
SFCC slat channel 1 is connected to EFCU groups A and C, SFCC slat channel 2 to EFCU groups B and D.

3 When both Vc and slat channels are invalid, roll spoiler laws are permanently "low speed".

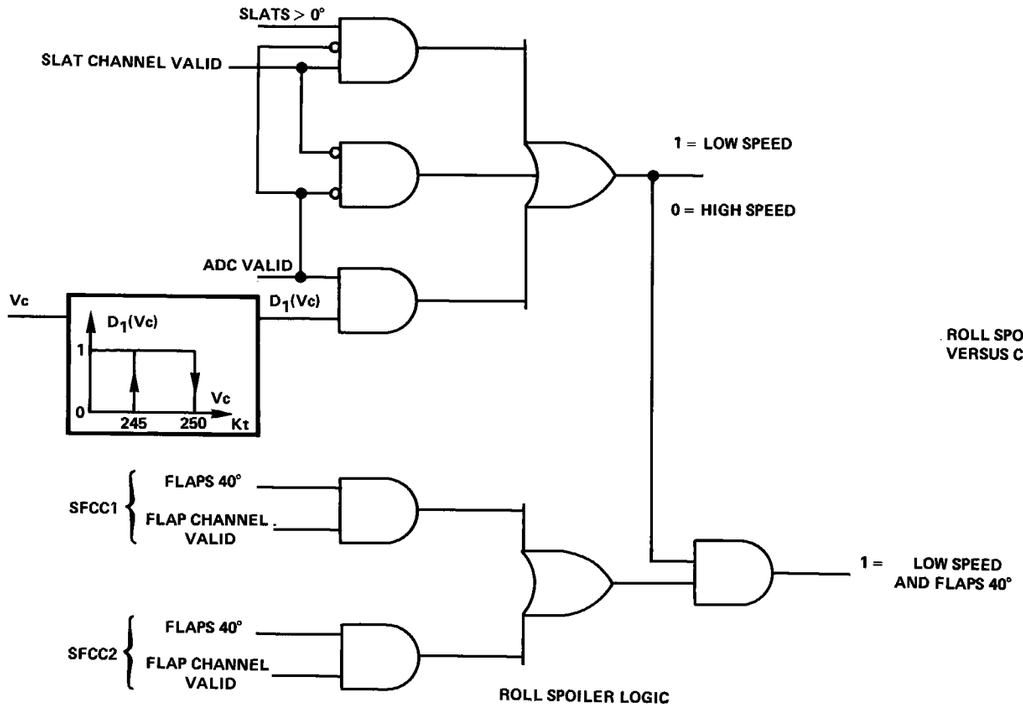
(c)Flaps position

1 Roll spoiler laws are "Flaps 40°" if the aircraft is in "low speed" condition and the flaps fully extended.
For this purpose each EFCU unit receives two discrete signals from each SFCC flap channel
- flaps extended
- flap channel valid

2 If both flap channels are invalid the roll spoiler laws "Flaps 40°" cannot be activated.



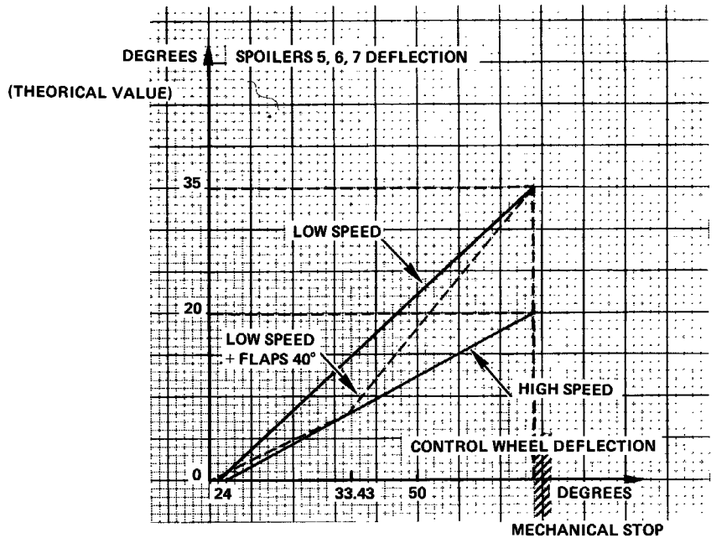
Roll Spoiler Commands - Block Diagram
Figure 011

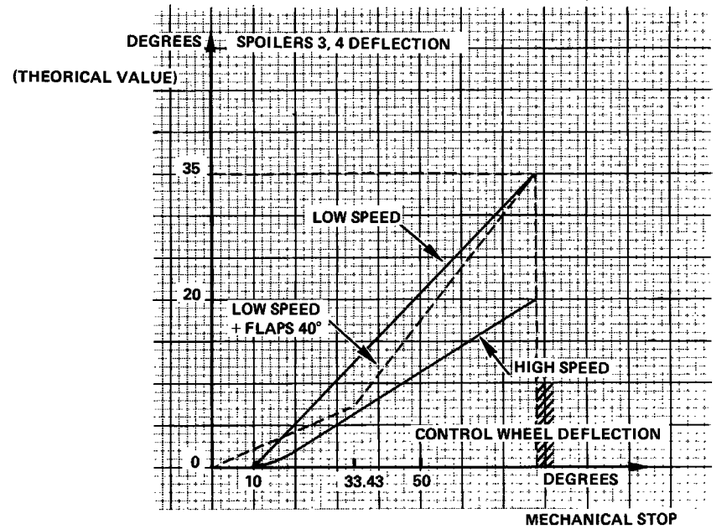


ROLL SPOILER LOGIC

NOTE : THIS CURVES DOES NOT INCLUDE
– CORRECTION OF KINEMATIC EFFECT BETWEEN ACTUATOR AND SURFACE
– SURFACE PRECLUTCHING EFFECT

ROLL SPOILER SURFACE DEFLECTION
VERSUS CONTROL WHEEL DEFLECTION





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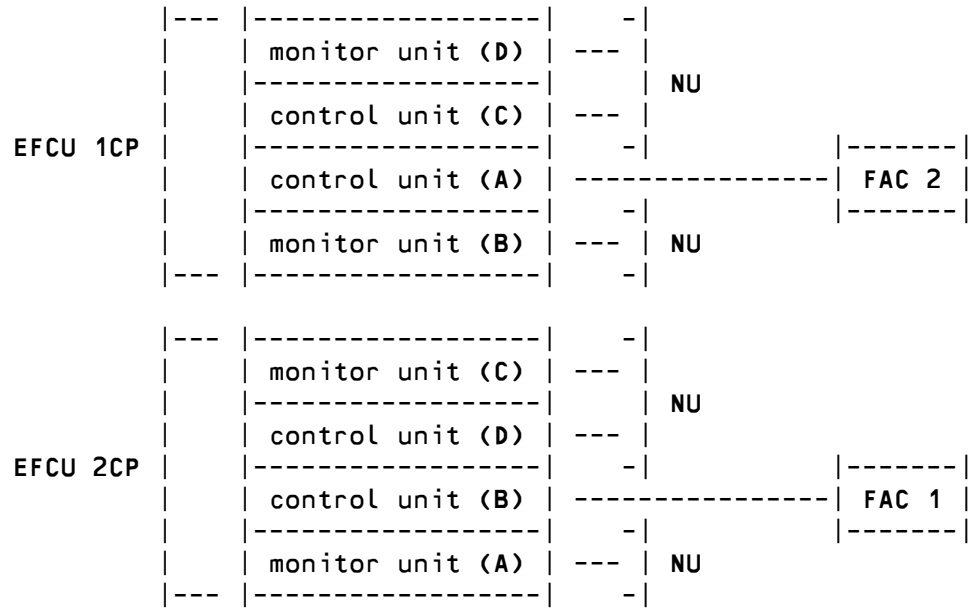
R

Roll Spoiler Laws and Logic
Figure 012

(3)Interconnection with FAC
Roll control wheel position signals are sent to the FAC via ARINC 429 bus (Ref. 22-23).



roll control wheel position = label 071
speed brake lever position = label 072

Max. roll order = 78° of control wheel deflection
= 35° of inductive transducer (R.V.D.T)
Max. speed braker order = 50° of control lever position
= 150° of potentiometer

- Rate = LOW SPEED
- Code = B.N.R
- Refresh time = 30 ms
- Data field = bits 17 to 28 (bit 17 is the LSB)
  roll order : LSB = 2-11 . 42.6° (transducer)
  speed brake order = LBS = 2-11 . 170° (transducer)
- validity of the message :
  Bit 32 = parity
  Bit 31 = 1 | if the information is
  Bit 30 = 1 | VALID
  Bit 29 = sign bit (0 = plus, 1 = minus)

R NOTE : When a transducer failure has been detected, the ARINC message
R sent to the FAC becomes NOT VALID (failure warning) after a time
R delay of 450 ms :
R - bit 30 = 0
R - bit 31 = 0.
R The message passes to its maximum value, and the spoilers are
R deactivated.
R If after a 26 VAC supply failure > 450 ms the circuitry becomes
R correct again, the message is always NOT VALID, althrough the
R value sent to the FAC is correct. The message becomes VALID only
R after a reengagement of the surface.

D. Ground Spoiler Commands(Ref. Fig. 013)

(1)All the spoilers of a given group are automatically extended to 50° by the associated EFCU control unit if ground spoiler conditions are achieved in both the control and monitor units associated with the group. For this purpose, discrete signals are exchanged between the two units. Ground spoiler conditions are achieved in each unit if both the following conditions are met :

- Ground spoiler function selected
- Aircraft on ground.

(2)Ground spoiler selection logic (Ref. Fig. 014)

(a)This is achieved by wiring through microswitch and relay contacts. The following two conditions must be fulfilled :

1 Preselection

This is performed

- By pulling the SPEED BRAKE control lever upwards when it is in RET position. This actuates the two ground spoiler preselection microswitches.
- or by selecting one engine thrust reverser.

2 Both engine throttle control levers in idle position

(b)Two separate ground spoiler selection signals are generated and sent one to EFCU 1, the other to EFCU 2.

If there is disagreement between these two signals, the spoilers cannot be automatically extended. This is indicated to the crew as follows :

- Ground signals are sent to the Flight Warning Computers and to a memorized fault annunciator on the maintenance panel
- After receiving this signal, the FWCs generate the following warnings :

On CAPT and F/O main instrument panels 3VU and 5VU

- MASTER CAUTION lights flash
- Single chime sounds

These warnings will be inhibited when the aircraft is not on the ground.

Furthermore :

- The right ECAM display unit (system display) will confirm that the spoilers have not extended.

(3)Aircraft on ground logic (Ref. Fig. 015)

(a)This is achieved by software logic in the EFCU, if one of the two following conditions is fulfilled :

Either :

- main landing gear aft wheel speed > 85 kts (signals generated by tachometers).

or

- bogie beam movement, which is validated by a logic using the following signals : shock absorber, altitude < 5 ft (information received from the radio altimeter through the FWC, ground spoiler selection. Bogie beam logic is inhibited 3 s after the shock absorber is compressed (Ref. Fig. 014)

(b)Each aft wheel tachometer transmits its signal to one control unit and one monitor unit of the same EFCU.

(c)Aircraft on ground logic is inhibited at takeoff as soon as the shock absorber is extended. (Ref. Fig. 015)

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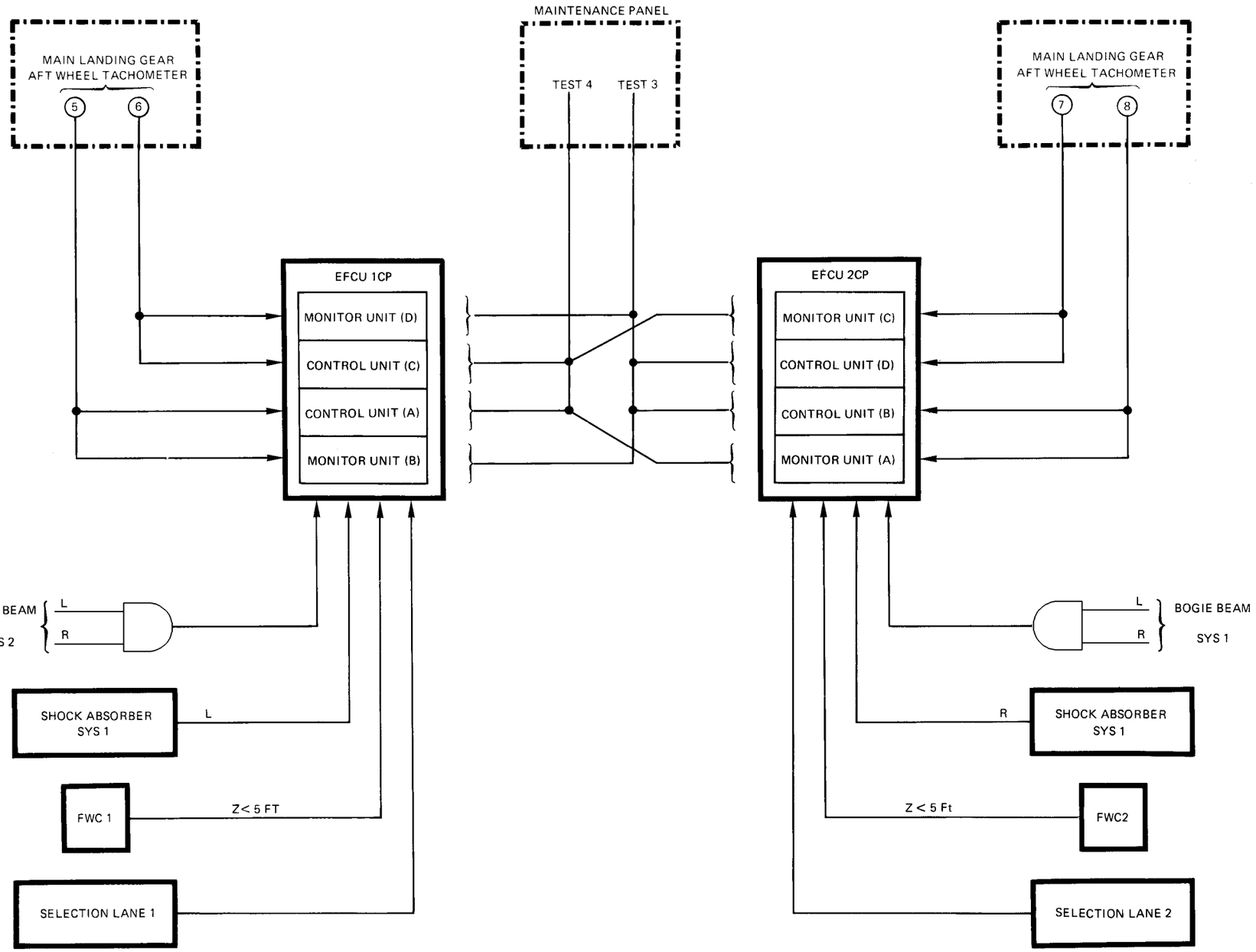

Ground Spoiler Commands - Block Diagram
Figure 013

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R

EFFECTIVITY: ALL

PIA

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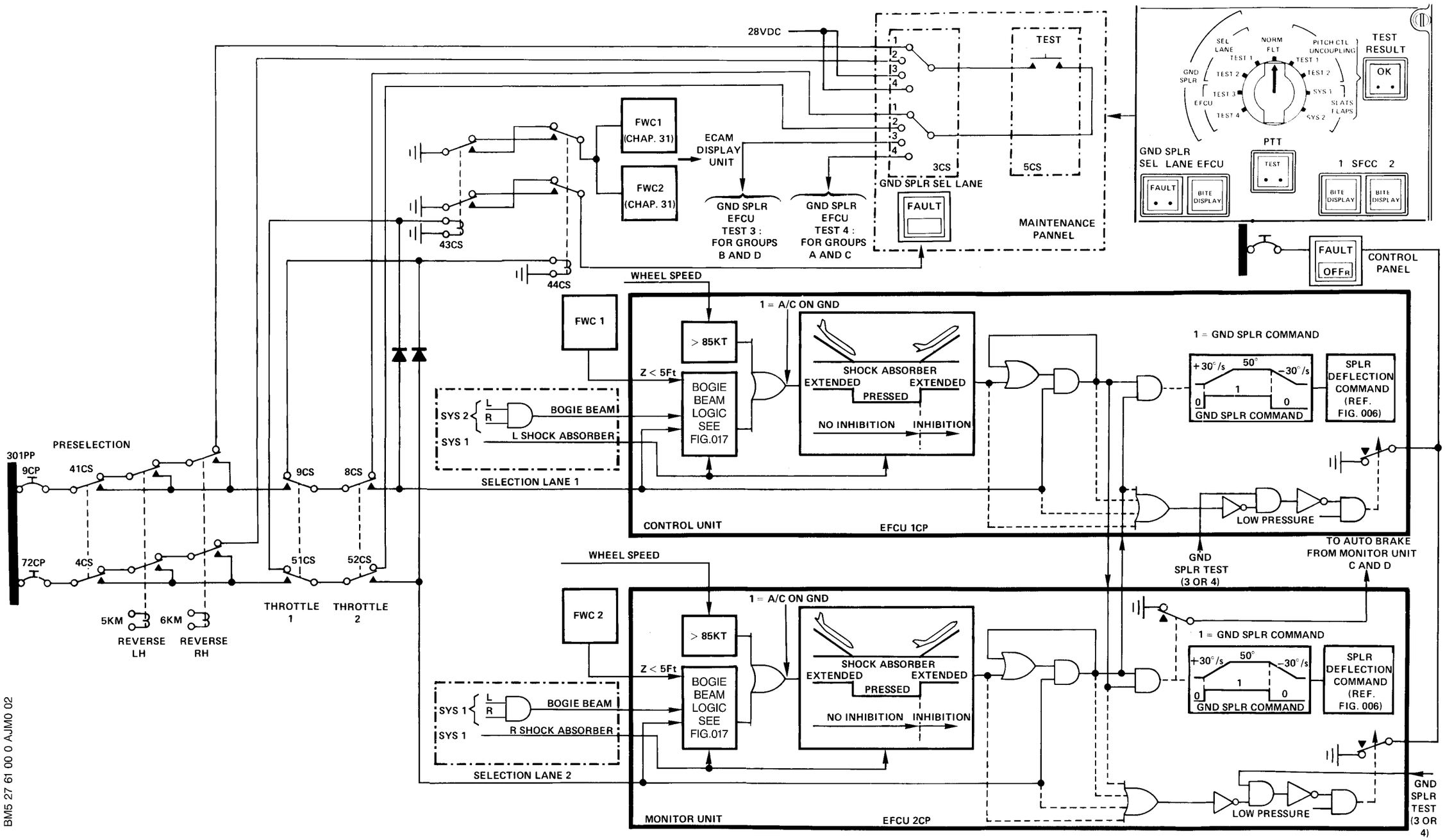

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Ground Spoiler Logic
Figure 014

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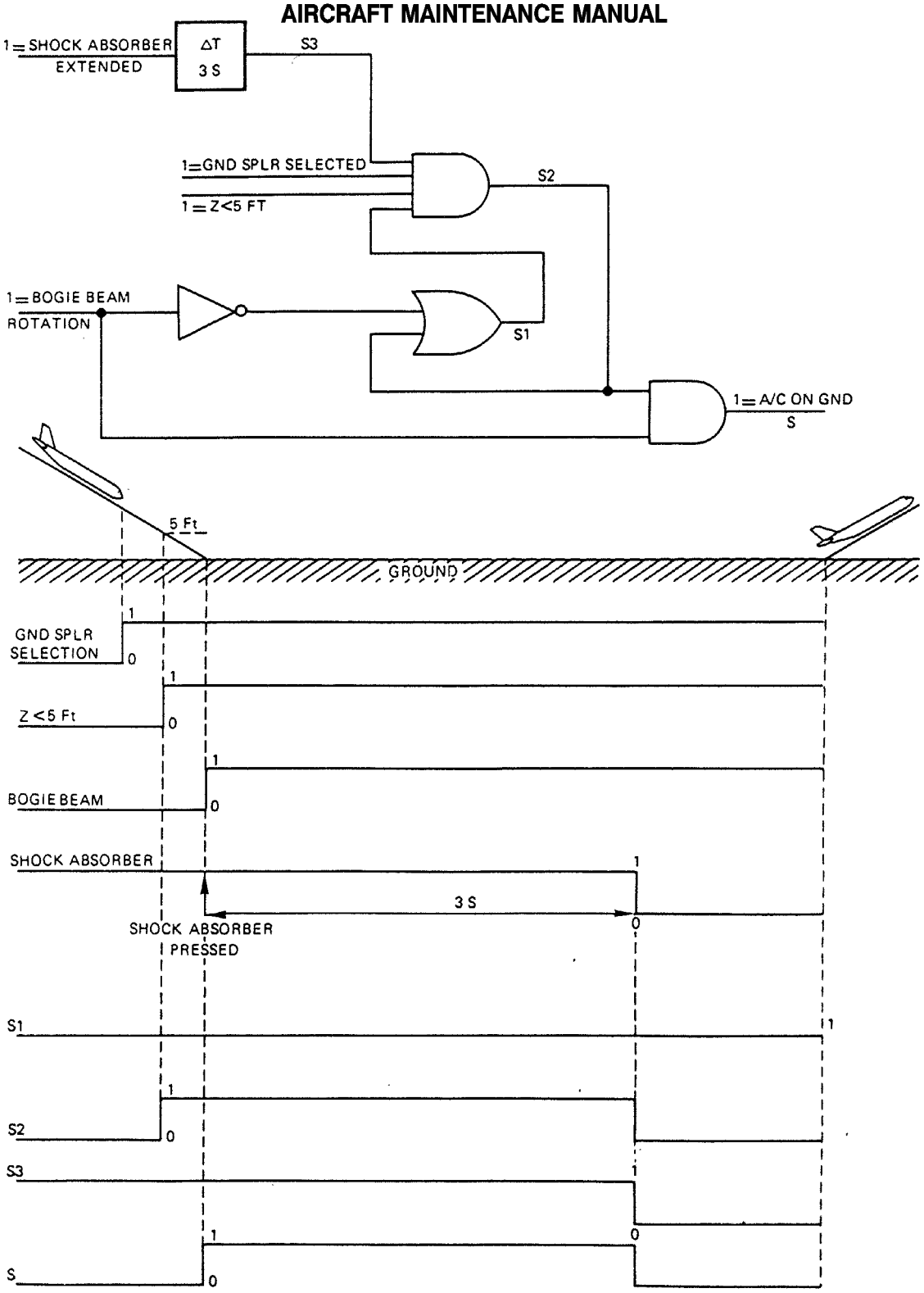

Bogie Beam Logic
Figure 015

(4)Ground spoiler retraction after landing
This is achieved
- By cancelling the preselection by pressing the SPEED BRAKE control lever down.
- Or by pulling one throttle control lever out of the idle position (the spoilers will extend again if the throttle control lever is returned to idle position provided that speed remains > 85 kts).

(5)Test
Testing is achieved manually by means of a selector switch and a pushbutton switch located on the maintenance panel.

R NOTE : Make certain that EFCU bite display light is off. If not,
R a bite reset on both EFCUs should be performed.

(a)Aim
1 EFCU test : to check that no undue condition is achieved in the ground spoiler logic inside or outside the EFCU.
2 SEL LANE test : to generate a disagreement between the two selection lanes.

(b)Aircraft configuration :
- aircraft on ground
- no preselection
- both throttle control levers in 20° position.
- no hydraulic pressure.

(c)Procedure
1 - Selector switch in GND SPLR TEST 1 position.
- Press PTT pushbutton switch.
- Result : GND SPLR SEL LANE/FAULT annunciator comes on if the test result is OK.

2 - Selector switch in GND SPLR TEST 2 position
- Press PTT pushbutton switch
- Result : GND SPLR SEL LANE/FAULT annunciator comes on if the test result is OK.

3 - Selector switch in GND SPLR TEST 3 position
- Press PTT pushbutton switch
- Result : FAULT legends on SPLR & SPD BRK 4 & 1 and 5 pushbutton switches (overhead control panel) go off if the test result is OK.

4 - selector switch in GND SPLR TEST 4 position
- Press PTT pushbutton switch
- Result : FAULT legends on SPLR & SPD BRK 3 & 2, 6 and 7 push-button switches (overhead control panel) go off if the test result is OK.

(6)Interconnection with brake system control unit. The monitoring units C and D send to the BSCU discrete signals when ground spoiler command is achieved.

E. Spoiler Extension Commands (Ref. Fig. 016)

(1)Spoilers 5 - 6 - 7

If the control wheel is turned left (or right), the spoilers on the left (or right) wing extend and the spoilers on the right (or left) wing remain retracted.

(2)Spoilers 3 - 4

If there is no speed brake command, they are controlled in the same manner as spoilers 5-6-7. If there is a speed brake command the left and right wing spoilers extend. Roll and speed brake commands are combined in such a manner that the difference between left and right spoilers is equal to the roll command, even if the sum of roll and speed brake commands is greater than 45° (maximum extension in flight).

This is obtained as follows :

If roll + speed brake commands < 45° the roll command is added to the speed brake command on one wing. On the other wing, spoiler extension corresponds to the speed brake command only.

If roll + speed brake commands > 45° the spoilers extend 45° on one wing, and 45° minus the roll command on the other wing.

(3)Spoilers 1-2

Left and right wing spoilers 1 and 2 extend symmetrically.

(4)Ground spoiler commands (Ref. Para 4.D)

When ground spoiler conditions are achieved, all the spoilers are fully extended at a constant speed.

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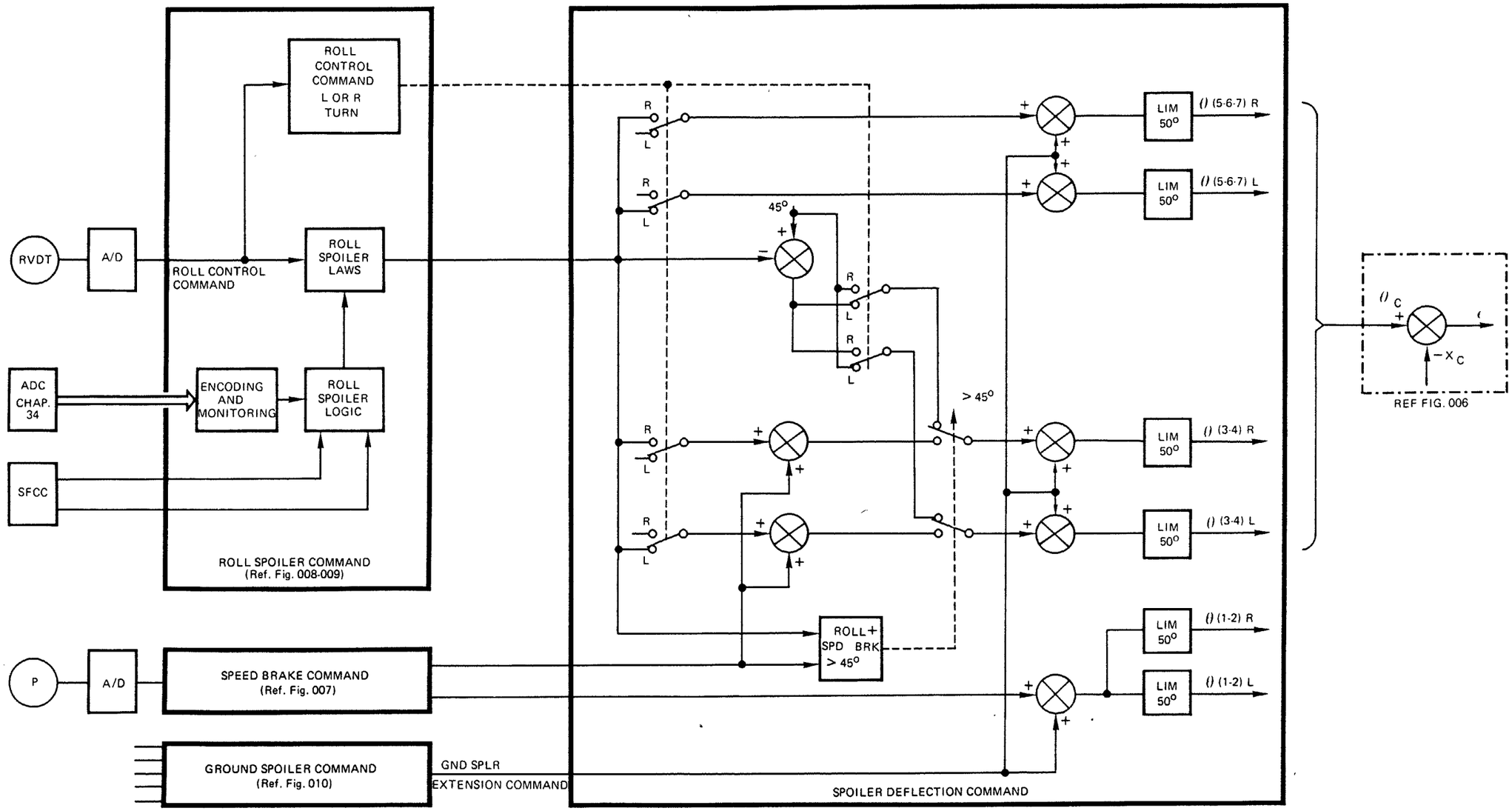

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Spoiler Extension Command
Figure 016

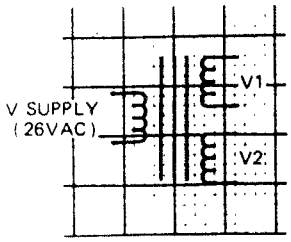
F. Inductive Transducers
(Ref. Fig. 017)

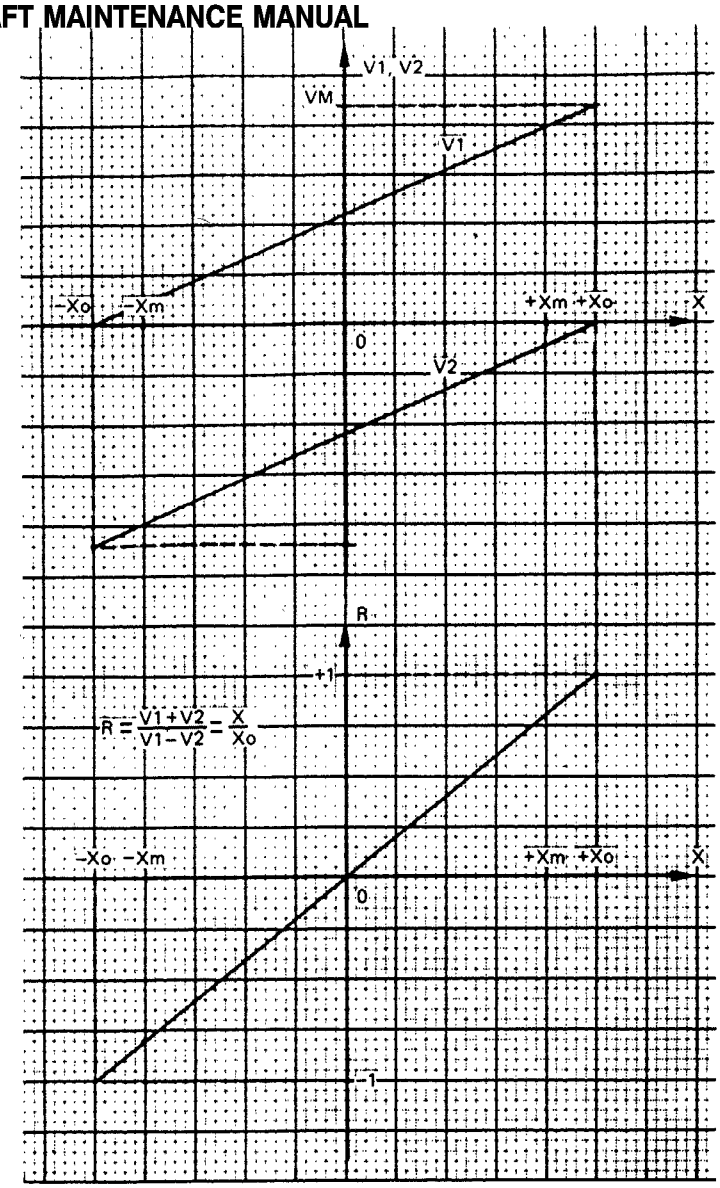
(1)Two types of transducers are used in the electrical flight control system for roll control :
RVDTs for roll control inputs
LVDTs for servo control position feedback.
NOTE : The same type of RVDT is used for rudder trim (Ref. 27-22) and rudder travel limiting (Ref. 27-23).

(2)Electrical characteristics
Each transducer gives two linear, biased output signals :
$V_1 = K.V\ (X + Xo)\sin(2\ \pi\ F\ t + Gamma_1)$
$V_2 = K.V\ (X - Xo)\sin(2\ \pi\ F\ t + Gamma_2)$
where :
X = transducer position
X_0 = bias between the two signals, which is greater than the maximum possible displacement x max of the transducer
V = transducer supply voltage (26VAC)
K = transducer sensitivity
F = frequency of supply voltage (400 Hz)
$Gamma_1$, $Gamma_2$: phase shift between V_1, V_2 and V.

(3)Encoding
Each control and monitor unit receives V_1 and V_2 from its associated transducers.
After eliminating the effects of $Gamma_1$ and $Gamma_2$, each unit computes the ratio :
$R = \frac{V_1 + V_2}{V_1 - V_2} = \frac{x}{x_0}$
The measured value of x does not therefore depend on K and V variations.
All the transducers are designed and set in such a manner that R = 0 for the mechanical zero of the component measured.

(4)Monitoring
- If there is no transducer failure :
  $|R| < 1$ because $x_0 > x$ max (maximum measured position)
  V_1 and V_2 are not simultaneously at zero.
- If a secondary winding is failed :
  V_1 or $V_2 = 0$
  therefore $|R| = 1$.
- If the primary winding is failed :
  V_1 and V_2 are simultaneously at zero.
  The control and monitor units consequently monitor their transducer from the transducer signals they receive.





	X_o	X_m	VM (VOLT RMS)
ROLL CONTROL TRANSDUCER UNIT (RVDT)	42.6°	35°	6.4
SPOILER ACTUATOR FEEDBACK TRANSDUCER (LVDT)	78 mm (3.04 in)	74 mm (2.88 in)	6
FOR REFERENCE { RUDDER TRIM (RVDT)	42.6°	37°	6.4
FOR REFERENCE { RUDDER TRAVEL LIMITING (RVDT)	42.6°	37°	6.4

NOTE : FOR SPOILER STROKE X ONLY IN POSITIVE DIRECTION

BM5 27 61 00 0 BRMO

Inductive Transducer Characteristics
Figure 017

G. Fault and Engage Logic

(1)Automatic safety test

(Ref. Fig. 018)

(a)General

Both associated control and monitor units achieve a safety test as soon as they detect one of the following events :

- Application of either hydraulic or electrical power if the relevant control panel pushbutton switches are pressed in.
- Reset action by pressing the pushbutton switch in.

During this test, each control unit checks that the associated monitor unit is able to detect and override a servo control runaway.

The spoilers are not deflected during the test.

Duration of the test : 2 s.

(b)Test Operation

1 When the test sequence starts, the monitor unit associated with each servo control initializes coding of the actuator feedback transducer to its maximum value. As long as the coded value has not reached the actual value of the feedback transducer, a servo control runaway is simulated in the monitor unit.

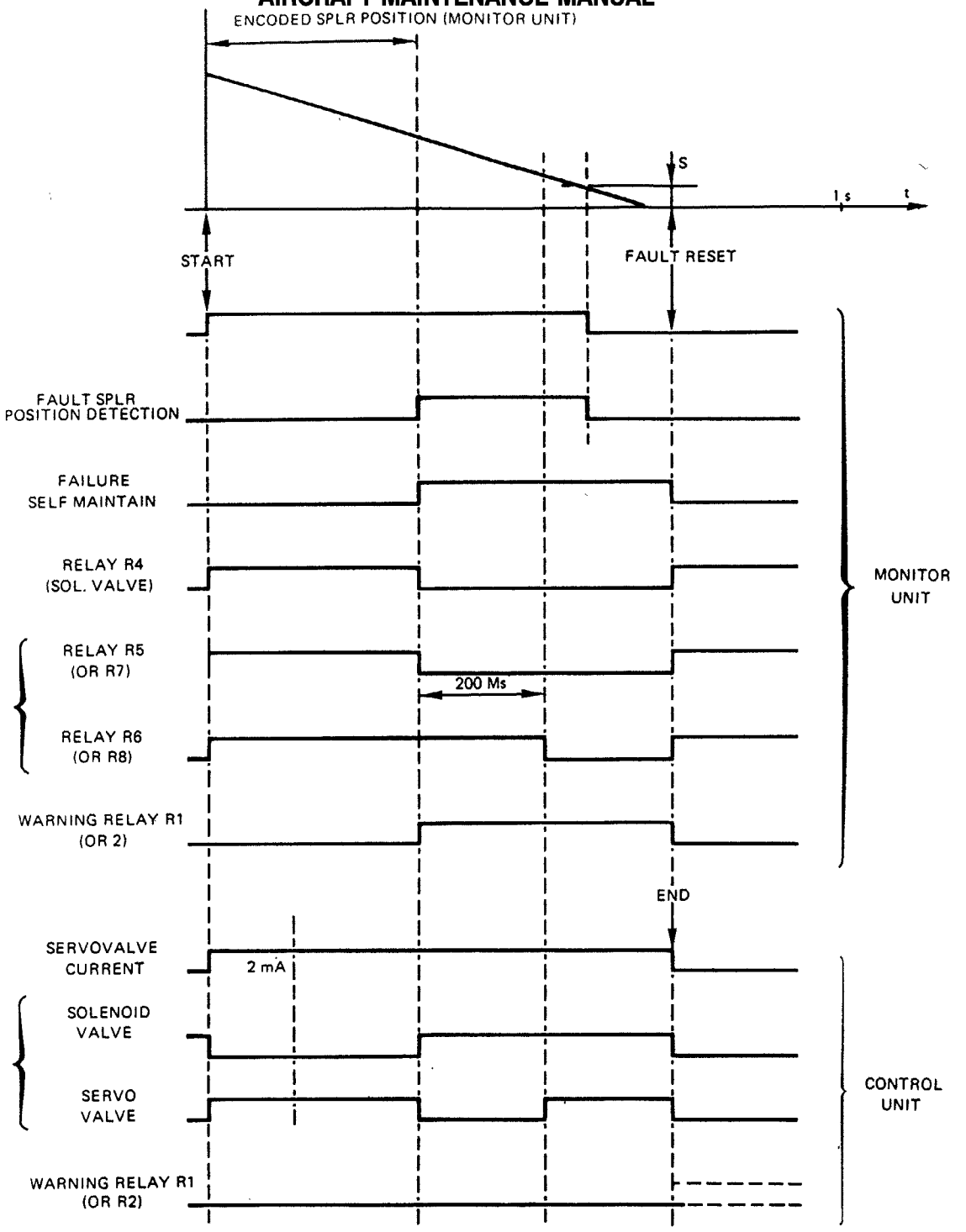
The monitor unit detects this situation as a spoiler servo control fault and de-energizes sequentially the relevant output relays, the second being de-energized 0.2 s. after the first.

2 During this sequence, the control unit sends a 2 mA constant current to the servovalves. The control unit detects whether the monitor unit operates correctly or not by checking the value of the servo valve current which must be constant or null depending on the test sequence phase.

The discrete signal sent to spoiler 1 and 2 solenoid valves is also checked.

3 The control unit authorizes spoiler activation if it does not detect a malfunction of the monitor unit.

The control unit maintains the spoilers fully retracted if it detects a malfunction of the monitor unit.



Fault and Engage Logic
Figure 018

(2)Fault detection
For each spoiler group, detection of the following faults is permanently operative, excluding the RAM test which is performed only at application of electrical power (28VDC).

(a)Spoiler position : each monitor unit checks that the spoiler position corresponds to the commanded extension (Ref. Para 4.A.(3).

(b)Transducers : each control and monitor unit checks that the signals it receives from its associated transducers are inside their nominal range (Ref. Para 4.F.)

(c)Servovalve current : each control unit checks that the current it actually sends to each servovalve is equal to the digital value it has computed. The actual current is therefore converted into a digital value and compared to the pre-computed value.

(d)Cross monitoring.
The control and monitor units of a given group exchange serial digital signals. Each therefore permanently cross-checks the other for correct operation.

1 Check of validity and speed of the digital signal.

2 Check of the signal value :
- The monitor unit sends the encoded value of the roll control transducer unit input (RVDT) to its associated control unit.
  The control unit compares it to the RVDT value encoded by itself
- The control unit sends the state of the discrete input it receives to its associated monitor unit.
  The monitor unit verifies that it is identical to the discrete input it receives.

(e)EFCU auto-test
Each control or monitor unit performs the following auto-test :

1 ROM check sum : this consists in summing all the ROM bits and checking that the result is equal to a predefined value.

2 RAM test : this is performed only when 28VDC is applied. It consists in checking the RAM register for correct operation in Read and Write mode.

3 Internal electrical supply test : each unit encodes its internal 5VDC and checks that the coded value is not lower than a pre-defined value (4.6 VDC).

(f)ARINC 429 receiver
Each control or monitor unit verifies the validity of the ARINC 429 signal it receives from the ADC.

1 The receiver circuit checks itself parity and frequency of the digital signal.

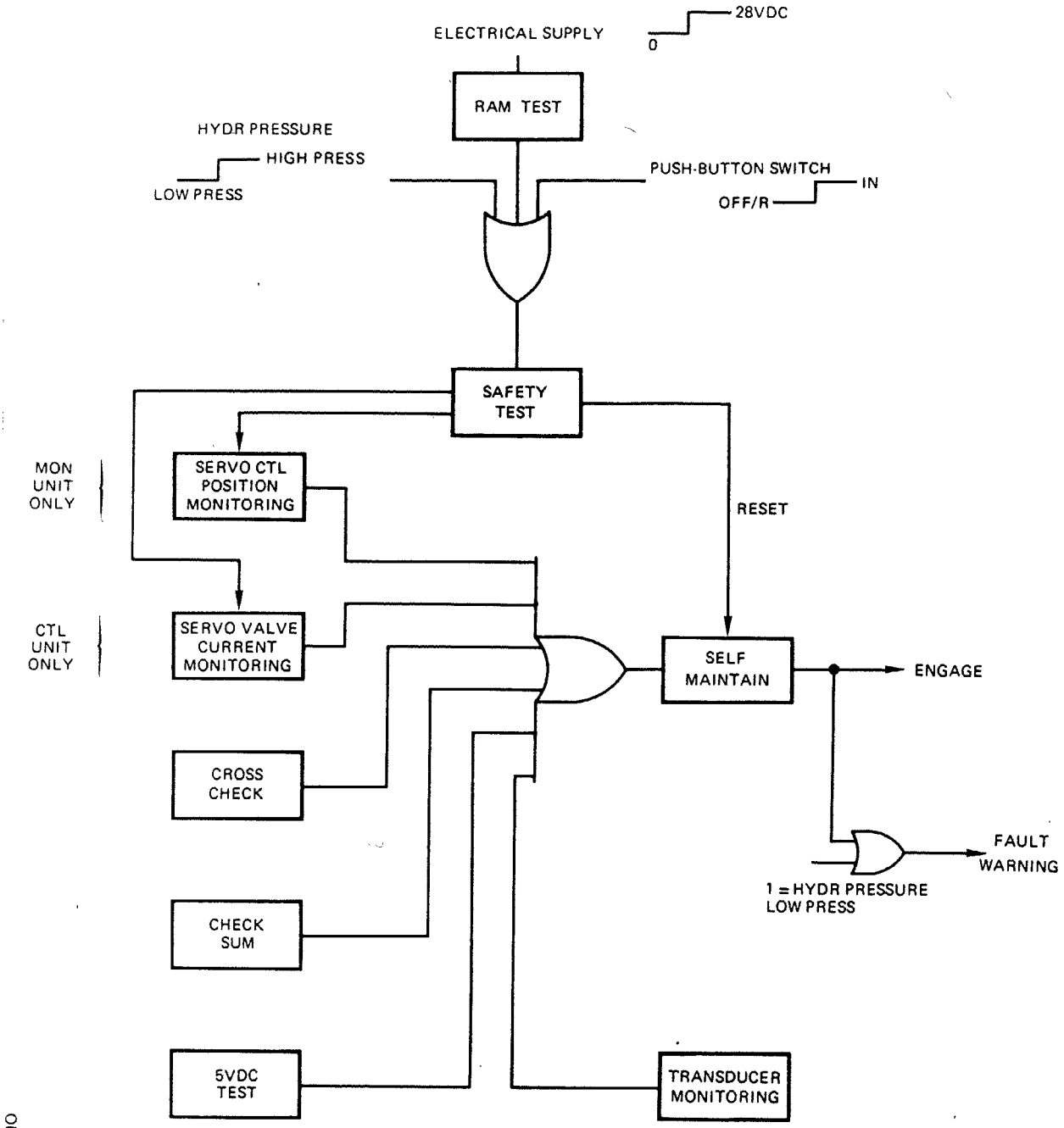
2 The state of the status matrix (SSM) (i.e state of Bit 30 and 31) is checked by software.
The signal is considered
- invalid if the SSM code is "Failure Warning" or "No computed data"
- valid if the SSM code is "Functional Test" or "Normal Operation".

(3)Engage logic
(Ref. Fig. 019)
(a)Spoiler servo controls are activated if all the following conditions are fulfilled :
- pushbutton switch pressed in.
- result of the automatic safety test is correct.
- no fault detection by control or monitoring logic.
Fault detection of the discrete input (via cross monitoring) and of the ARINC 429 input is not taken into account in the engage logic.

(b)When a fault is detected
1 The spoilers involved are fully retracted
2 The FAULT warning is activated.
3 The EFCU BITE DISPLAY memorized fault annunciator is activated on the maintenance panel.
4 The origin of the failure is stored and indicated on the EFCU face (Ref. Para 6.).

(c)Reset
Any fault indications are latched on. They are unlatched :
- automatically at each application of 28VDC or of hydraulic power.
- manually when the pushbutton switch is pressed

(4)FAULT warning logic
The FAULT legend is illuminated on the control panel.
(a)If the involved spoilers are deactivated by the engage logic.
(b)If the hydraulic power low pressure is detected.



Fault and Engage Logic
Figure 019

5. Component Description

A. Roll Control Transducer Unit (Ref. Fig. 020)

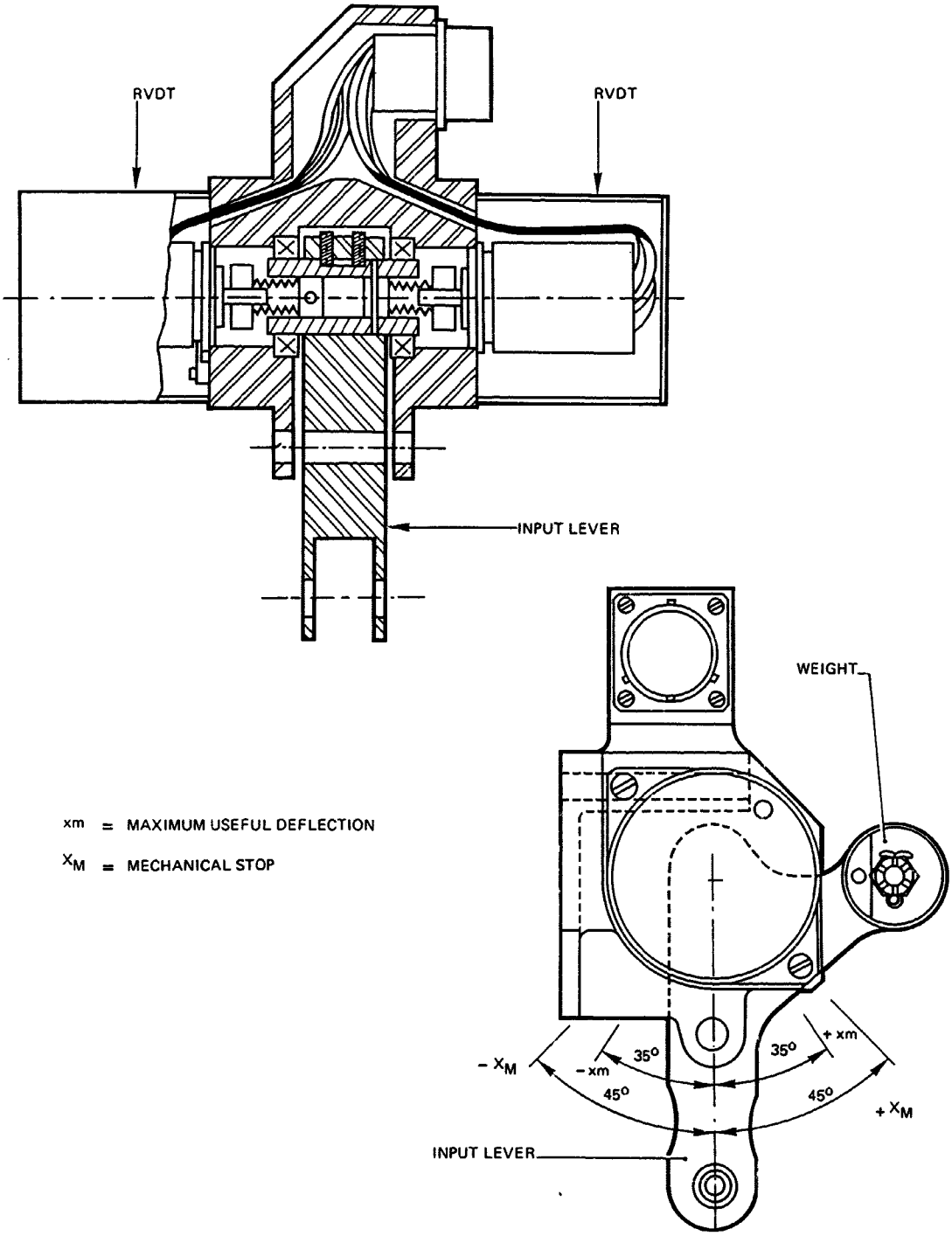
(1) Two roll control transducer units are installed on the aircraft, one connected to each control wheel.
The LRU includes :

(a) Two special brushless size 11 RVDTs. The electrical characteristics are described in paragraph 4.F.

(b) The associated mechanical parts (body, cover, input lever, ball bearing, connector plug etc...).

(2) Roll control system neutral position is determined by locking the input lever to the transducer unit body with a rigging pin.
The RVDTs are pre-set in the workshop to make their electrical zero coincide with the mechanical neutral position of the transducer unit.
Replacement of faulty transducer units requires neither electrical measurement nor special tooling.
Maximum useful deflection is ± 35° RVDT angle for maximum control wheel deflection.
Maximum possible deflection is limited to ± 45° of RVDT angle by mechanical stops.
A second lever with a weight is installed perpendicular to the input lever. If the rod driving the input lever is disconnected, the input lever contacts its 45° stop.
The transducer unit then transmits a signal greater than its maximum useful signal to the EFCU, which will detect a fault.
There are no maintenance tasks on the aircraft.
NOTE : The same type of transducer unit is also used in the rudder travel limiting system.

(3) Transducer output signals are sent to the EFCUs where they are received by one control unit and one monitor unit.
Each control and monitor unit monitors its associated RVDT.
If a transducer failure is detected, all the servo controls involved are fully retracted and a FAULT signal is sent to the control panel.



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Roll Control Transducer Unit
Figure 020

B. SPEED BRAKE Control Lever (Ref. Fig. 021, 022)

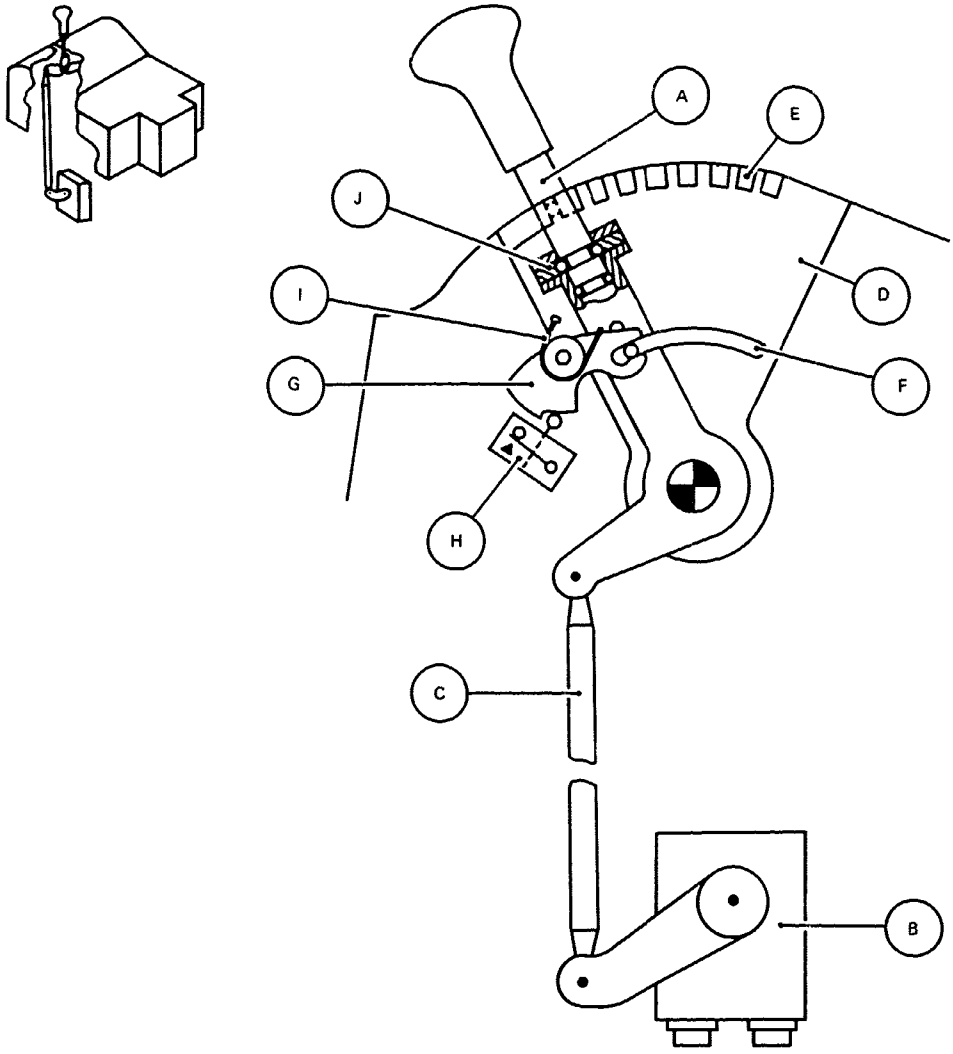
A control lever assembly located in the center pedestal enables the crew to select the position of the speed brake surfaces and to preselect the ground spoiler function.

The control assembly is composed of :

- A control lever (A) which drives the speed brake control transducer unit (B) via mechanical linkage (C)
- A fixed quadrant (D) with eleven notches (E) which lock the SPEED BRAKE control lever in the selected position.

Lever motion is guided by a slot (F). The slot prevents ground spoiler preselection if the control lever is not in the RET position.

- A spring device (J) which holds the control lever extended when the ground spoiler function is preselected.
- A cam (G) which drives the ground spoiler preselection microswitches (H).
- A spring (I) which holds the cam in the "ground spoiler not preselected" position when the control lever is not pulled upwards.



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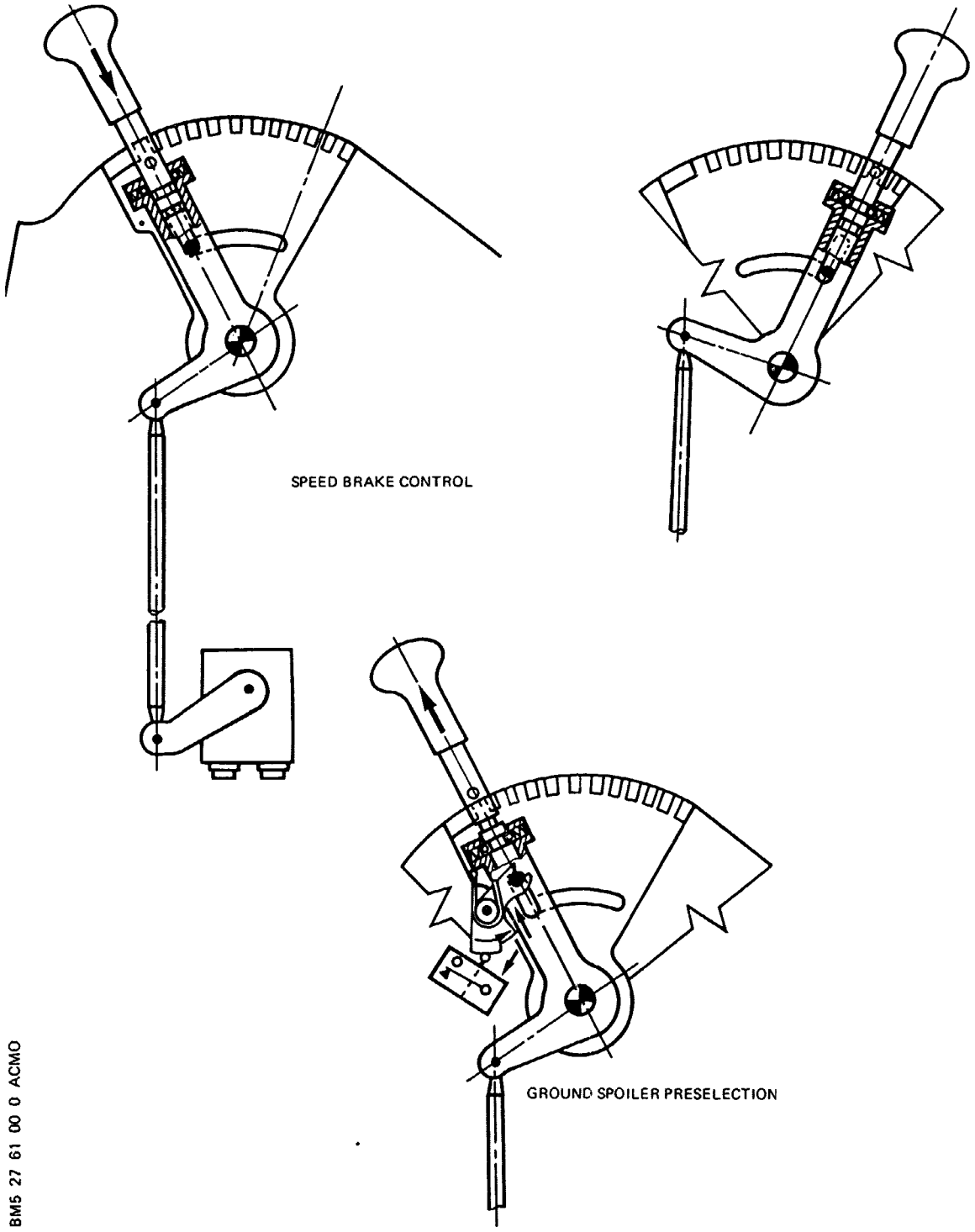
SPEED BRAKE Control Lever Assembly
Figure 021



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SPEED BRAKE Control Lever
Figure 022

C. Speed Brake Control Transducer Unit (Ref. Fig. 023)

(1) The speed brake control lever drives a transducer unit which is located under the center pedestal.
The LRU includes :
- Two transducers each consisting of a group of five potentiometers
- One spring loaded friction brake.

(2) The spring loaded friction brake :
- Introduces artificial feel when the pilot moves the control lever.
- Freezes the position of the transducer unit input lever in the event of a rupture of the attachment between the input lever and the **SPEED BRAKE** control lever.
- Freezes the position of at least one group of potentiometers in the event of a rupture inside the unit.

(3) The input lever drives the main shaft of the transducer unit at one end. The friction brake is mounted at the other end of the shaft.
The main shaft drives two toothed sectors which each drive a secondary shaft.
Each secondary shaft drives one group of potentiometers.

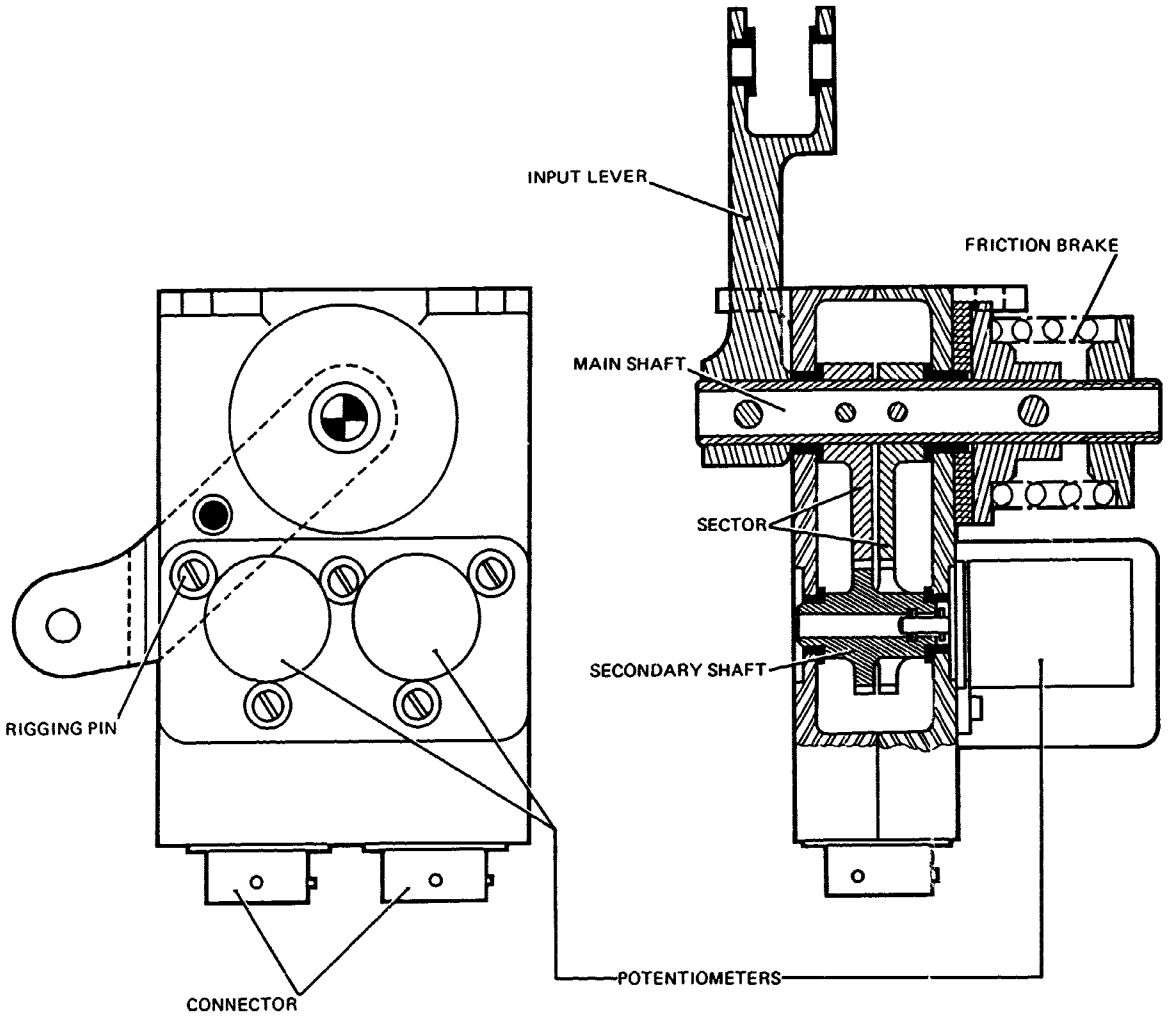
(4) Friction brake torque can be set to between 3 and 10 Nm/2.2 and 7.5 lbf.ft. (nominal torque : 3.5 Nm/2.6 lbf.ft.).

(5) Speed brake control system neutral position is determined by locking the input lever to the transducer unit body with a rigging pin.
The potentiometers are pre-set in the workshop to make their electrical zero coincide with the mechanical neutral position of the transducer unit.
Replacement of faulty transducer units requires neither electrical measurement nor special tooling.
With the input lever locked in neutral position, the potentiometers are at mid-travel, with an output voltage which is therefore half the supply voltage.

(6) Each group consists of five potentiometers : eight are associated with the EFCUs (one potentiometer per control or monitor unit), two are associated with the aircraft recorders.
The potentiometers in one group are used by the control units, those in the other group by the monitor units.
Each potentiometer is electrically supplied with DC voltage by its associated unit.
The transducer unit is equipped with two electrical connectors, one per group.

(7) The transducer unit input lever can sustain without damage a maximum torque load of 75 Nm (55.3 lbf.in.) in the event of action on the **SPEED BRAKE** control lever if, after replacement of a transducer unit, the rigging pin is inadvertently left in place.

(8) There are no maintenance tasks on the aircraft.



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Speed Brake Control Transducer Unit
Figure 023

D. EFCU

(1)General

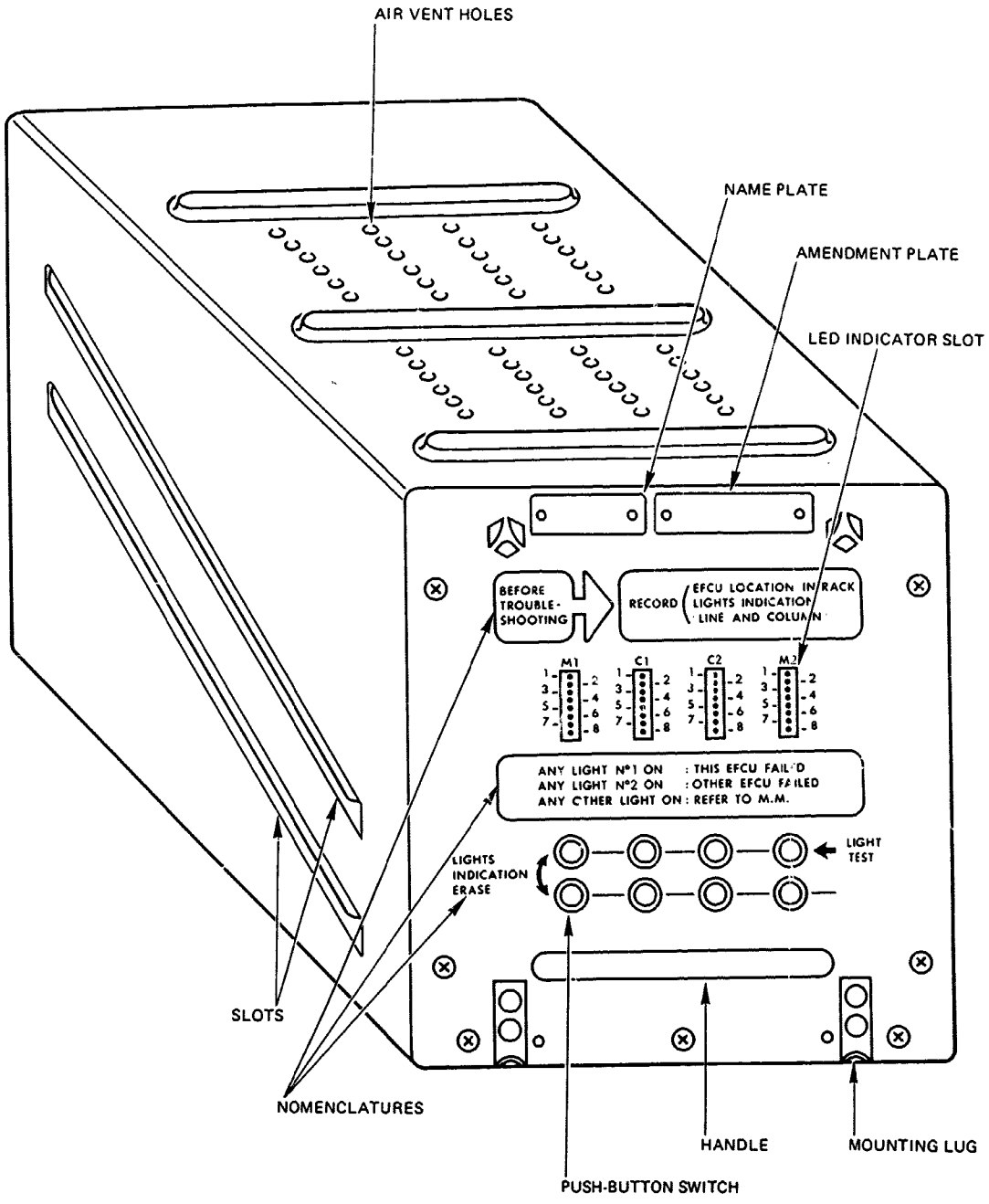
The EFCUs, identified 1CP and 2CP, are located in electronics rack 90VU. Case design is conform to ARINC Specification 600.
Case size : 6 MCU
Connector size : 3
Each EFCU contains four printed circuit boards.
The EFCU comes in the form of a rectangular case made of aluminum alloy.
The unit has the following physical characteristics :

Height	199 mm	7.8 in.
Width	193 mm	7.6 in.
Depth	320 mm	12.6 in.
Weight	5.5 kg	11 lb.

The boards are inserted in guides between the cover and the bottom of the unit and plug into the pin connectors mounted on the mother board.

(2)EFCU case (Ref. Fig. 024)

The face of the unit contains four indicator slots which correspond to the four boards. The slots enable viewing of the eight LED indicators on each board. Below each indicator slot are two holes providing access to two pushbutton switches on each board. Nomenclatures related to the LEDs and pushbutton switches are inscribed on the face. Mounted on the upper section of the face is a name plate and an amendment plate. At the lower section, the face contains two mounting lugs and a handle for removing the unit from its housing.
The back contains a connector (Ref. Fig. 025). This connector is divided into six areas marked A thru F. Areas A, B, D and E each contain 150 contacts arranged in a 10 x 15 matrix. Each contact used is fitted with a pin.
The C and F areas each contain 13 contacts.
The cover and base of the case are provided with small vent holes. The case sides each contain two slots arranged diagonally.
The inside of the unit is fitted (Ref. Fig. 026), at the top, with an angle bracket containing slots in which the boards slide. Each side contains two mounting lugs for the board clamp. At the bottom, a mounting lug is provided for attachment of the unit face panel. This mounting lug is provided with two cylindrical pins used to properly locate the face panel on the unit when assembling. Each of the four boards slide between two board guides mounted on the cover and on the bottom of the unit.
The boards plug into pins on the mother board (Ref. Fig. 027).
The mounting plate is used to secure the mother board in the unit.
The mother board contains four rows with 118 pins each. A locating pin is provided at either end of each row. The board names are printed.



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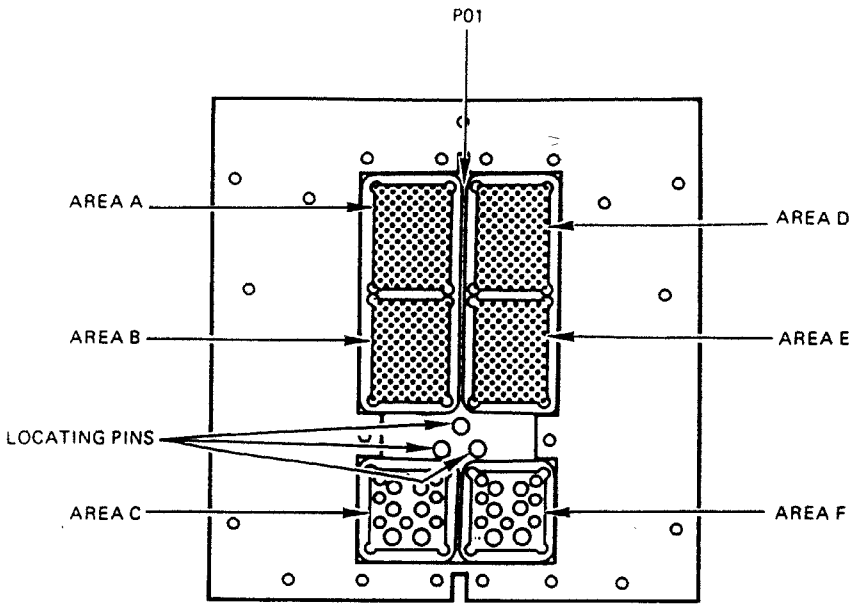
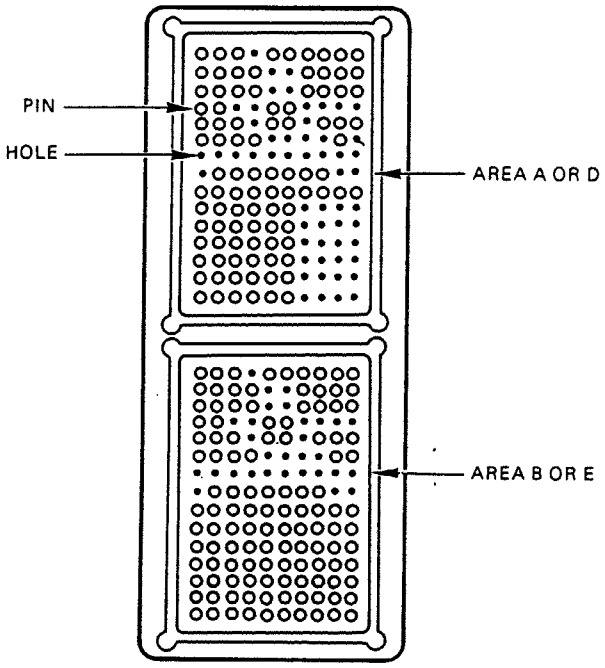
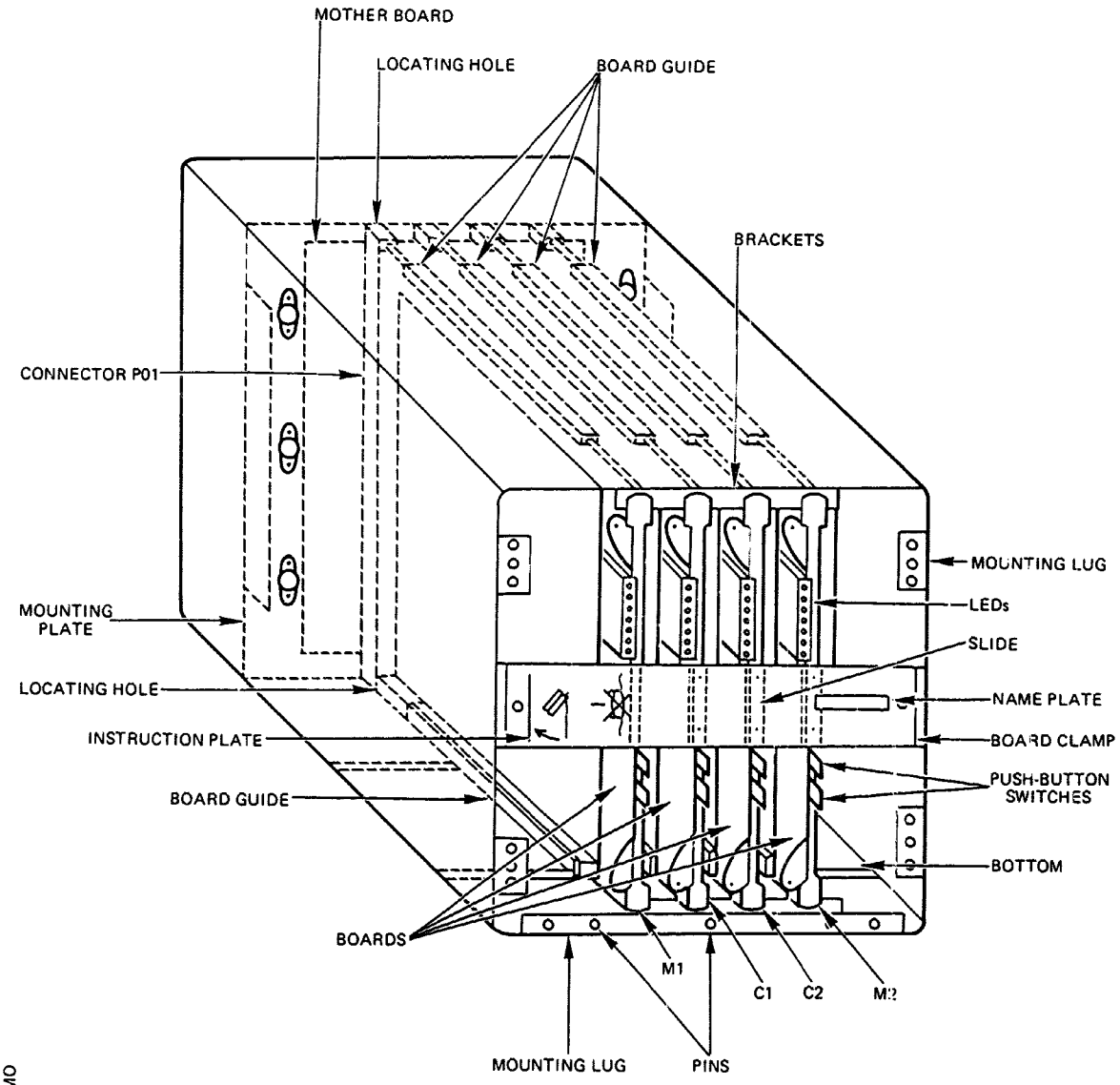
EFCU - General View
Figure 024





BM5 27 61 00 0 CCMO

Back Panel and Connector P01
Figure 025



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Inside View of Unit
Figure 026

On the back panel side, the mother board is provided with four 118-pin rows. A grounding pin is provided on either side of each of the four rows. The four rows of pins are wire-wrap connected to the four contact areas (A, B, E and D) of connector P01. Wire harnesses are used for interconnections. This flexible wiring is held together with cable ties and secured by clamps. These are mounted on the back panel using spacers. The C and F areas are not used and are covered with a fiber glass plate.

(3) Printed circuits boards (Ref. Fig. 028)

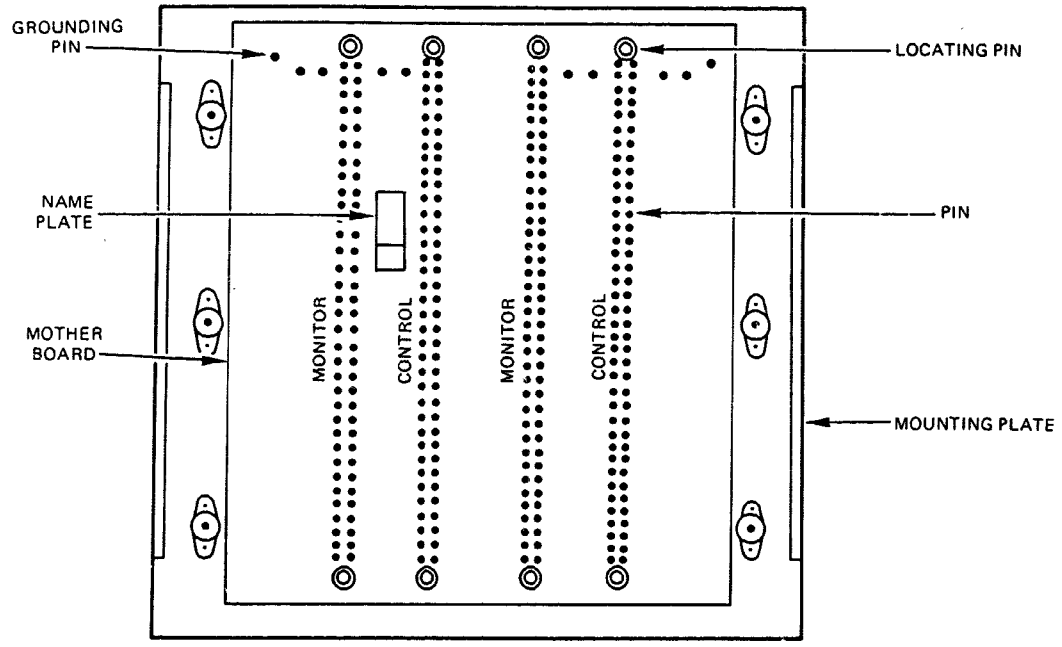
The boards consist of printed circuits with six layers of fiber glass resin. The boards have the following dimensions :

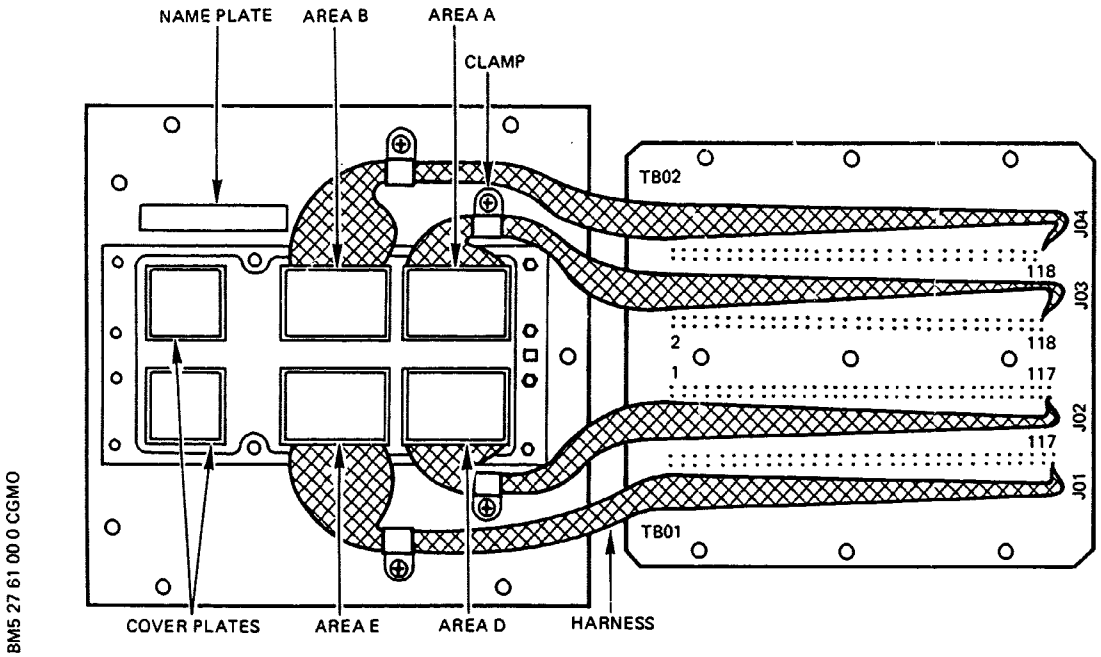
Length = 255 mm (9.84 in)

Width = 180 mm (7.08 in)

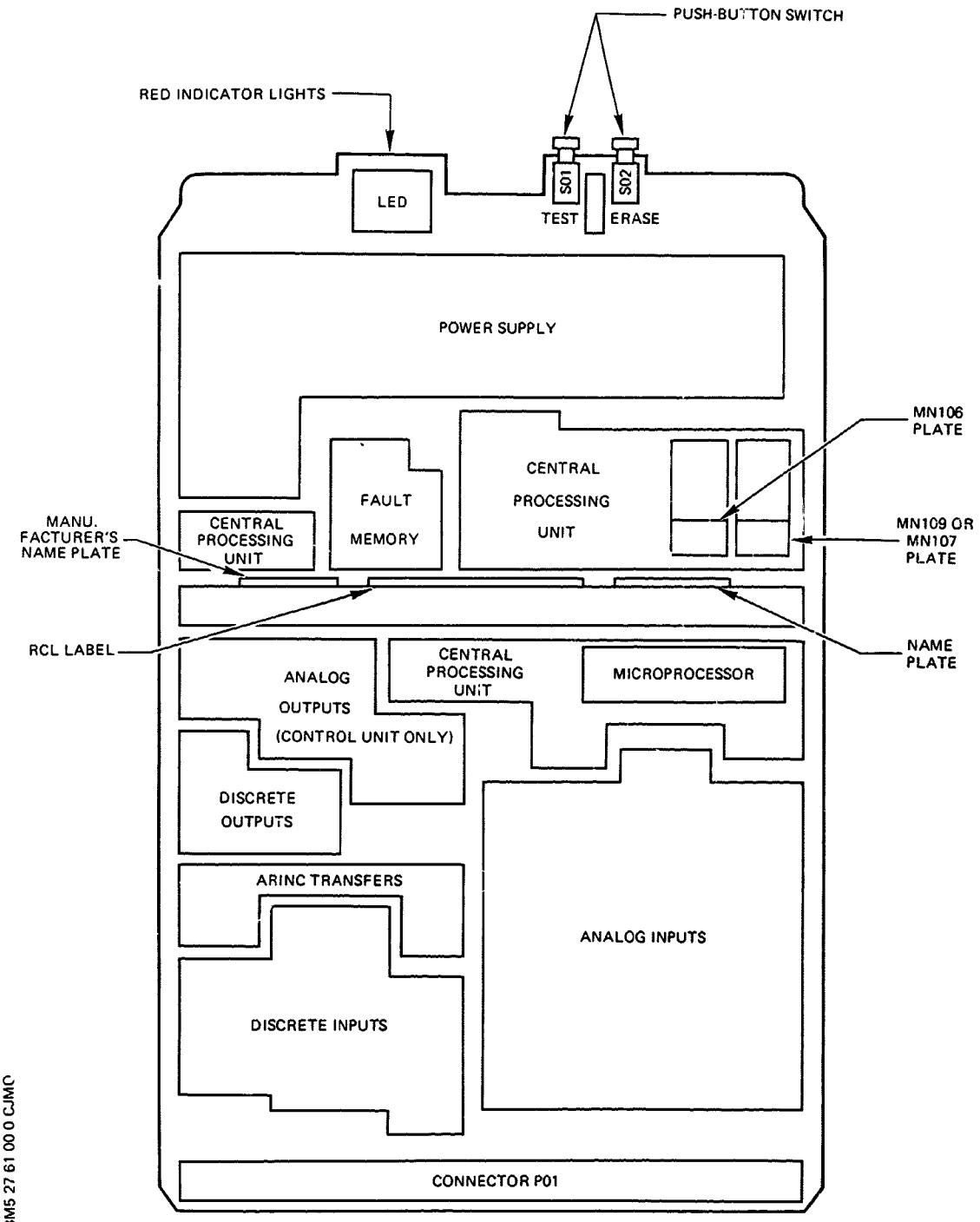
Each board is fitted with a functional connector P01 containing 118 contacts. This connector plugs into one of the rows of pins on the mother board. The connector is provided on either side with a female locating pin. The board contains about 110 16-pin integrated circuits. A stiffener is used to divide the board in two. Each board contains eight red indicator lights and two pushbutton switches.

The indicator lights and pushbutton switches are accessible on the face of the unit. Three labels are fastened on the stiffener. These include a manufacturer's name plate, an RCL label and a name plate.





Mother Board - Back Panel Interconnection
Figure 027



Board Organization
Figure 028

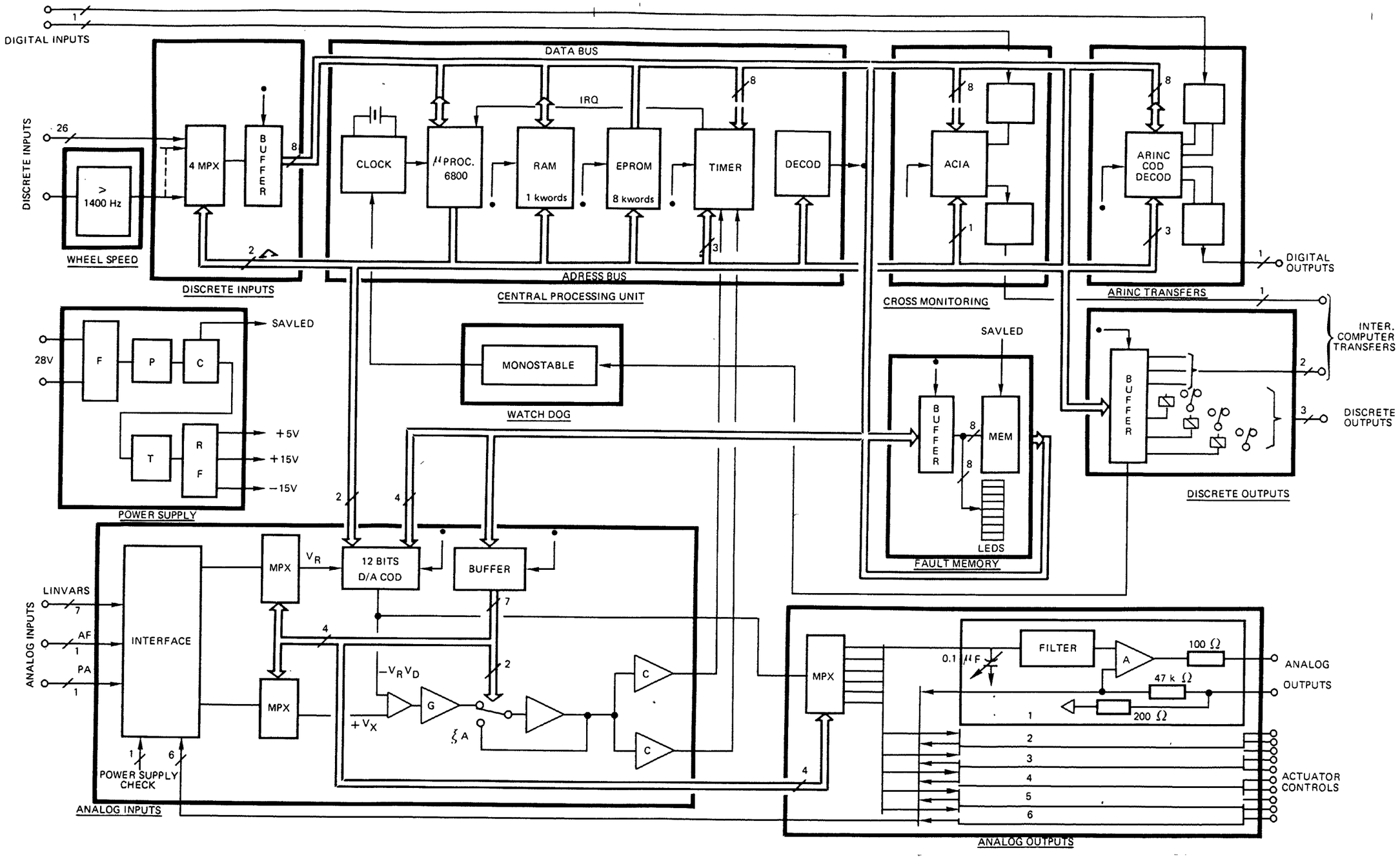
(4)Control board operation
All the components required to achieve the functions of a control unit are assembled on a single board.
Each board may be split into several functional blocks, as shown on (Ref. Fig. 029)

(a)Analog inputs (Ref. Fig. 030)

1 Purpose of function
The Analog inputs function provides digital conversion (VDi) of Analog input voltages (VAI). The Analog input "i" is called the "i" input channel.
The following table lists the various analog inputs, plus the corresponding spoilers, per group, for channel 1 through 4 signals.

TYPE	INPUT REFERENCE	NAME	
AC	A1	SPLR position	
	A2	SPLR position	
	A3	SPLR position	External
	A4	SPLR position	Input
	A7	Roll control input	
DC	A8	Spd brk control input	
DC	5V	Internal supply	
	I1	Servovalve current	Internal
	I2	Servovalve current	Input
DC	I3	Servovalve current	
	I4	Servovalve current	

CHANNELS	A	B	C	D
A1, I1	SPLR2, L	SPLR1, L	SPLR6, L	RUDDER TRIM
A2, I2	SPLR2, R	SPLR1, R	SPLR6, R	
A3, I3	SPLR3, L	SPLR4, L	SPLR7, L	SPLR5, L
A4, I4	SPLR3, R	SPLR4, R	SPLR7, R	SPLR5, R



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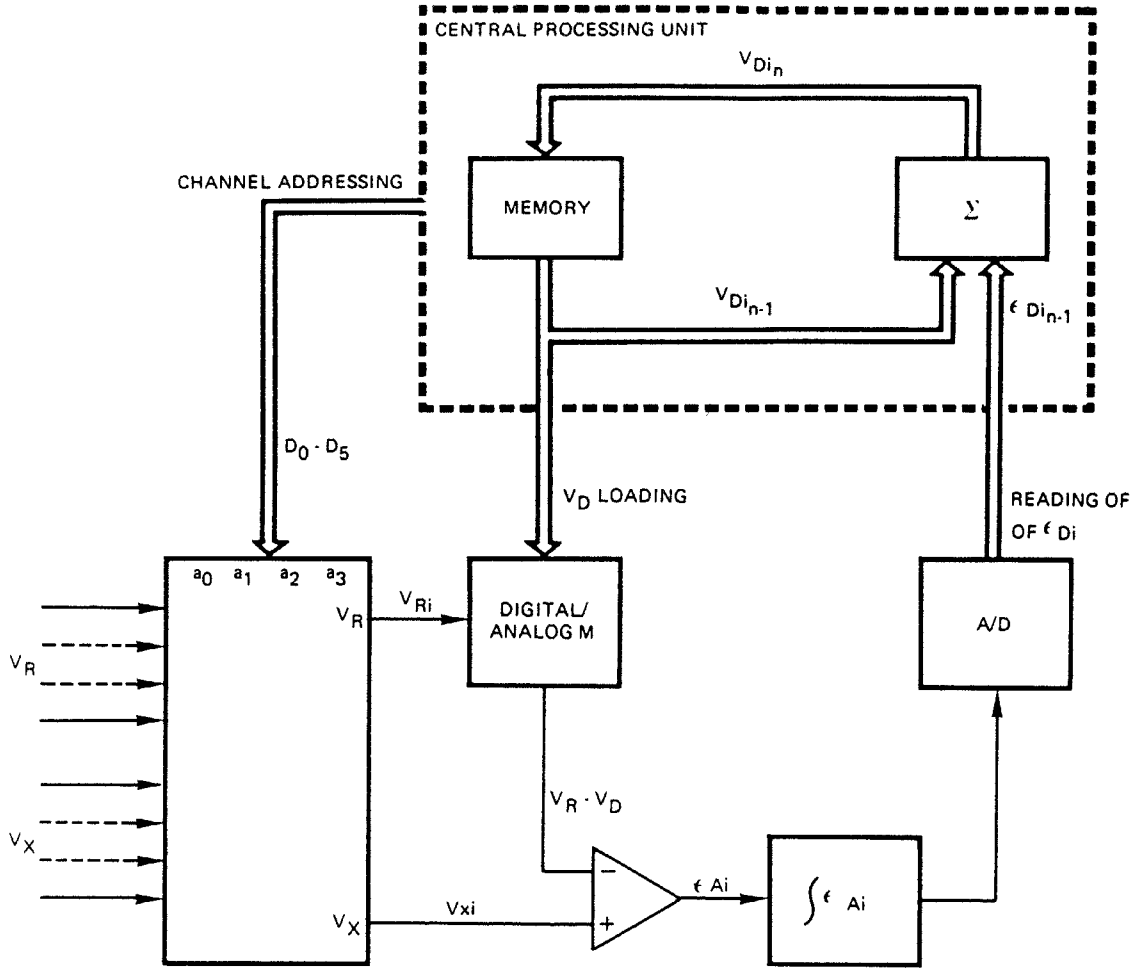
Block Diagram of Control Board
Figure 029



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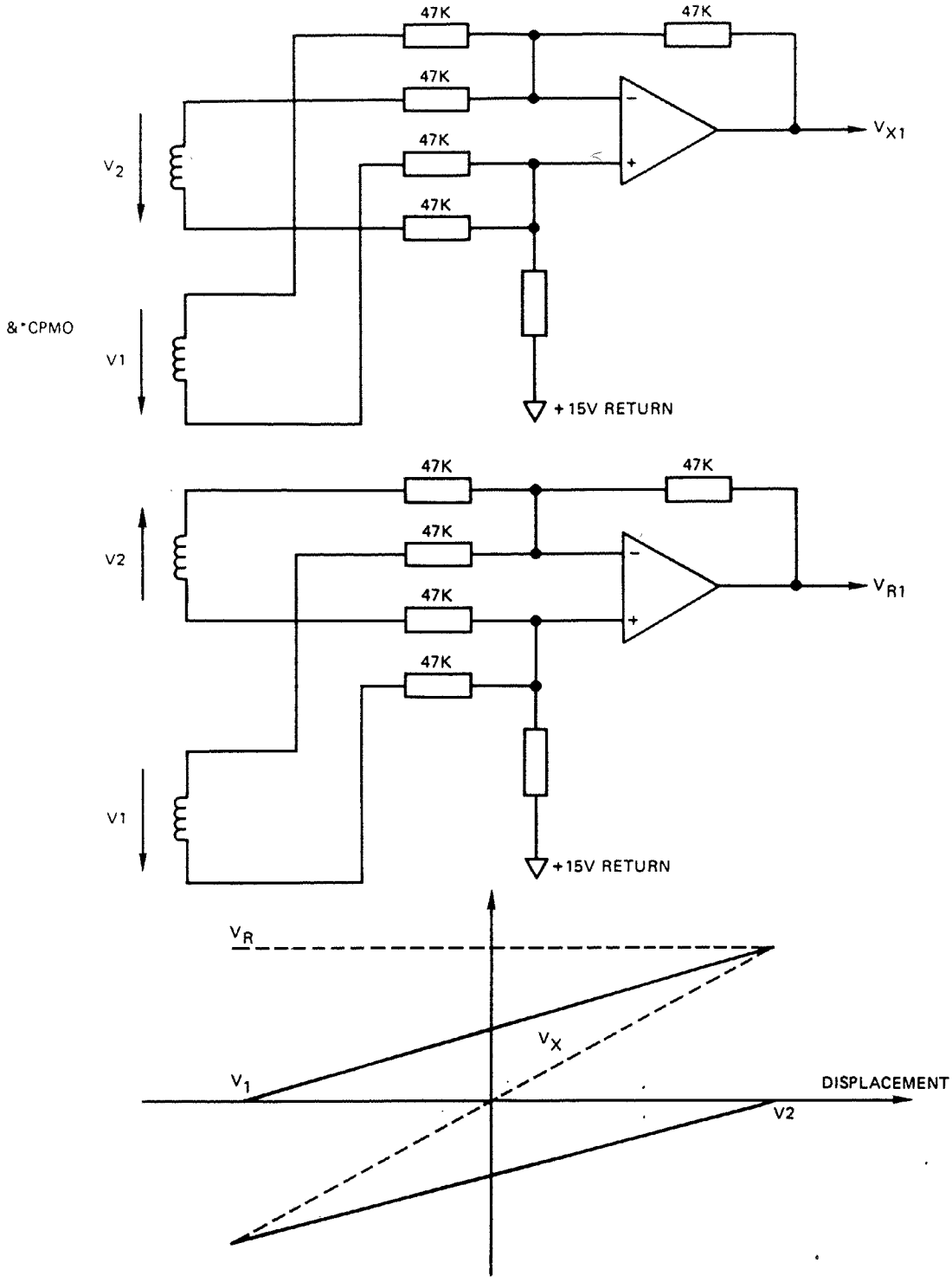
Analog Input Processing
Figure 030

2 Encoding principle : for each "i" channel it consists in correcting the digital value VDin at each program cycle "n" using a looped system until the balanced position is obtained, i.e. when the digital error ϵDin is cancelled.
The various input channels (VAi) are processed sequentially. The sequence is controlled by the central processing unit making it possible to use one conversion loop only.
A conversion program cycle is the following :
- Selection of the analog input VAi and loading of a multiplier with VDi
- Computation of the analog error :
  ϵAi = VXi - VRi . VDi
- Integration of the error ϵAi
- Conversion of the analog error ϵAi into digital ϵDi
- Correction of the digital value VDi of VAi by ϵDi
- Storage of new value VDi for next program cycle of the "i" channel.

At each moment, the central processing unit memory thus contains the digital value of each input.

3 Generation of encoding voltages VRi . VXi
In order to achieve similar Analog inputs encoding, different preliminary processes are applied according to the type of input.
- Inductive transducer Analog inputs (AI1 thru AI7) (Ref. Fig. 031)
  Inputs AI1 thru AI7 receive two 400 Hz AC voltages (V1 and V2) from the inductive transducers. Voltages V1 and V2 are proportional to the transducer travel. The processing performed on these inputs consists in converting the pair (V1, V2) to a pair (VXi, VRi) to obtain :
  VRi = V1 - V2
  VXi = V1 + V2
- DC input A8 (Ref. Fig. 032)
  This input receives a DC voltage generated by the speed brake control transducer unit potentiometer. The computer provides the potentiometer supply voltage and the constant reference voltage VR. The first stage of this circuit acts as a low pass filter (cut-off frequency about 16 Hz).
  The second stage modifies the variation law for optimum use of the converter dynamic range.
  The stage output voltage is expressed VX = 2VE - VR where VE represents the first stage output.
- Servovalve current
  These inputs receive DC voltages VX representing the actuator control currents generated by the Analog outputs function. The voltages VX are encoded in relation to the +10V internal reference voltage VR.
- +5V supply Analog input
  This input is used directly as a voltage VX and is encoded in relation to the +10V internal reference voltage VR.
  NOTE : Servovalve current and +5V supply inputs are internally connected on the board to the analog input encoding circuit.



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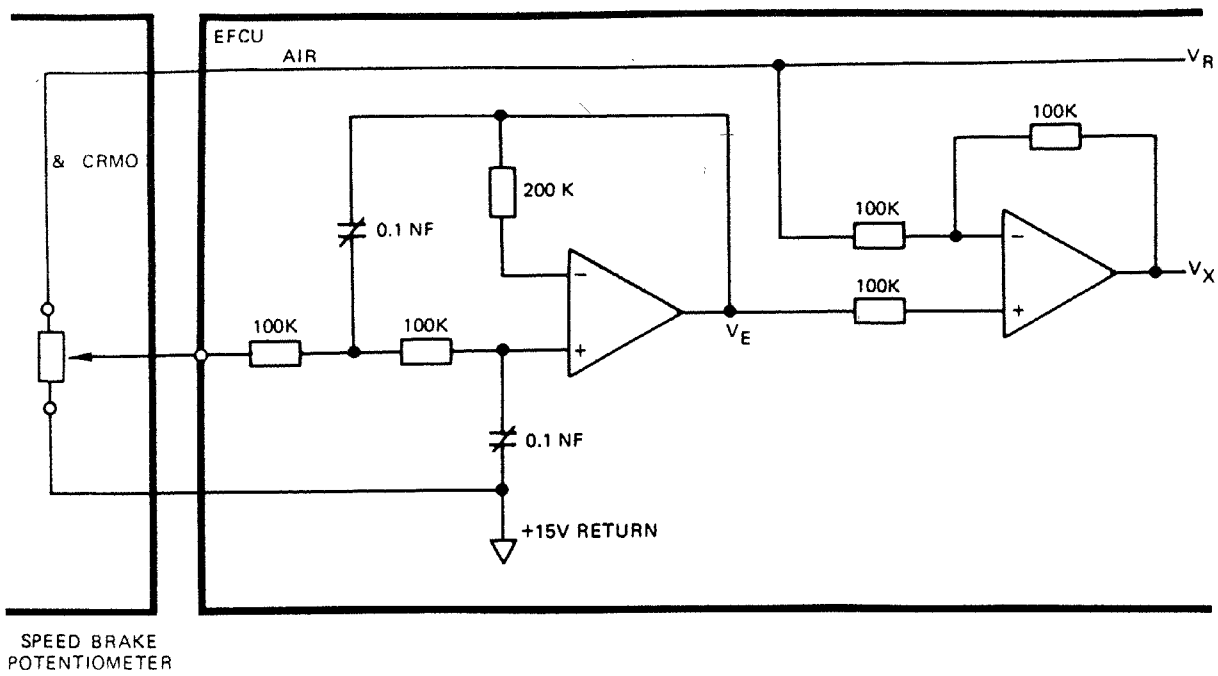
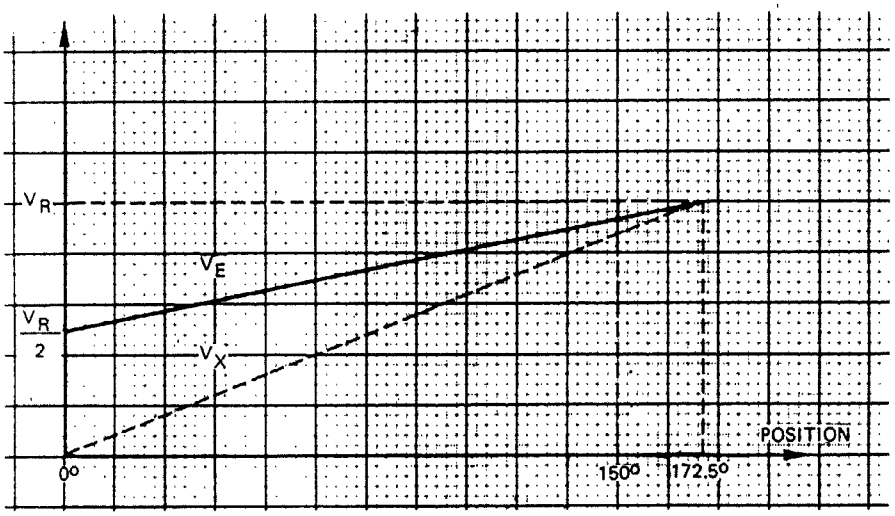
Inductive Transducer Encoding Voltage Generation
Figure 031





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Speed Brake Control Transducer Unit Potentiometer Encoding Voltage Generation
Figure 032

(b) Discrete inputs

The discrete input function ensures acceptance of discrete information by the computer. The discrete inputs are logic levels sent to the computer. This information is gathered on four 8-bit words.
The following table lists the various discrete inputs and the definition of logic states 0 and 1.

DISCRETE INPUT ORIGIN	DISCRETE INPUT NAME	REF	DEFINITION OF LOGIC STATE 1	LEVEL STATE 1	LEVEL STATE 0	NOTE
SFCC 1 or 2	Slat position	DI1	Not retracted	O.C.	GND	(2)
	Slat channel valid	DI2	Invalid	O.C.	GND	(2)
SFCC1	Flap position	DI3	Not extended	O.C.	GND	(2)
SFCC1	Flap channel valid	DI4	Invalid	O.C.	GND	(2)
SFCC2	Idem DI3	DI16	Idem DI3	O.C.	GND	(2)
	Idem DI4	DI17	Idem DI4	O.C.	GND	(2)
A/C Wiring	GND SPLR selection	DI6	GND SPLR selected	28VDC	O.C.	(1)
54GB	Bogie Beam	DI7	Rotation	O.C.	GND	(1)
Other EFCU	GND SPLR decision	DI8	GND SPLR ext decided	-12VDC	+12VDC	(1)
54GB	Shock absorber	DI9	Extended			
FWC	HRA	DI10	HRA >5FT	O.C.	GND	(1)
	Hydraulic pressure switch	DI11	Low press	O.C.	GND	DI11: B Y B G
		DI12	Low press	O.C.	GND	DI12: NU NU Y NU
A/C Wiring	GND SPLR Test	DI13	Test selected	28VDC	O.C.	(1)
A/C Wiring	Unit identification (pin programming)	DI18				DI18: A=0 B=0 C=1 D=1
A/C Wiring		DI19				DI19: A=0 B=1 C=0 D=1

DISCRETE INPUT ORIGIN	DISCRETE INPUT NAME	REF	DEFINITION OF LOGIC STATE 1	LEVEL STATE 1	LEVEL STATE 0	NOTE
Control panel	Engage input	DI25	Engage	28VDC	O.C.	
Control panel	Engage input	DI26	Engage	28VDC	O.C.	
Valve group L Valve group R	Solenoid valve test	DI28 DI29				For SPLR 1 and 2 only

NOTE

	A	B	C	D
DI25	SPLR 2-3	SPLR 1-4	SPLR 6	SPLR 5
DI26	NU	NU	SPLR 7	RUD TRIM re-set

GND = Ground
O.C. = open circuit
NU = not used
(1) Ref Para.3D
(2) Ref Para.3C

(c)Wheel speed input

The main landing gear aft wheel tachometers generate sinewave voltage with a frequency F proportional to the speed of the aircraft.
The sinewave signal is converted by a wheel speed functional circuit into a discrete command which goes to the 1 state when the aircraft speed reaches 85 knots (i.e a frequency of 2725 Hz), with an hysteresis of ±10%.

(d)Analog outputs (Ref. Fig. 033)

This function is used for processing of the four spoiler servovalve currents. It comprises :

- Digital-analog conversion
- Sampling-blocking
- Filtering (provision)
- Power amplification.

1 Digital-analog conversion

The voltage VD representing the value output by the computer is converted from digital to analog by the 12-bit digital-analog multiplier. This circuit is common to the Analog inputs and Analog outputs functions. The multiplier output is expressed as follows :

$$V = -VR \cdot VD$$

(VR is the +10V internal reference voltage).
This voltage is then inverted by an amplifier. The voltage thus obtained (VDAC = + VR . VD) is applied to a demultiplexer for distribution to the outputs.

2 Sampling-blocking

Once the multiplier is loaded, bit ESA is positioned to 1 enabling the three address bits (a1, a2 and a3) of demultiplexer MA204 to select one of its outputs.
The voltage VDAC is then applied to the corresponding sampler-blocker. Bit ESA remains at 1 during the time required to charge the sampler capacitor.

3 Filtering (provision)

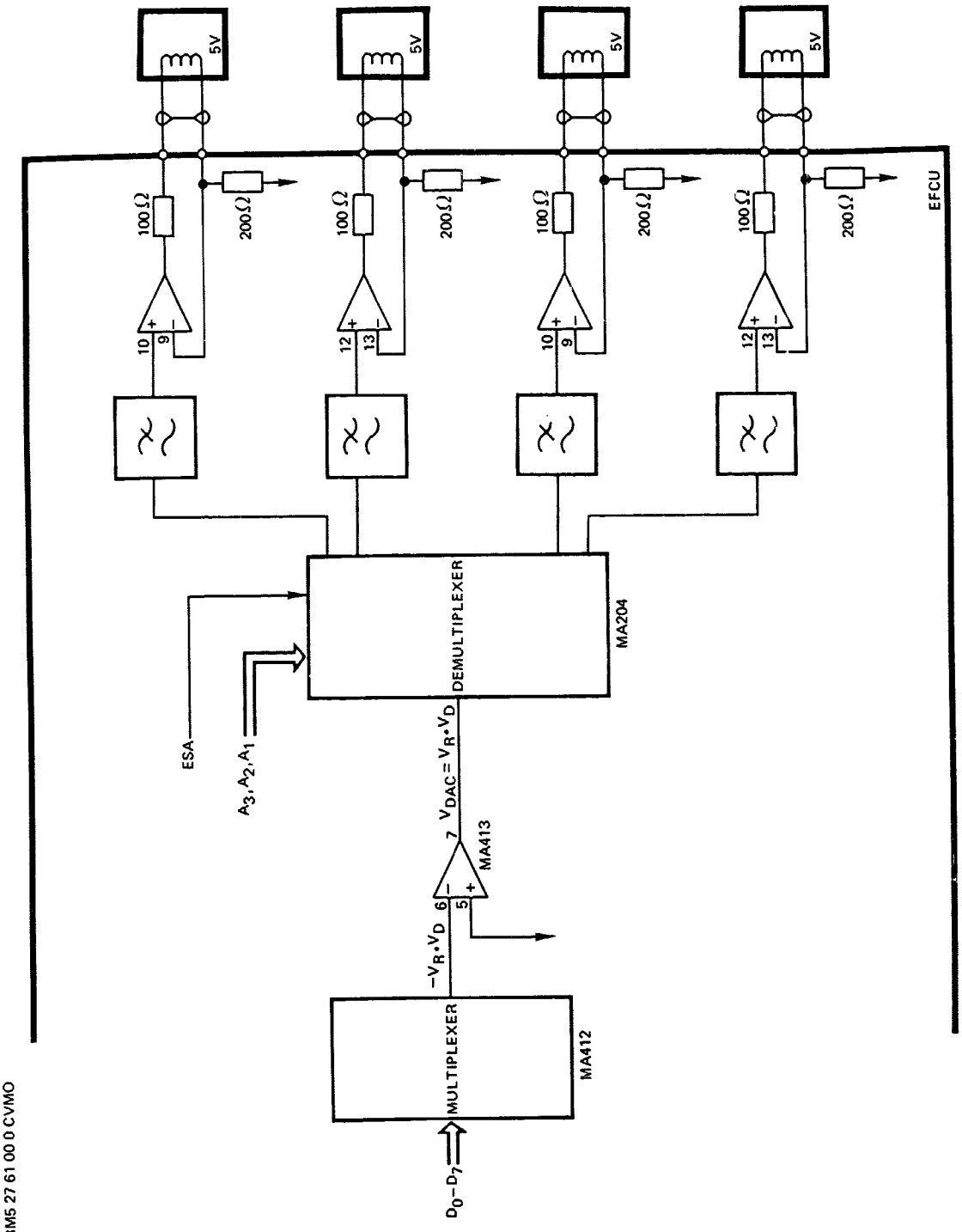
The actuator voltage VDAC is then applied to the input of a second order low-pass filter with a gain of 1. This filter consists of an operational amplifier (MA201, MA202 or MA203) and two RC networks.

4 Power amplification

The low-pass filter output is applied to an operational amplifier wired as a voltage follower. The amplifier output is applied to a resistor to produce the actuator feedback control. In steady state operation, the feedback control is expressed as follows :

$$I(SV) = \frac{VR \cdot VD}{R} \quad \text{with } R = 200\ \Omega$$

Two zener diodes on the amplifier output are used to limit undesired effects of possible overvoltages on the EFCU/servovalve line.



Block Diagram of Analog Outputs Function (Control Board)
Figure 033

(e)Discrete outputs

These signals are generated using bits supplied by the CPU.
The following discrete signals are emitted by line drivers or relays.

DISCRETE OUTPUT			DEFINITION OF	LEVEL		PIN
DESTINATION	TYPE	NAME	LOGIC STATE 1	STATE 1	STATE 0	REF
Other EFCU	Line Driver	GND SPLR decision	GND SPLR extension decided	-12VDC	+12VDC	
Maintenance panel (EFCU BITE DISPLAY)	idem	Memorized Fault	No failure	-12VDC	+12VDC	
Control panel	relay	Fault R1	No failure	O.C.	GND	
Control panel	relay	Fault R2	No failure	O.C.	GND	

O.C. = open circuit

Fault relays R1 and R2 are used as follows, depending on the board location (i.e. A, B, C or D)

FAULT RELAYS	A	B	C	D
R1	SPLR 2-3	SPLR 1-4	SPLR 6	RUD TRIM
R2	N.U.	N.U.	SPLR 7	SPLR 5

(f)Digital transfers

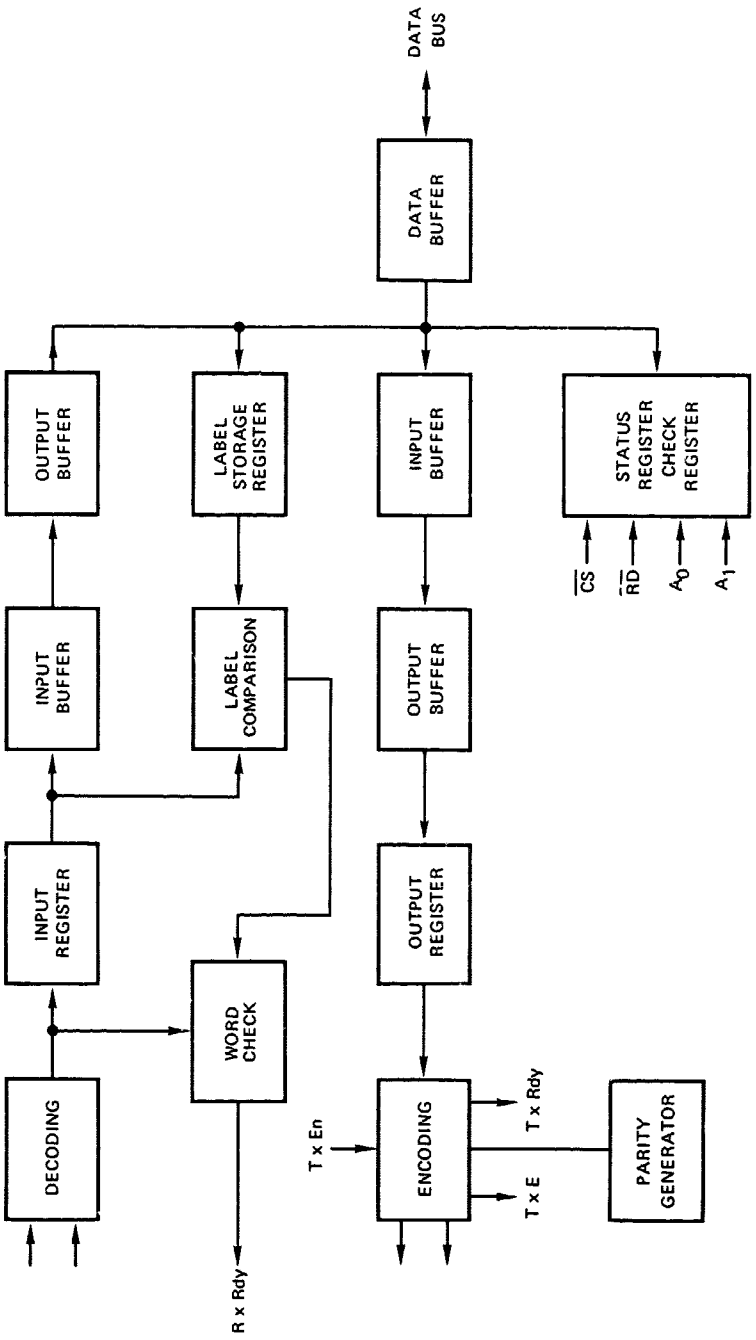
Two types of digital signals are transferred between the computer and associated equipment, depending on the transmission medium used :

1 Cross monitoring

The cross monitoring function between the control and monitor units is performed by an 8-bit serial asynchronous link (V24 standard).
The interface circuit performs data formatting and transmission monitoring.

2 ARINC Transfer (Ref. Fig. 034)

ARINC transfers are interfaced by a special LSI circuit manufactured by BENDIX. This interface emits one ARINC bus, and receives one ARINC bus.



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Block Diagram of ARINC Interface
Figure 034

(g)Central processing units (Ref. Fig. 029)

The central processing unit comprises a MOTOROLA 6800 microprocessor, a clock, a programmable timer circuit, a programmable read only memory PROM, a random access memory RAM and an addressing circuit.

1 Microprocessor

The microprocessor is the heart of the central processing unit.
The main characteristics are :

- Bidirectional 8-bit data bus
- 16-bit address bus
- 72 instructions
- 7 addressing modes
- Six internal registers (accumulator A, accumulator B, index, program counter, stack pointer, status register)

2 Clocks

The basic function of the clock generation circuit is to provide the microprocessor with two phases and general synchronization of the central processing unit.

3 Timer

This circuit comprises three counters used to generate programmable time delays. The circuit is used to produce program interrupts in the central processing unit function and as a down counter for the digital error measurement (εD) in the analog input function.

4 Read only memory PROM

The read only memory has an 8 K-byte capcity. It contains the program instructions encoded on eight bits.

5 Random access memory RAM

The random access memory has a 1 K-byte capacity. This memory circuit is entirely static and requires no clock or refresh operation.

6 Addressing circuit

The central processing unit contains a 16-bit address bus providing an addressing capacity of 64 K-Bytes, in hexadecimal form. Selection of the main address areas is performed by a PROM circuit. It selects the random access memory RAM, the read only memory PROM and two other decoder units for the various central processing unit interfaces.

(h)Fault memory (Ref. Fig. 029)

The EFCU unit contains circuitry used for maintenance purposes enabling detection of certain types of faults occurring during flight.
The origin of the fault detected is encoded on an 8-bit word. The type of fault is then displayed on an indicator containing eight LED indicators.
At each power cut-off, the fault code is transferred into a non-volatile memory. Thus stored, information can again be sent for display on the LED indicators. A TEST LED pushbutton switch enables testing of the eight LED indicators for correct operation. When the TEST LED and ERASE pushbutton switches are pressed simultaneously, the central processing unit fault isolation memory is cleared.

(i)Watchdog

The watchdog is a monitoring system which is initiated at regular intervals by the program. When not reinitiated, the watchdog reinitializes the computer to prevent blockage on a spurious signal.

(j)Power supply

The power supply function uses the aircraft 28V system voltage to generate the +5V, +15V and -15V voltages required for the EFCU operation. In addition, the 28V input voltage is monitored and a fault signal is generated in the event of a voltage drop.
This is a flyback chopping type power supply.

(5)Monitor Board Operation

This may be split into several functional blocks, as for the control board (Ref. Fig. 035)

The architecture is similar to that of the control board. The basic differences are described for each function.

(a)Analog inputs

The DC servovalve current inputs are not present on this board. With this single exception, the Analog inputs function of the monitor board is identical to that of the control board.

(b)Discrete inputs

The monitor board receives the same discrete inputs as the control board except as regards the solenoid valve test inputs DsI28 and DsI29.

(c)Wheel speed input

No difference with control board.

(d)Analog outputs

Not applicable to monitor board.

(e)Discrete outputs

The monitor board contains, in addition to the discrete outputs identical to those of the control board, seven discrete outputs used to cut off the solenoid valve, the servovalve currents and to control rudder trim reset and the pitch uncoupling solenoid.

These additional 2-contact relays are used as follows, depending on the monitor board location.

GROUP	R4	R5	R6	R7	R8	R9	R10
A	S2	SV2		SV3		NU	NU
B	S1	SV1		SV4		NU	NU
C	GND SPLR	SV6		SV7		NU	Pitch Uncoupling
D	GND SPLR	Rudder trim reset		SV5		NU	Pitch Uncoupling

S = solenoid valve
SV = servovalve

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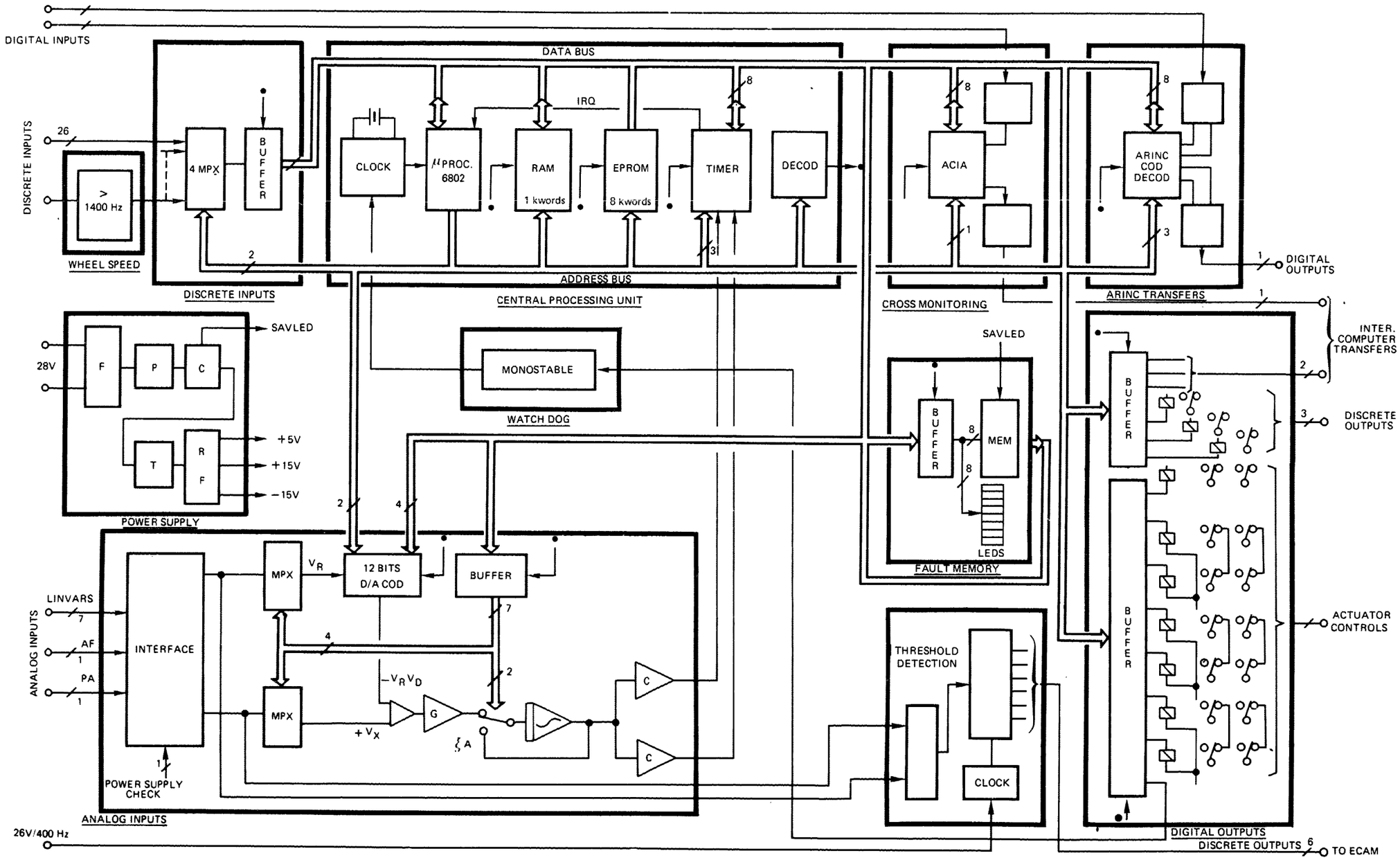


Block Diagram of Monitor Board
Figure 035

(f)Digital transfers
Identical to control board (Ref. para. 5.D.

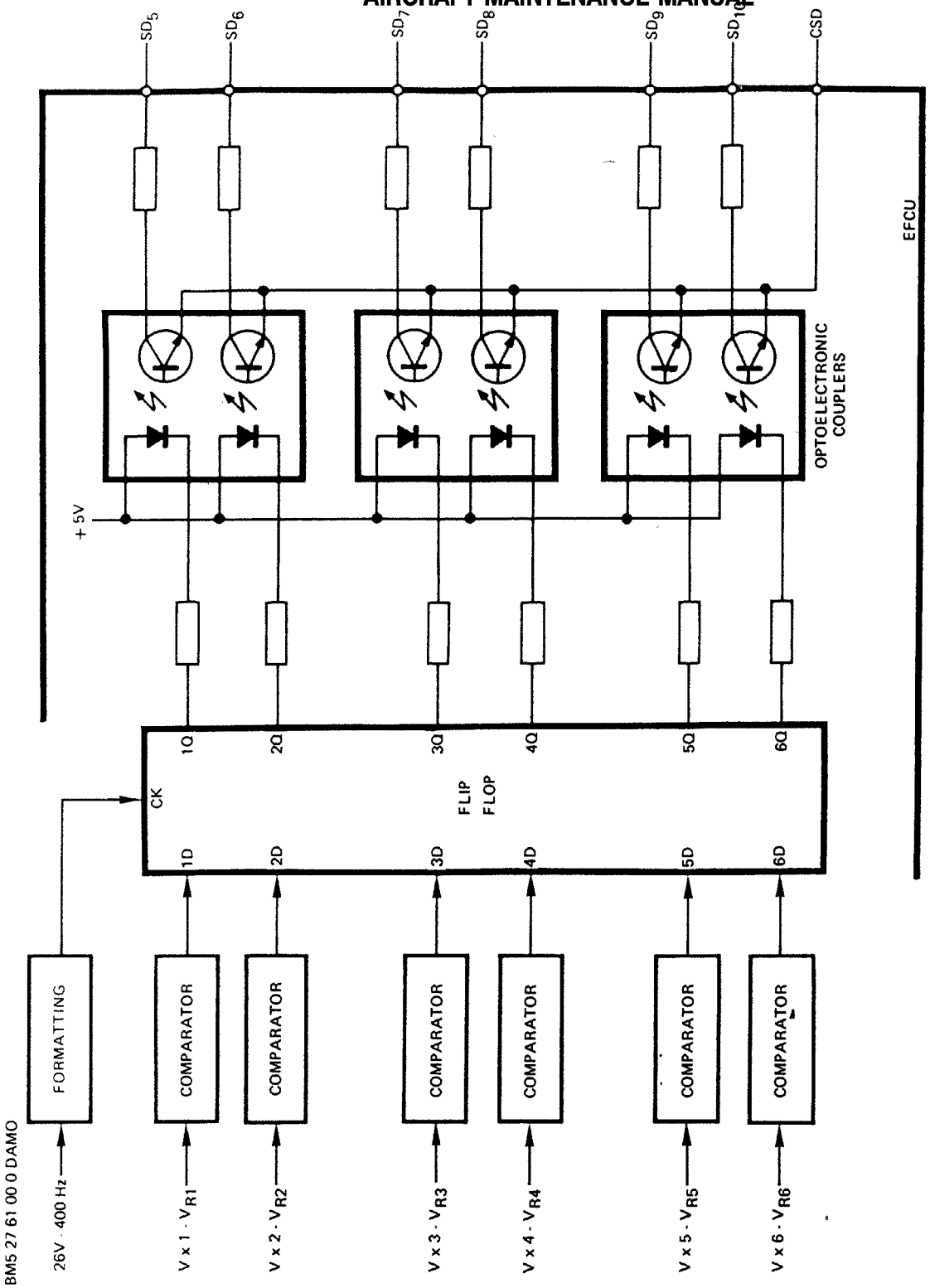
(g)Central processing unit
The central processing unit function of the monitor board is slightly different to that of the control board. The microprocessor used is a MOTOROLA 6802. This central processing unit uses an integrated clock controlled by a 4 MHz quartz oscillator.

(h)Fault memory
Identical to control board (Ref. para. 5.D.).

(i)Watchdog
Identical to control board (Ref. para. 5.D.).

(j)Power supply
Identical to control board (Ref. para. 5.D.).

(k)Position indication (Ref. Fig. 036)
The position indication function is present only on the monitor board. This function is achieved with discrete components; disconnected from the computer program. In this respect, it is directly connected to the signals supplied by the spoiler actuator feedback transducers. The displacement value of the transducer is compared to a threshold to generate a position signal which is sent to the ECAM system. The output signals are decoupled by opto-electronic couplers.



Spoiler Position Indication
Figure 036

6. Maintenance and Periodic Test

A. Failure Indication

Two fault annunciators are located on the lateral panel.

(1) EFCU/BITE DISPLAY

Is activated as soon as a failure is detected by the EFCU for T ≥0.5 s, and indicated by LEDs on its face.

So the EFCU bite display remains on until the LEDs are reset on the EFCU.

- Low hydraulic pressure FAULT legends come on on relevant SPLR push-button switches on overhead panel but there is no indication on the EFCU face, so EFCU bite display is not activated.
- For a loss of DC PWR, EFCUs are not energized so there is no LED coming on on the face and EFCU bite display remains OFF.
- For a loss of AC TRANSDUCER PWR, a fault is detected by the EFCUs and a code appears on the face, so EFCU bite display is activated.

EFCU/BITE DISPLAY reset

When the origin of the failure has been eliminated, the EFCU face can be cleared and at the same time the EFCU bite display is deactivated.

(2) GND SPLR SEL LANE/FAULT

This annunciator is not memorized and is cleared as soon as the FAULT desappears.

B. Failure Identification

(Ref. Fig. 037)

Each EFCU aids maintenance to identify the following components if failed :

(1) The EFCU itself
(2) Roll control transducer unit
(3) Speed brake control transducer unit
(4) Servovalve
(5) Solenoid valve (when installed) for each servo control
(6) Servo control feedback transducer (LVDT)

Failure information is stored in the EAROM for several days.

Failures are indicated by LED lights (eight per unit) :

- Two lights for failure of the EFCU itself
- Six lights for failure of other components (encoding)

Aircraft electrical network de-energized :

- Failure information is stored
- All lights are off.

Two pushbutton switches per unit are located on the face. By pressing the upper switch, the operator checks LED condition. By pressing both switches he erases the information inside the EAROM.

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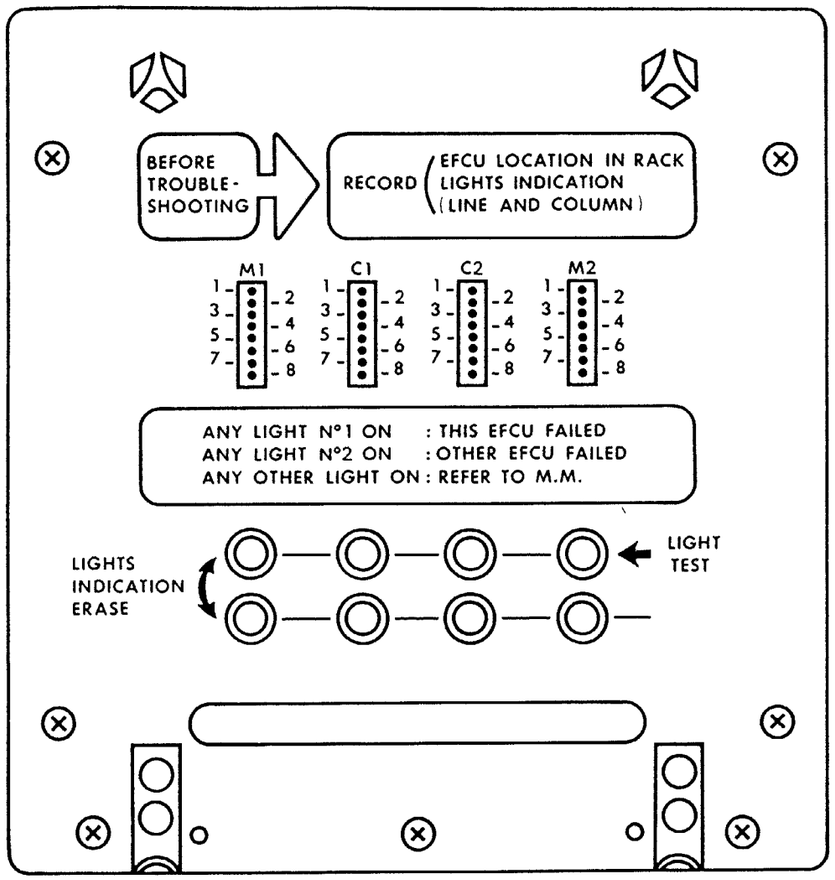

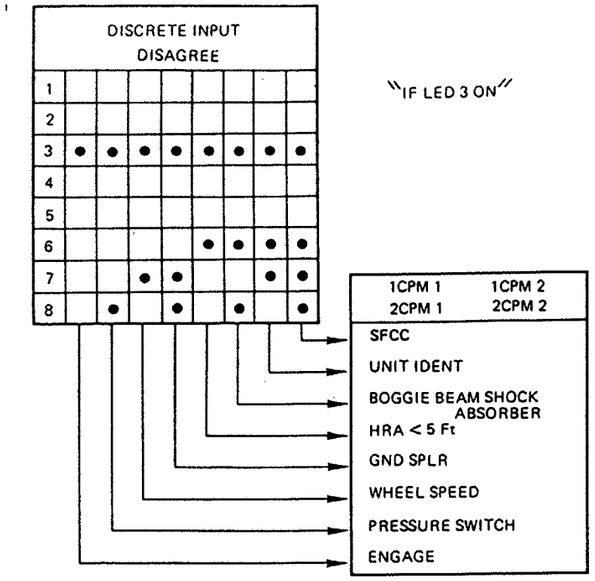

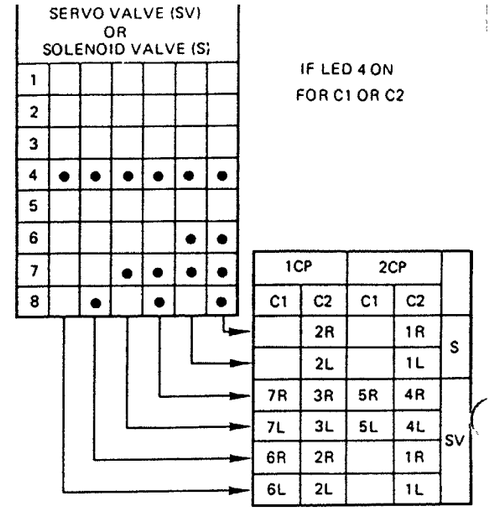

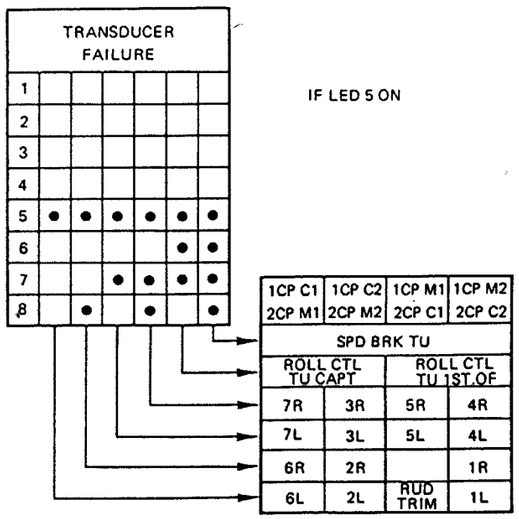

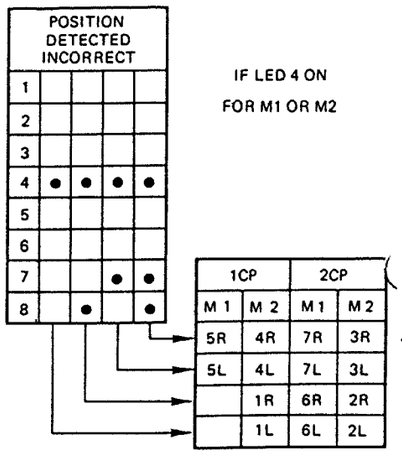

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EFCU - Failure Light Encoding
Figure 037

EFFECTIVITY: ALL

PIA

C. Periodic Test
(1)Ground spoiler test
Is achieved from the lateral panel : Ref. Para. 4.D.
(2)EFCU failure test
Is achieved by checking EFCU/BITE DISPLAY annunciator on the lateral panel.
If the annunciator is on, the origin of the fault is located by using the EFCU face display.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Adjustment

A. Reason for the Job
(1)Adjustment of linkage between SPEED BRAKE control lever and speed brake control transducer unit.
(2)Adjustment of spoilers 1 and 2 by manual retraction/extension.
(3)Adjustment of spoilers 1 and 2 with spoiler valve group control box.
(4)Adjustment of spoilers 3 to 7 by manual retraction/extension.
(5)Adjustment of spoilers 3 to 7 with spoiler valve group control box.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27901000000	Pin - Rigging, Aileron Control Wheel
(2)98A27608011000	Control Box - Spoiler Valve Group
(3)98A27608013000	Safety Collar Set - Spoiler 5 to 7/Actuator Piston
(4)98A27608014000	Safety Collar Set - Spoiler 1 to 4/Actuator Piston
(5)98A27608015000	Setting Gage Set - Actuator Adjustment, Spoiler/Airbrake, Surfaces 1 thru 7
(6)98A27608017000	Spanner Set - Spoiler/Airbrake Actuator Piston Adjustment
(7)VG2-68	Pin - Rigging, Transducer Unit
(8)	Access Platforms 2.50 m., 5m. and 5.60 m. (8 ft. 2, 16 ft. 5 in. and 18 ft. 5 in.)
(9)	Safety Barriers
10)	Lockwire - Corrosion Resistant Steel, dia. 0.6 mm, 0.8 mm and 1 mm (0.025 in., 0.032 in. and 0.04 in.)
11)	Warning Notices
Referenced Procedures	
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 24-41-00, P. Block 301	AC External Power Control

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up

(a)Initial conditions

- Correct electrical power supply (Ref. 24-41-00, P. Block 301).
- Forward services ventilation system in operation.
- Overhead and aft panel circuit breakers closed, particularly those associated with FLT CTL (133VU).
- Aircraft on ground (L/G PROX DET & RELAYS SYS1 & 2 circuit breakers closed, on panel 133VU).

(b)Connect hydraulic ground power cart and pressurize Green, Blue and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).

(c)Install access platforms and safety barriers.

(d)On SERVO CTL section of panel 428VU, make certain that SERVO CTL, G, B and Y, (JAM OFF) pushbutton switches are pressed and legends off.

(e)Before undertaking adjustment of spoilers 1 and 2, operate SPEED BRAKE control lever several times from RET position to FULL position to bleed actuators ; end by placing control lever in RET position, ground spoiler function not preselected.
Install a warning notice prohibiting operation of speedbrakes.
Before undertaking adjustment of spoilers 3 to 7, turn Captain's or First Officer's control wheel several times full right and full left to the stop to bleed actuators. Return control wheel to neutral position.
Make certain that roll trim control is at zero.

R (f)Move flap and slat control lever to slat 30 flap 40 position and
R display a warning notice prohibiting operation of slats and flaps.

(g)Open access doors 572BB, 672BB, 572CB, 672CB.

(h)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/2 & 3	5CP	335/R63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/6 & 7	7CP	335/R62
133VU	EFCU/NORM/SUPPLY/SPLR 2 & 3	8CP	335/T62
133VU	EFCU/LAND RECOVERY/NORM SUPPLY/SPLR/6 & 7	9CP	333/T66
133VU	EFCU/NORM/SUPPLY/SPLR 6 & 7	10CP	332/U62
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/1 & 4	53CP	334/S63
133VU	LAND/RECOVERY/SUPPLY/SPLR/1 & 4 & 6 & 7	54CP	334/S67
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/5	55CP	334/S64
133VU	EFCU/NORM/SUPPLY/SPLR 5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM/SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	EFCU/LAND RECOVERY/SUPPLY/SPLR/1 & 4	72CP	333/T67
133VU	FLAPS/SYS1/26VAC	1CV	335/R61
133VU	FLAPS/SYS2/26VAC	2CV	334/S62
133VU	SLATS/26VAC/SYS1	3CV	335/R65
133VU	SLATS/26VAC/SYS2	4CV	335/R64
133VU	SFCC/NORM/SUPPLY/FLAPS/SYS1	5CV	332/U61
133VU	FLT CTL/SFCC/NORM/SUPPLY/FLAPS/SYS2	6CV	331/V61
133VU	SFCC/NORM SUPPLY/SLATS/SYS1	7CV	333/T63
133VU	SFCC/NORM SUPPLY/SLATS/SYS2	8CV	333/T64
133VU	SFCC/LAND RECOVERY/SUPPLY/SLATS/SYS1	9CV	335/R66
133VU	SFCC/LAND RECOVERY/SUPPLY/FLAPS/SYS1	10CV	335/R67

D. Adjustment

(1)Adjustment of linkage between SPEED BRAKE control lever and speed brake control transducer unit
(Ref. Fig. 501)

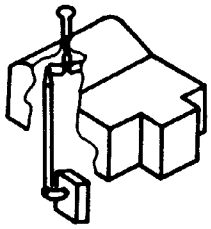
(a)Open access door 121BL.

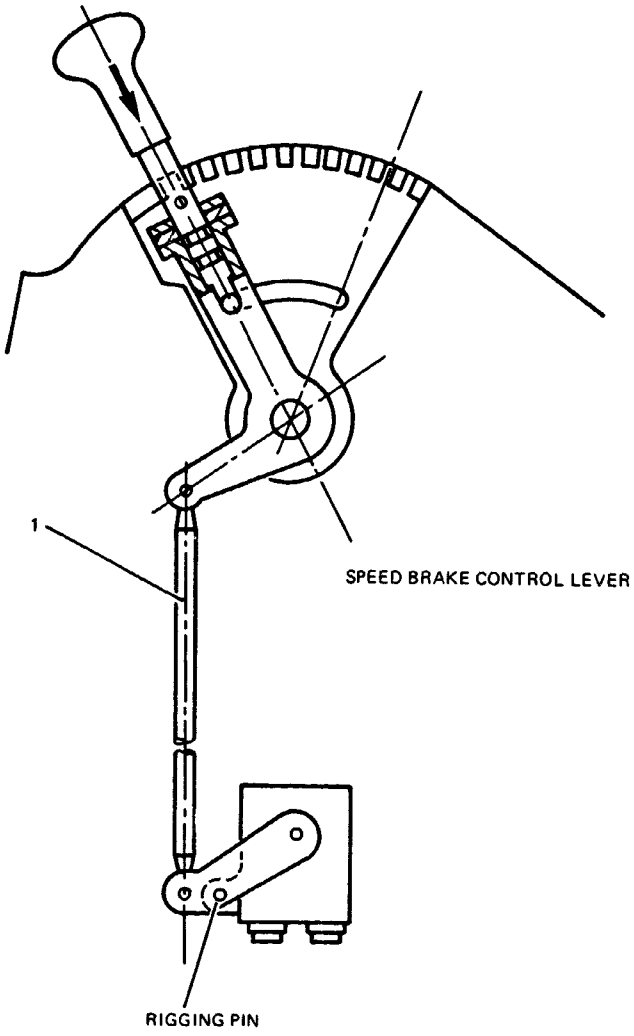
(b)On SERVO CTL section of panel 428VU
- release SERVO CTL/B and Y (JAM/OFF) pushbutton switches.

(c)Insert rigging pin VG2-68 in transducer unit rigging hole. Check that rigging pin can be freely installed and removed. If not, cut and remove lockwire and unscrew each rod end nut. Disengage lockwashers and adjust length of rod until free installation and removal of rigging pin is obtained. Engage lockwashers, tighten nuts and wirelock. Remove rigging pin VG2-68.

(d)On SERVO CTL section of panel 428VU
- press SERVO CTL/B and Y (JAM/OFF) pushbutton switches.

(e)Close access door 121BL.





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Speed Brake Transducer Unit Adjustment
Figure 501

(2)Adjustment of spoilers 1 and 2 by manual retraction/extension.
(Ref. Fig. 502, 503)
NOTE : The following operations concern R and L wing spoilers.
Refer to table below for adjustment values and number of surface considered.
WARNING : BEFORE ADJUSTING LENGTH OF ACTUATOR, MANDATORILY PERFORM THE FOLLOWING :
- RELEASE P PUSHBUTTON SWITCH ASSOCIATED WITH ACTUATOR TO BE ADJUSTED.
- SHUT DOWN PRESSURIZATION OF CORRESPONDING HYDRAULIC SYSTEM.

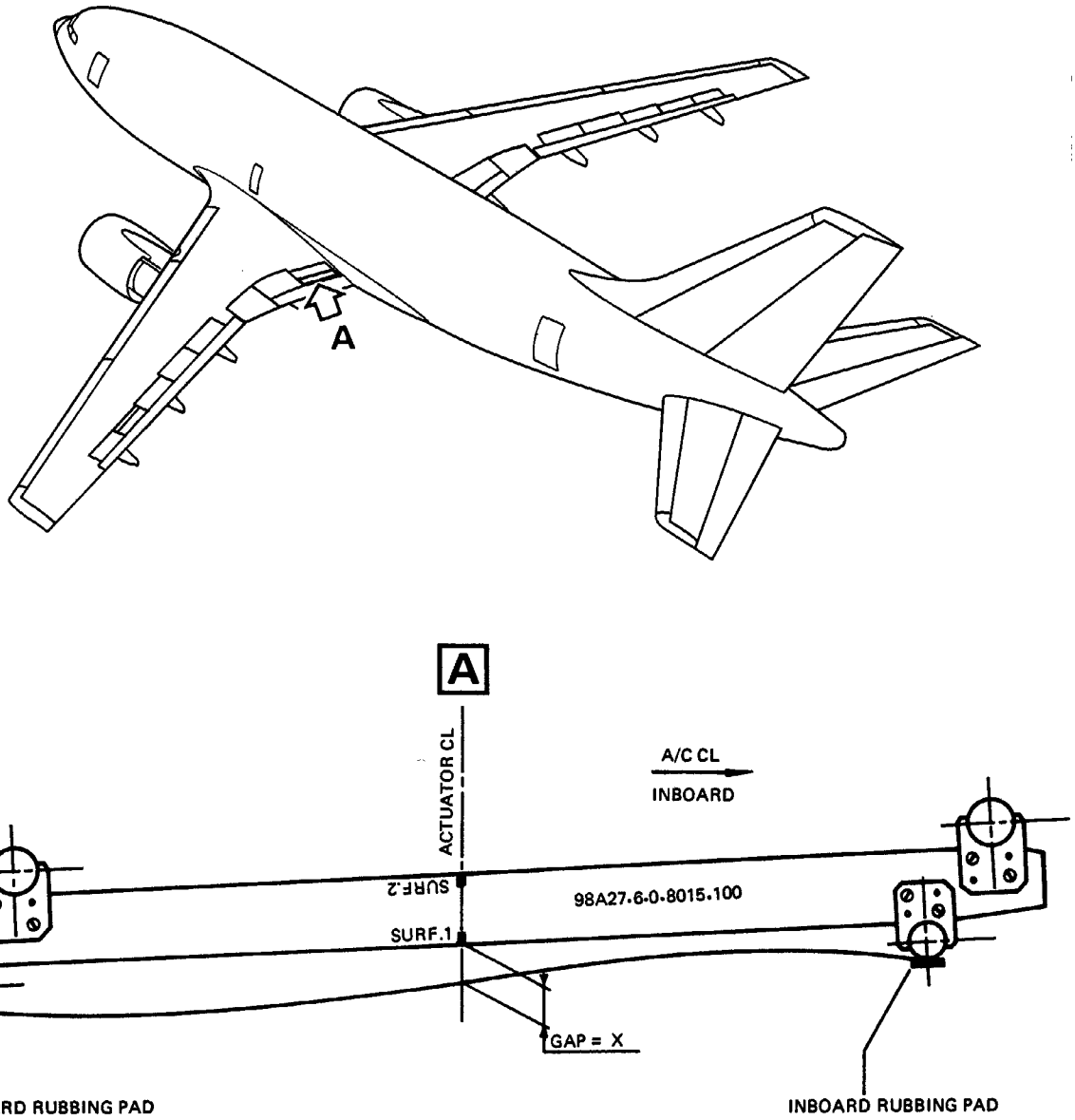
	Spoiler : N	1	2
	Pushbutton switch : P	Y	B
R R	Gap between gage and spoiler : X mm (in.)	23 ± 0.2 (0.906) ± (0.008)	3.8 to 4.2 (0.149 to 0.165)
	Gap reduction when rotating actuator rod by 360° counterclockwise = Y mm (in.)	13.8 (0.543)	14 (0.551)

(a)On SERVO CTL section of panel 428VU
- release SERVO CTL, B and Y (JAM/OFF) pushbutton switches.
- display a warning notice prohibiting operation of these pushbutton switches.

(b)Place setting gage 98A27608015000 parallel to trailing edge of spoiler concerned. Make certain that mark is aligned with actuator centerline.
(c)On SERVO CTL section of panel 428VU
- press P pushbutton switch associated with spoiler N to be adjusted.

(d)Measure gap between setting gage and spoiler using set of shims.
Gap must be equal to X.
If not, perform the following operations.
(e)On SERVO CTL section of panel 428VU
- release P pushbutton switch.

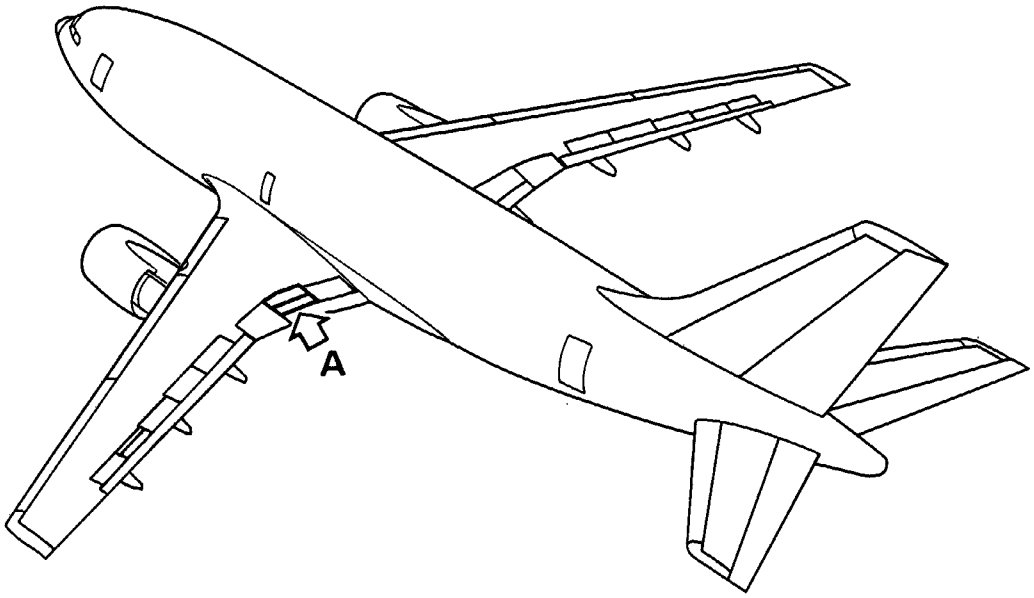
CAUTION : SHUT DOWN PRESSURIZATION OF HYDRAULIC SYSTEM.
(f)Pivot maintenance unlocking crank lever to M position acting on valve block using spanner.
NOTE : Manual extension of surface is obtained by moving lever to M position, system being depressurized.
(g)Remove setting gage 98A27608015000. Manually extend surface to gain access to actuator.
(h)Cut and remove lockwire, loosen lock nut, disengage washers and lock plates.
(j)Rotate actuator rod counterclockwise, considering that a 360° rotation corresponds to a gap reduction equal to Y.
CAUTION : REDUCTION BY STAGES OF RESIDUAL DISTORTION SHALL BE PERFORMED CAREFULLY. DISTORTION OF SPOILER N SHALL NEVER EXCEED GAP X.

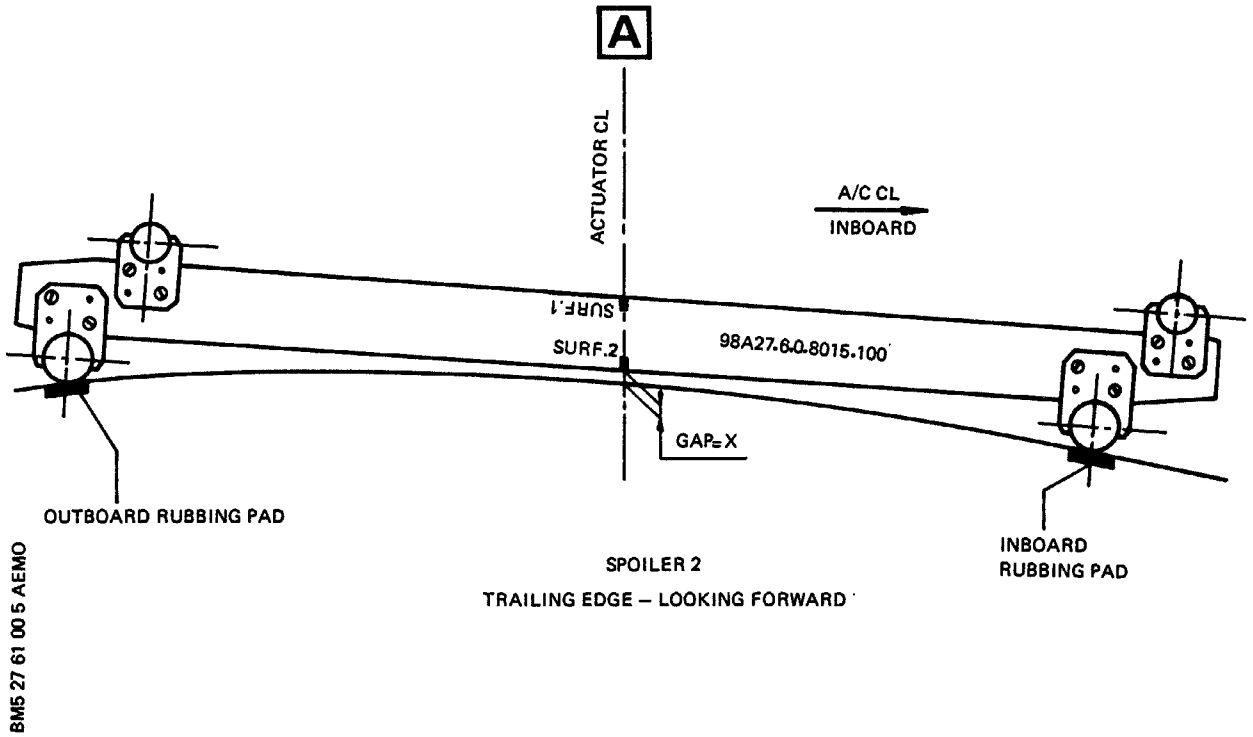


SPOILER 1

TRAILING EDGE – LOOKING FORWARD

Adjustment of Spoiler No.1
Figure 502





Adjustment of Spoiler No.2
Figure 503

(k)Engage lockwashers and tighten lock nut.
(l)Manually retract spoiler against structure.
(m)On SERVO CTL section of panel 428VU
- press P pushbutton switch and pressurize corresponding hydraulic system.

(n)Place setting gage 98A27608015000 on spoiler N, taking into account tool P/N and surface number.
Measure gap between setting gage and spoiler using shims placed in line with actuator centerline.
Gap must be equal to X.
If not, repeat steps (e) to (n) until gap value X is obtained.
(p)On SERVO CTL section of panel 428VU
- release P pushbutton switch.

CAUTION : SHUT DOWN PRESSURIZATION OF HYDRAULIC SYSTEM.

(q)Manually extend spoiler by acting on valve block.
Install lock plates. TORQUE nut to between 18 and 20 m.daN (132.75 and 147.5 lbf.ft.) and wirelock.
(r)Manually retract spoiler against structure.
(s)On SERVO CTL section of panel 428VU
- press P pushbutton switch and then pressurize corresponding hydraulic system. Make certain that maintenance unlocking crank lever is in O position.

(3)Adjustment of spoilers 1 and 2 with spoiler valve group control box.

NOTE : The following operations concern R and L wing spoilers.
Refer to table below for adjustment values and number of surface considered.

WARNING : BEFORE ADJUSTING LENGTH OF ACTUATOR, MANDATORILY PERFORM THE FOLLOWING :
- RELEASE P PUSHBUTTON SWITCH ASSOCIATED WITH ACTUATOR TO BE ADJUSTED.
- SHUT DOWN PRESSURIZATION OF CORRESPONDING HYDRAULIC SYSTEM.

Spoiler : N	1	2
Pushbutton switch : P	Y	B
Gap between gage and spoiler : X mm (in.)	23 ± 0.2 (0.906) ± (0.008)	3.8 to 4.2 (0.149 to 0.165)
Gap reduction when rotating actuator rod by 360° counterclockwise = Y mm (in.)	13.8 (0.543)	14 (0.551)

(a)On SERVO CTL section of panel 428VU
- release SERVO CTL, B and Y (JAM/OFF) pushbutton switches.
- display a warning notice prohibiting operation of these pushbutton switches.

(b)Place setting gage 98A27608015000 parallel to trailing edge of spoiler concerned. Make certain that mark is aligned with actuator centerline.

(c)On SERVO CTL section of panel 428VU
- press P pushbutton switch associated with spoiler N to be adjusted.
For spoiler 1, pressurize Yellow hydraulic system.
For spoiler 2, pressurize Blue hydraulic system.

(d)Measure gap between setting gage and spoiler using set of shims.
Gap must be equal to X.
If not, perform the following operations.

(e)Remove setting gage 98A27608015000.

(f)On Control Box 98A27608011000, make certain that ON/OFF switch is in OFF position and selector switch in RETRACT position.

R Connect Control Box to servo valve electrical connector.

R Disconnect electrical connector from solenoid valve.

(g)Place control box switch in ON position. Make certain that ON/OFF light comes on.
Place control box selector switch in EXTEND position.

(h)Install safety collar 98A27608014000.

(j)On SERVO CTL section of panel 428VU
- release associated P pushbutton switch.

CAUTION : SHUT DOWN PRESSURIZATION OF HYDRAULIC SYSTEM.

(k)On spoiler actuator
Cut and remove lockwire, loosen lock nut, disengage washers and lock plates.

(l)Rotate actuator rod counterclockwise, considering that a 360° rotation corresponds to a gap reduction equal to Y.
CAUTION : REDUCTION BY STAGES OF RESIDUAL DISTORTION SHALL BE PERFORMED CAREFULLY. DISTORTION OF SPOILER N SHALL NEVER EXCEED GAP X.
(m)Engage lockwashers and tighten lock nut.
(n)On SERVO CTL section of panel 428VU
- press associated P pushbutton switch.
(p)Remove safety collar from servo control.
(q)Place control box selector switch in RETRACT position.
(r)Place setting gage 98A27608015000 on spoiler N, taking into account tool P/N and surface number.
Measure gap between setting gage and spoiler using shims placed in line with actuator centerline.
Gap must be equal to X.
If not, repeat steps (e) to (r) until gap value X is obtained.
(s)Place control box selector switch in EXTEND position.
(t)Install safety collar 98A27608014000.
(u)On SERVO CTL section of panel 428VU
- release P pushbutton switch.
CAUTION : SHUT DOWN PRESSURIZATION OF HYDRAULIC SYSTEM.
(v)Install lock plates. TORQUE nut to between 18 and 20 m.daN (132.75 and 147.5 lbf.ft.) and wirelock.
(w)On SERVO CTL section of panel 428VU
- press associated P pushbutton switch.
(x)Remove safety collar from servo control.
(y)Retract spoiler by placing control box selector switch in RETRACT position.
(z)Disconnect control box from valve group. Remove protective cap and connect electrical connector to valve group.

(4)Adjustment of spoilers 3 to 7 to zero by manual retraction/extension. (Ref. Fig. 504, 505)

NOTE : The following operations concern R and L wing spoilers. Refer to table below for adjustment values and number of surface considered.

Spoiler : N	3	4	5	6	7
Hydraulic Generation System P	B	Y	G	Y	B
Gap between gage and spoiler : X mm. (in.)	3.45 ± 0.2 (0.136) ± (0.008)	4.0 ± 0.2 (0.160) ± (0.008)	3.40 ± 0.2 (0.134) ± (0.008)	3.30 ± 0.2 (0.130) ± (0.008)	2.9 ± 0.2 (0.114) ± (0.008)
Gap reduction when rotating actuator rod by 360° counterclockwise = Y mm. (in.)	10.9 (0.429)	10.9 (0.429)	9.6 (0.378)	8.6 (0.339)	7.0 (0.276)

(a)Open access doors 581AB, 681AB, 581BB, 681BB, 581CB, 681CB, 581DB, 681DB, 581FB, 681FB, 581GB, 681GB, 581HB, 681HB, 581JB, 681JB.

(b)Adjustment of spoiler N

1 Make certain that control wheels are in neutral position. Immobilize control wheels with rigging pins 98A27901000000. Display a warning notice prohibiting removal of these rigging pins.

2 Place setting gage 98A27608015000 on spoiler N parallel to trailing edge, taking into account indications on tool giving the number of the surface to be adjusted (Ref. Fig. 504, 505). Measure gap between setting gage and spoiler using shims placed in line with actuator centerline.
Gap must be equal to X.
If not, perform the following operations.

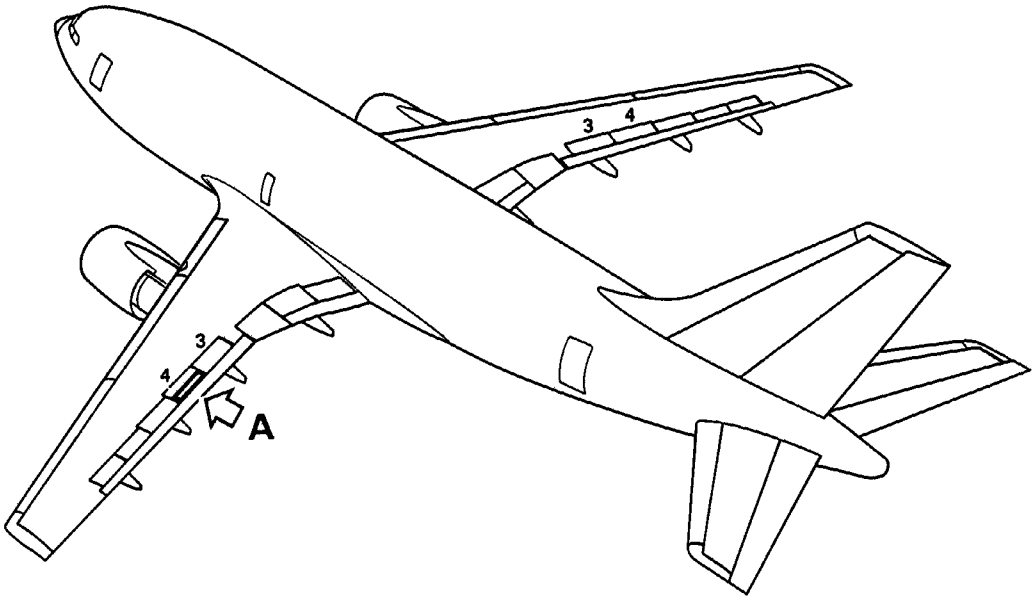
3 Depressurize Green, Blue and Yellow hydraulic systems. Display a warning notice on panel 427VU prohibiting pressurization of Green, Blue and Yellow hydraulic systems.

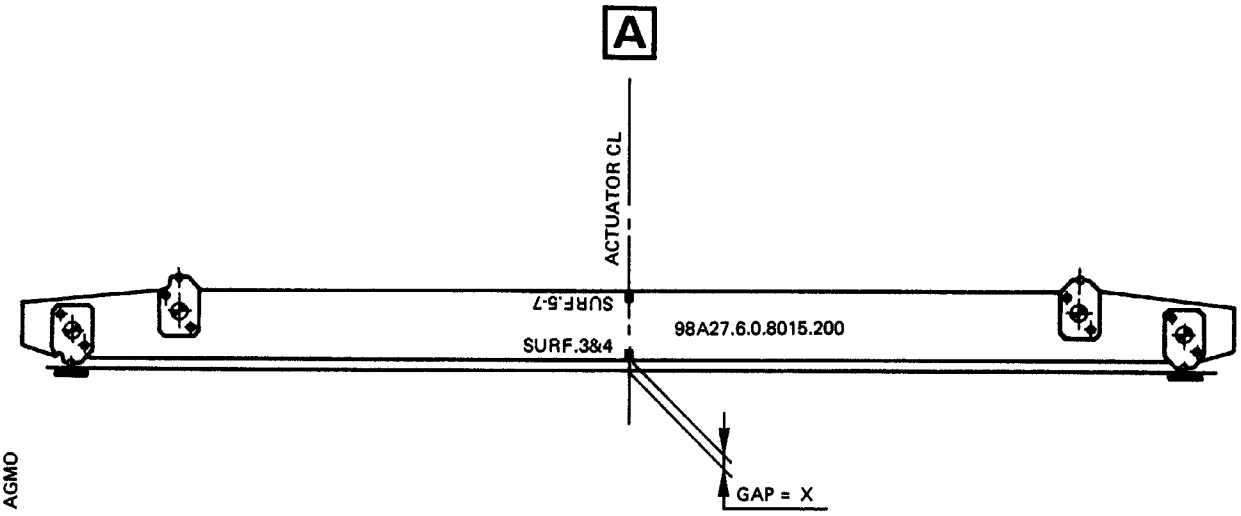
4 Pivot maintenance unlocking crank lever to M position acting on valve block using spanner.
NOTE : When associated system is pressurized, maintenance unlocking crank lever automatically returns to 0 position.
Manual extension of surface is obtained by moving lever to M position the pressure in system being shut down.

5 Manually extend spoiler to gain access to actuator.

6 Cut and remove lockwire, loosen lock nut and disengage lock washers.

7 Rotate actuator rod counterclockwise, considering that a 360° rotation corresponds to a gap equal to Y.





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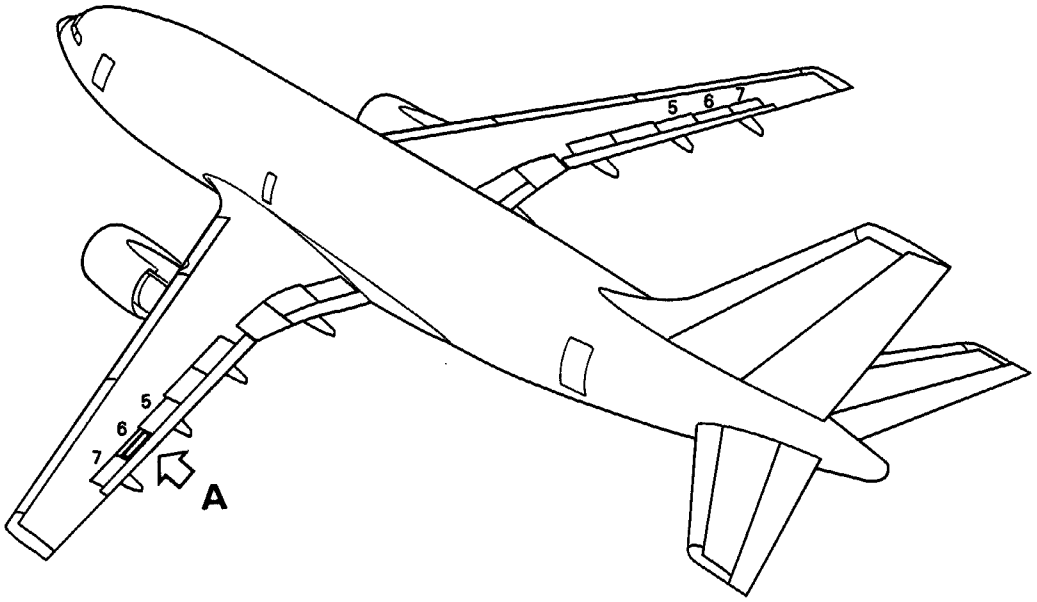
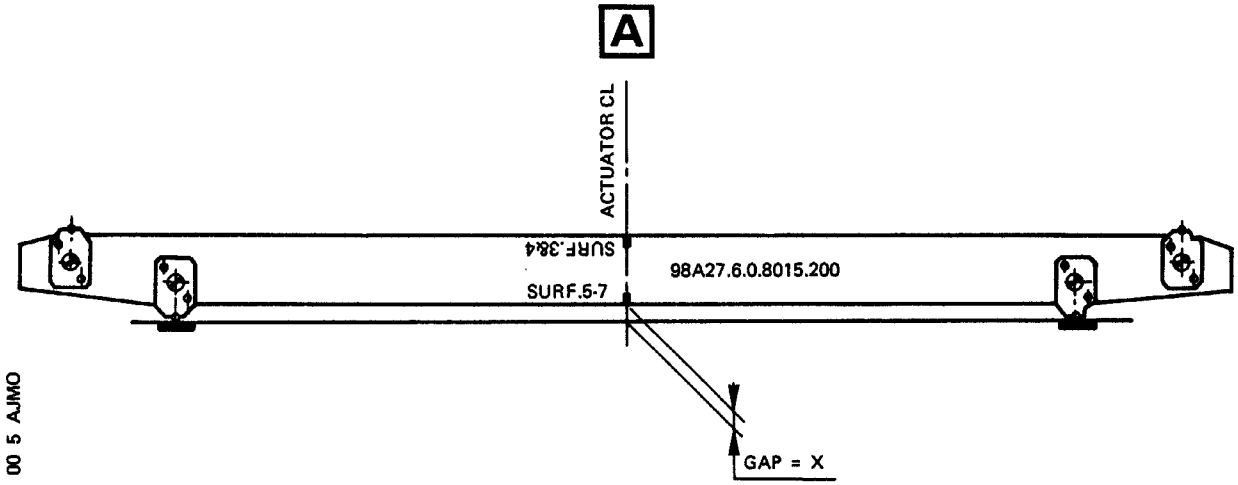
SPOILER 3 & 4

TRAILING EDGE–LOOKING FORWARD

Adjustment of Spoilers 3 & 4
Figure 504





BM5 27 61 00 5 AJMO

SPOILER 5 - 7

TRAILING EDGE--LOOKING FORWARD

Adjustment of Spoilers 5 to 7
Figure 505

CAUTION : REDUCTION BY STAGES OF RESIDUAL DISTORTION SHALL BE PERFORMED CAREFULLY. DISTORTION OF SPOILER N SHALL NEVER EXCEED GAP X.

8 Engage lock washers and tighten lock nut.
9 Manually retract spoiler against structure.
10 Pressurize hydraulic system P.
On SERVO CTL section of panel 428VU
- make certain that P pushbutton switch is pressed and legend off.
11 Place equipment 98A27608015000 on spoiler N taking into account tool P/N and surface number.
Measure gap between setting gage and spoiler using shims placed in line with actuatorcenterline.
Gap must be equal to X.
If not, repeat steps 4 to 12 until gap value X is obtained.
12 Shut down pressurization of hydraulic system P.
13 Manually extend surface by acting on valve block.
14 Position lock washers.
TORQUE and wirelock : For spoiler actuators 3 and 4 : 18 to 20 m.daN (132.75 to 147.5 lbf.ft.)
For spoiler actuators 5 thru 7 : 8 to 9 m.daN (59 to 66.4 lbf.ft.)
15 Manually retract surface against structure.
16 Pressurize hydraulic system P. Remove all rigging pins.
Make certain that maintenance unlocking crank lever is in O position.

(5)Adjustment of spoilers 3 to 7 to zero with spoiler valve group control box.
(Ref. Fig. 504, 505)
NOTE : The following operations concern R and L wing spoilers. Refer to table below for adjustment values and number of surface considered.

Spoiler : N	3	4	5	6	7
Hydraulic Generation System P	B	Y	G	Y	B
Gap between gage and spoiler : X mm. (in.)	3.45 ± 0.2 (0.136 ± 0.008)	4.0 ± 0.2 (0.160 ± 0.008)	3.40 ± 0.2 (0.134 ± 0.008)	3.30 ± 0.2 (0.130 ± 0.008)	2.9 ± 0.2 (0.114 ± 0.008)
Gap reduction when rotating actuator rod by 360° counterclockwise = Y mm. (in.)	10.9 (0.429)	10.9 (0.429)	9.6 (0.378)	8.6 (0.339)	7.0 (0.276)

(a)Open access doors 581AB, 681AB, 581BB, 681BB, 581CB, 681CB, 581DB, 681DB, 581FB, 681FB, 581GB, 681GB, 581HB, 681HB, 581JB, 681JB.
(b)Adjustment of spoiler N
1 Make certain that control wheels are in neutral position. Immobilize control wheels with rigging pins 98A27901000000. Display a warning notice prohibiting removal of these rigging pins.
2 Place setting gage 98A27608015000 on spoiler N parallel to trailing edge, taking into account indications on tool giving the number of the surface to be adjusted (Ref. Fig. 504, 505). Measure gap between setting gage and spoiler using shims placed in line with actuator centerline.
Gap must be equal to X.
If not, perform the following operations.
3 Remove protective cap from servo valve electrical connector on valve group and connect control box 98A27608011000 to valve group.
CAUTION : MAKE CERTAIN THAT ON/OFF SWITCH IS IN OFF POSITION AND SELECTOR SWITCH IN RETRACT POSITION.
4 Remove setting gage 98A27608015000. Extend surface to gain access to actuator.
5 Install safety collars 98A27608014000 and 98A27608013000.
6 Depressurize Green, Blue and Yellow hydraulic systems. Display a warning notice on panel 427VU prohibiting pressurization of Green, Blue and Yellow hydraulic systems.
7 Cut and remove lockwire, loosen lock nut and disengage lock washers.
8 Rotate actuator rod counterclockwise, considering that a 360° rotation

corresponds to a gap equal to Y.
CAUTION : REDUCTION BY STAGES OF RESIDUAL DISTORTION SHALL BE PERFORMED CAREFULLY. DISTORTION OF SPOILER N SHALL NEVER EXCEED GAP X.

9 Engage lock washers and tighten lock nut.
10 Pressurize hydraulic system P.
On SERVO CTL section of panel 428VU
- make certain that P pushbutton switch is pressed and legend off.
11 Remove safety collars 98A27608014000 and 98A27608013000.
12 Retract spoiler against structure.
13 Place equipment 98A27608015000 on spoiler N taking into account tool P/N and surface number.
Measure gap between setting gage and spoiler using shims placed in line with actuator centerline.
Gap must be equal to X.
If not, repeat steps 3 to 13 until gap value X is obtained.
14 Extend spoiler and install safety collars 98A27608014000 and 98A27608013000.
15 Shut down pressurization of hydraulic system P.
16 Install lock plates.
TORQUE and wirelock : For spoiler actuators 3 and 4 : 18 to 20 m.daN (132.75 to 147.5 lbf.ft.)
For spoiler actuators 5 thru 7 : 8 to 9 m.daN (59 to 66.4 lbf.ft.)
17 On SERVO CTL section of panel 428VU
- press P pushbutton switch then pressurize corresponding hydraulic system.
18 Remove safety collars 98A27608014000 and 98A27608013000.
19 Retract spoiler against structure. Remove control box and install protective cap on valve group.
20 Make certain that maintenance unlocking crank lever is in O position.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close the following circuit breakers :
R CAUTION : CLOSE EFCU TRANSDUCERS C/Bs BEFORE EFCU C/Bs.
- EFCU TRANSDUCERS 5CP, 7CP, 53CP, 54CP, and 55CP
- EFCU 8CP, 9CP, 10CP, 70CP, 71CP and 72CP
- 3CG
- SLATS 3CV, 4CV, 7CV, 8CV and 9CV
- FLAPS 1CV, 2CV, 5CV, 6CV, and 10CV
(3)Close all access doors.
(4)Remove all warning notices.
(5)Move slat and flap control lever to first notch.
(6)Remove safety barriers and access platforms.
(7)Depressurize hydraulic systems and disconnect hydraulic ground power cart.
(8)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Operational Test

A. Reason for the Job
(1)Indicating system test.
(2)Spoiler and speed brake electrical power supply test.
(3)Operational test of spoilers and speedbrakes servo-control disengagement.
(4)Ground spoiler operational test.
R (5)TO CONFIG warning test.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
R - 27-00-00, P. Block 501	General
R - 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
NOTE : In order to obtain the messages mentioned as results on the LDU, it may be necessary to press several times CLR pushbutton switch on center pedestal panel 11VU to have the message displayed.
Certain messages are inhibited on ground. In order to override this inhibition, it is necessary to press INHIB OVRD pushbutton switch on panel 470VU and to hold it pressed while actuating simultaneously CLR pushbutton switch.
Information concerning systems other than the one being checked is displayed on pages on LDU, this must be disregarded.
(1)Job set-up
(a)Initial conditions
- Correct electrical power supply (Ref. 24-41-00, P. Block 301).
- Forward services ventilation system in operation.
- Overhead and aft panel circuit breakers closed, particularly those associated with FLT CTL (133VU), ECAM (21VU).
- Aircraft on ground (L/G PROX DET & RELAYS SYS1 & 2 circuit breakers closed, on panel 133VU).
(b)Pressurize Green, Blue and Yellow hydraulic systems either :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
(c)Make certain that Captain's and First Officer's control wheels are at zero (roll trim at zero).
(d)On SERVO CTL section of panel 428VU

- make certain that SERVO CTL/G, B and Y pushbutton switches (JAM OFF) are pressed and legends off.

(e)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.

(f)Make certain that slats and flaps control lever is in slat 15 flap 0 position.

(g)On ECAM control panel of electrical center pedestal 11VU
- press F/CTL pushbutton switch. FLT CTL page appears on right ECAM display unit.
- press CLR pushbutton switch until legend goes off.

(h)On panel 472VU
- place ANN LT switch in READ position.

(j)On FLIGHT CONTROLS section of panel 471VU
- Make certain that EFCU BITE DISPLAY annunciator is off. If not, reset EFCU 1CP and 2CP in electronics rack 90VU by simultaneously pressing the two pushbutton switches of each card. Make certain that no failure code is displayed.

(k)In order to obtain certain messages on the left ECAM display unit, it is necessary to press the ECAM INHIBIT OVERRIDE pushbutton switch.

(l)Make certain that PARKING BRAKE is released.

D. Test
(1)Indicating system test

ACTION	RESULT
1. On SPLR & SPD BRK section of panel 428VU - make certain that SPLR & SPD BRK (FAULT OFF/R) pushbutton switches 4 & 1, 3 & 2, 5, 6 and 7 are pressed.	- Corresponding legends are off.
2. On ANN LT section of panel 436VU - place ANN LT switch in TEST position.	On SPLR & SPD BRK section of panel 428VU - FAULT OFF/R legends of pushbutton switches 4 & 1, 3 & 2, 5, 6 and 7 come on. On panel 424VU - ON legend of LAND RECOVERY pushbutton switch comes on. On Slat/Flap indicator - SPD BRK legend comes on. - MASTER CAUTION lights come on. - MASTER WARN lights come on.
3. On ANN LT section of panel 436VU - place ANN LT switch in BRT position.	- above lights go off.
4. On panel 472VU - place ANN LT switch in TEST position.	On FLIGHT CONTROLS section of panel 471VU - FAULT legend of GND SPLR SEL LANE annunciator and EFCU BITE DISPLAY annunciator and TEST legend of PTT pushbutton switch come on.
5. On panel 472VU - place ANN LT switch in OFF position.	- above lights go off.

(2)Spoiler and speed brake electrical power supply test.

ACTION	RESULT
1. On panel 424VU - Make certain that LAND RECOVERY pushbutton switch is released.	- ON legend is off.
2. On SPLR & SPD BRK section of panel 428VU - release SPLR & SPD BRK (FAULT OFF/R) pushbutton switches 4 & 1, 3 & 2, 5, 6 and 7.	- Corresponding OFF/R legends come on. On left ECAM display unit following messages appear : FLT CTL SPLR 7 OFF/R SPLR 6 OFF/R SPLR 5 OFF/R SPLR 4 + 1 OFF/R SPLR 3 + 2 OFF/R - Single chime sounds On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on.
3. On ANN LT section of panel 436VU - place ANN LT switch in DIM position.	- above OFF/R legends dim
- place ANN LT switch in BRT position.	- OFF/R legends resume normal brightness.
4. On SPLR & SPD BRK section of panel 428VU - press SPLR & SPD BRK (FAULT OFF/R) pushbutton switches 4 & 1, 3 & 2, 5, 6 and 7.	- corresponding OFF/R legends go off - messages disappear - FAULT legends come on then go off MASTER CAUTION lights go off after reset.
5. On panel 133VU - open circuit breakers 5CP, 7CP, 53CP and 55CP 5CP (location 335/R63) 7CP (location 335/R62) 53CP (location 334/S63) 55CP (location 334/S64)	On SPLR & SPD BRK section of panel 428VU - FAULT legends of SPLR & SPD BRK (FAULT OFF/R) pushbutton switches 6 & 7, 2 & 3, 5, 4 & 1 come on. On left ECAM display unit - following messages appear : FLT CTL SPLR 7 FAULT..... OFF/R SPLR 6 FAULT..... OFF/R SPLR 5 FAULT..... OFF/R SPLR 4 + 1 FAULT..... OFF/R

ACTION	RESULT
	SPLR 3 + 2 FAULT..... OFF/R On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on - single chime sounds
6. On panel 133VU - Close circuit breakers 5CP, 7CP, 53CP and 55CP	- no change
7. On ANN LT section of panel 436VU - place ANN LT switch in DIM position.	On SPLR & SPD BRK section of panel 428VU - FAULT legends of SPLR & SPD BRK (FAULT OFF/R) pushbutton switches 4 & 1, 3 & 2, 5, 6 and 7 dim. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights dim
- place ANN LT switch in BRT position.	- above FAULT legends and MASTER CAUTION lights (On CAPT and F/O main instrument panels 3VU and 5VU) resume normal brightness.
8. On SPLR & SPD BRK section of panel 428VU - release SPLR & SPD BRK (FAULT OFF/R) pushbutton switches 7, 6, 5, 4 & 1, 3 & 2.	- corresponding FAULT legends go off. - corresponding OFF/R legends come on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights remain on On left ECAM display unit, following messages appear : FLT CTL SPLR 7 OFF/R SPLR 6 OFF/R SPLR 5 OFF/R SPLR 4 + 1 OFF/R SPLR 3 + 2 OFF/R
9. On SPLR & SPD BRK section of panel 428VU - press SPLR & SPD BRK (FAULT OFF/R) pushbutton switches 7, 6, 5, 4 & 1, 3 & 2.	- corresponding OFF/R legends go off. - FAULT legends come on then go off. - messages disappear. On CAPT and F/O main instrument

ACTION	RESULT
	panels 3VU and 5VU - MASTER CAUTION lights go off after reset.
10. On panel 424VU - press LAND RECOVERY pushbutton switch.	- corresponding ON legend comes on.
- release LAND RECOVERY pushbutton switch.	- corresponding ON legend goes off.

(3)Operational test of spoilers and speedbrakes servocontrol disengagement

ACTION	RESULT
1. On SERVO CTL section of panel 428VU - release SERVO CTL G (JAM OFF) pushbutton switch	On SERVO CTL section of panel 428VU - G OFF legend and LO PR warning lights come on. On SPLR & SPD BRK section of panel 428VU - FAULT legend of pushbutton switch 5 comes on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on - single chime sounds On left ECAM display unit following message appears : FLT CTL GREEN SERVO LO PR
2. On SERVO CTL section of panel 428VU - press SERVO CTL G (JAM OFF) pushbutton swith	On SERVO CTL section of panel 428VU - G OFF legend and LO PR warning lights go off. On SPLR & SPD BRK section of panel 428VU - FAULT legend of pushbutton switch 5 goes off after one second. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off after reset On left ECAM display unit message disappears.
3. On SERVO CTL section of panel 428VU - release SERVO CTL B (JAM OFF) pushbutton switch	On SERVO CTL section of panel 428VU - B OFF legend and LO PR warning lights come on. On SPLR & SPD BRK section of panel 428VU - FAULT legends of pushbutton switches 3 & 2 and 7 come on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on - single chime sounds On left ECAM display unit following message appears : FLT CTL BLUE SERVO LO PR

ACTION	RESULT
4. On SERVO CTL section of panel 428VU - press SERVO CTL B (JAM OFF) push-button switch.	On SERVO CTL section of panel 428VU - B OFF legend and LO PR warning lights go off. On SPLR & SPD BRK section of panel 428VU - FAULT legends of pushbutton switches 3 & 2 and 7 go off after one second. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off after reset On left ECAM display unit : - message disappears.
5. On SERVO CTL section of panel 428VU - release SERVO CTL Y (JAM OFF) pushbutton switch.	On SERVO CTL section of panel 428VU - Y OFF legend and LO PR warning lights come on. On SPLR & SPD BRK section of panel 428VU - FAULT legends of pushbutton switches 4 & 1 and 6 come on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on - single chime sounds On left ECAM display unit following message appears : FLT CTL YELLOW SERVO LO PR
6. On SERVO CTL section of panel 428VU - press SERVO CTL Y (JAM OFF) pushbutton switch.	On SERVO CTL section of panel 428VU - Y OFF legend and LO PR warning lights go off. On SPLR & SPD BRK section of panel 428VU - FAULT legends of pushbutton switches 4 & 1 and 6 go off after one second On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off after reset On left ECAM display unit, message disappears.

(4)Ground spoiler operational test

ACTION	RESULT
R	
R 1. On center pedestal move throttle control levers (ENG1 and 2) to full throttle position.	
R	
R 2. Depressurize Green, Blue and Yellow hydraulic systems.	
R 3. On panel 472VU - place ANN LT switch in READ position.	
R 4. On FLIGHT CONTROLS section of panel 471VU - place selector switch in GND SPLR/SEL LANE/TEST 1 position.	On FLIGHT CONTROLS section of panel 471VU - TEST legend of PTT pushbutton switch comes on.
R 5. On FLIGHT CONTROLS section of panel 471VU - press and hold PTT (TEST) pushbutton switch.	On FLIGHT CONTROLS section of panel 471VU - FAULT legend of GND SPLR SEL LANE annunciator comes on - TEST legend of PTT pushbutton switch remains on
- release PTT (TEST) pushbutton switch.	On FLIGHT CONTROLS section of panel 471VU - FAULT legend of GND SPLR SEL LANE annunciator goes off. - TEST legend of PTT pushbutton switch remains on.
R 6. On FLIGHT CONTROLS section of panel 471VU - place selector switch in GND SPLR/SEL LANE/TEST 2 position.	On FLIGHT CONTROLS section of panel 471VU - TEST legend of PTT pushbutton switch remains on.
R 7. On FLIGHT CONTROLS section of panel 471VU - press and hold PTT (TEST) pushbutton switch.	On FLIGHT CONTROLS section of panel 471VU - FAULT legend of GND SPLR SEL LANE annunciator comes on - TEST legend of PTT pushbutton switch remains on
R 8. On FLIGHT CONTROLS section of panel 471VU	

	ACTION	RESULT
	- release PTT (TEST) pushbutton switch.	
		On FLIGHT CONTROLS section of panel 471VU - FAULT legend of GND SPLR SEL LANE annunciator goes off - TEST legend of PTT pushbutton switch remains on.
R 9.	On FLIGHT CONTROLS section of panel 471VU - place selector switch in GND SPLR/EFCU/TEST 3 position.	On FLIGHT CONTROLS section of panel 471VU - TEST legend of PTT pushbutton switch remains on.
R 10.	On FLIGHT CONTROLS section of panel 471VU - press and hold PTT (TEST) pushbutton switch.	On SPLR & SPD BRK section of panel 428VU - FAULT legends of pushbutton switches 4 & 1 and 5 go off.
R 11.	On FLIGHT CONTROLS section of panel 471VU - release PTT (TEST) pushbutton switch.	On SPLR & SPD BRK section of panel 428VU - FAULT legends of pushbutton switches 4 & 1 and 5 come on.
R 12.	On FLIGHT CONTROLS section of panel 471VU - place selector switch in GND SPLR/EFCU/TEST 4 position.	On FLIGHT CONTROLS section of panel 471VU - TEST legend of PTT pushbutton switch remains on.
R 13.	On FLIGHT CONTROLS section of panel 471VU - press and hold PTT (TEST) pushbutton switch.	On SPLR & SPD BRK section of panel 428VU - FAULT legends of pushbutton switches 3 & 2, 6 and 7 go off.
R 14.	On FLIGHT CONTROLS section of panel 471VU - release PTT (TEST) pushbutton switch.	On SPLR & SPD BRK section of panel 428VU - FAULT legends of pushbutton switches 3 & 2, 6 and 7 come on.
R 15.	On FLIGHT CONTROLS section of panel 471VU - place selector switch in NORM FLT position.	On FLIGHT CONTROLS section of panel 471VU - TEST legend of PTT pushbutton switch goes off.
R 16.	On center pedestal - move throttle control levers (ENG. 1 and 2) to idle position.	- On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off.

	ACTION	RESULT
R	17. Pressurize Blue, Green and Yellow hydraulic systems either with the hydraulic ground power cart (Ref. 29-10-00, P. Block 301) or Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).	On SPLR & SPD BRK section of panel 428VU - FAULT legends of pushbutton switches 4 & 1, 3 & 2, 5, 6 and 7 go off after one second.
R	18. On panel 472VU - place ANN LT switch in OFF position.	

R (5)TO CONFIG warning test
R For this test, refer to 27-00-00, P. Block 501

E. Close-Up
(1)Shut down hydraulic power supply.
Depressurize systems. Where applicable, disconnect hydraulic ground power cart.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

3. Functional Test

A. Reason for the Job
(1)Speed brake test.
(2)Ground spoiler test

B. Equipment and Materials

ITEM	DESIGNATION
(1)35M5M01040000 or 35M5M01040001 or G5M5M01040000	Wheel Speed Simulator
(2)860135958100001 or 860135958100004 and 98D32403004000	2 Wheel Generators Driving Device
Referenced Procedures	
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 24-41-00, P. Block 301	AC External Control
- 32-00-00, P. Block 501	Landing Gear

C. Procedure
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
(1)Job set-up
(a)Initial conditions
- Correct electrical power supply (Ref. 24-41-00, P. Block 301).
- Forward services ventilation system in operation.
- Overhead and aft panel circuit breakers closed, particularly those associated with FLT CTL (133VU), ECAM (21VU).
- Aircraft on ground (L/G PROX DET & RELAYS SYS1 & SYS2 circuit breakers closed, on panel 133VU).

(b)Pressurize Green, Blue and Yellow hydraulic systems using hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(c)Make certain that Captain's and First Officer's control wheels are at zero (roll trim at zero).
(d)On SERVO CTL section of panel 428VU
R - make certain that G, B and Y pushbutton switches (JAM OFF)
R are pushed and legends off.
(e)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.
(f)On ECAM control panel of electrical center pedestal 11VU
- push F/CTL pushbutton switch. FLT CTL page appears on right ECAM display unit
- push CLR pushbutton switch until its legend goes off.

D. Test
(1)Speed brake functional test

ACTION	RESULT
1. Notch by notch, move **SPEED BRAKE** control lever to 7th notch.	- outboard speed brakes (spoilers 3 and 4) extend - inboard speed brakes (spoilers 1 and 2) extend by half the total extension value of spoilers 3 and 4. On right **ECAM** display unit above **SPD BRK** legend - green arrows standing for **R** and **L** wing speed brakes 1 to 4 appear.
2. Return **SPEED BRAKE** control lever to **RET** position.	- outboard and inboard speed brakes retract. - green arrows disappear, only the horizontal dashes standing for speed brakes 1 to 4 remain.

(2)Ground spoiler test
(a)With SPEED BRAKE control lever in RET position, preselect extension of ground spoilers by pulling control lever upwards.
(b)Make certain that throttle control levers are in idle position.
(c)At rear of Avionics compartment, on VC connector mount, at rack 90VU, near utility light (MOVABLE LIGHT 34LS), disconnect plug connector 2392 VC-A. Connect equipment 35M5M01040000 or 35M5M01040001 between plug and receptacle. If this simulator is not available : on R and L Landing gears or alternately, attach wheel generator driving device 860135958100001 or 860135958100004 and 98D32403004000 to wheels 6, 7 and 5, 8 and drive the generator at 750 rpm.

ACTION	RESULT
1. Using wheel speed simulator device or wheel generator driving device - simulate V > 85 kts on R landing gear - simulate V > 85 kts on L landing gear	- the 7 ground spoilers of each wing extend.
2. Simulate V < 85 kts on R and L landing gears.	No change.
3. Move throttle control levers to full throttle position.	- the 7 ground spoilers of each wing retract.
4. Move throttle control levers to idle position.	No change.
5. Simulate V > 85 kts on L landing gear.	No change
6. Simulate V > 85 kts on R landing gear.	- the 7 ground spoilers of each wing extend.
7. On center pedestal - move SPEED BRAKE control lever (position not preselected).	- the 7 ground spoilers of each wing retract.
8. On panel 133VU - make certain that the following circuit breakers are closed : . 1 KM (ENG 1/REVERSE/ CTL 332/U69) . 2 KM (ENG 2/REVERSE/ CTL 331/V74.)	
9. On center pedestal - Move L REVERSE control lever to REVERSE position.	- the 7 ground spoilers of R and L wings extend.

ACTION	RESULT
10. Pull L REVERSE control lever back	- all ground spoilers retract.
11. On center pedestal - move R REVERSE control lever to REVERSE position.	- ground spoilers of R and L wing extend.
12. Pull R REVERSE control lever back	- all ground spoilers retract.
13. On panel 133VU Open circuit breaker 119GB L/G PROX DET/ & RELAYS/SYS1/ FLT/GND, position 332/U52 (Ref. 32-00-00, P. Block 501).	
14. On center pedestal - Move R REVERSE control lever to REVERSE. - Pull R REVERSE control lever back.	- ground spoilers do not extend.
15. Close circuit breaker 119GB	
16. On wheel speed simulator or wheel generator driving device, return simulated speeds to zero. Remove tools.	

4. System Test

A. Reason for the Job
(1)Measuring travel of speed brakes 1 to 4.
(2)Measuring travel of ground spoilers.
(3)Measuring travel of roll spoilers 3 to 7.
Change in travel of spoilers versus speed.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27308005000	Protractor - Control Surface Deflection
or	
TR12-18	Rigmaster System
TR31	Rigmaster System - Protractor
or	
3028000	Clinometer
98A27203500000	Measurement Base - Flight Control Surface Deflection
(2)98A27901000000	Pin - Rigging, Aileron Control Wheel
(3)	Warning Notices
(4)	Access Platforms, 2.50 m, 5 m and 5.60 m

ITEM	DESIGNATION
	(8 ft. 2 in., 16 ft. 5 in. and 18 ft. 6 in.) 2 to 6 m. (6 ft. 7 in. to 19. ft 8 in.)
(5)35M5M01040001	Wheel Speed Simulator
or	
35M5M01040001	Wheel Speed Simulator
(6)87202126V15	Generator - Ground Pressure
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 34-10-00, P. Block 501	Flight Environment Data

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up

(a)Initial conditions
- Correct electrical power supply (Ref. 24-41-00, P. Block 301).
- Forward services ventilation system in operation.
- Overhead and aft panel circuit breakers closed, particularly those associated with FLT CTL (133VU), ECAM (21VU).
- Aircraft on ground (L/G PROX DET & RELAYS SYS1 and SYS2 circuit breakers closed, on panel 133VU).

(b)Pressurize Green, Blue and Yellow hydraulic systems with hydraulic ground power cart (Ref. 29-10-00, P. Block 301).

(c)On SERVO CTL section of panel 428VU
- make certain that SERVO CTL/G, B and Y pushbutton switches (JAM OFF) are pressed and legends off.

(d)Make certain that Captain's and First Officer's control wheels are at zero (roll trim at zero).

(e)Make certain that flap and slat control lever is in slat 15 flap 0 position.
Display a warning notice prohibiting operation of flaps and slats.

(f)Make certain that SPEED BRAKE control lever is in RET position, ground spoiler function not preselected.

(g)Install protractors 98A27308005000 or tools TR12-18 and TR31 or clinometer 3028000 and flight control surface deflection measurement base 98A27203500000 on control surfaces 1 to 7 of each wing.

(h)On SPLR & SPD BRK section of panel 428VU
- make certain that SPLR & SPD BRK (FAULT OFF/R) pushbutton switches 3 & 2, 4 & 1, 5, 6 and 7 are pressed and legends off.

(j)Set protractors to zero.

(k)At rear of Avionics compartment, on VC connector mount, at rack 90VU, near utility light (MOVABLE LIGHT 34LS), disconnect plug connector 2392VC-A. Connect equipment 35M5M01040000 or 35M5M01040001 between plug and receptacle.

(l)Connect equipment 87202126 V15 (Ref. 34-10-00, P. Block 501).

D. Test

(1)Measuring speed brake travel

NOTE : The travel values of spoilers 1 to 4 functioning as speed brakes are given in the following table.

ACTION	RESULT
1. Immobilize control wheels with rigging pins 98A27901000000	
2. Notch by notch, move **SPEED BRAKE** control lever to fully extend speed brakes (notch 11).	The travel values are given in the following table. With symmetrical control surfaces fully extended, measured asymmetry must be less than or equal to 1°. Make certain that controls are free from any friction point.
3. Move **SPEED BRAKE** control lever to **RET** position.	

Control Lever	R and L Wing Speed Brakes			
	1	2	3	4
FULL	18° ± 1° 30'	19°30' ± 1° 30'	44°15' ± 1° 30'	44°15' ± 1° 30'

4. Remove rigging pins 98A27901000000

(2)Measuring ground spoiler travel
(a)With **SPEED BRAKE** control lever in **RET** position, preselect ground spoiler function by pulling control lever.
(b)Make certain that throttle control levers are in idle position.

ACTION	RESULT
1. Using wheel speed simulator - simulate V > 85 kts on R landing gear	
2. Simulate V > 85 kts on L landing gear.	- the 7 spoilers of each wing extend. The travel values are given in the following table. NOTE : With symmetrical control surfaces fully extended, measured asymmetry must be less than or equal to 1°. Ground spoiler extension time is less than or equal to 1.5 s.
3. Using wheel speed simulator - simulate V < 85 kts on R and L landing gears.	- the 7 spoilers of each wing remain extended.
4. Move throttle control levers to full throttle position.	- all spoilers retract. Operation time is less than or equal to 1.5 s.
5. Move throttle control levers to idle position.	No change.
6. Simulate V > 85 kts on L landing gear.	No change.
7. Simulate V > 85 kts on R landing gear.	- the 7 spoilers of R and L wings extend.
8. On center pedestal - move **SPEED BRAKE** control lever back to the not preselected position.	- all spoilers retract.

TRAVEL OF CONTROL SURFACES

1	2	3	4	5	6	7
50° 15' ± 1° 30'	51° 30' ± 1° 30'	49° ± 1° 30'	49° ± 1° 30'	49° ± 1° 30'	48° 45' ± 1° 30'	49° ± 1° 30'

(3)Measuring roll spoilers 3 to 7 travel

NOTE : The travel values are given in the table to be found at end of test. The following test concerns R and L wing spoilers. Left and Right turn test operations are identical.

ACTION	RESULT
1. Fully turn Captain's or First Officer's control wheel to the left, without exceeding a force equal to 10 daN. (22.5 lbf.).	Spoilers deflect to the values A given in table.
2. Using ground pressure generator - increase simulated VC to > 250 kts	Spoilers deflect to the values B given in table.
3. Reduce simulated speed to 245 kts.	No change.
4. Reduce simulated speed slightly below 245 kts.	Spoilers deflect to the values A given in table.
5. Return Captain's or First Officer's control wheel to zero.	

Config.	Spoilers				
	3	4	5	6	7
A	34° ± 1°30'	34° ± 1°30'	34° ± 1°30'	34° ± 1°30'	34° ± 1°30'
B	19° 8'±1°30'	19° 8'±1°30'	19° 8'±1°30'	18° 45'± 1°30'	18°15'±1°30'

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Close access doors.

(3)Remove access platforms and safety barriers.

(4)Depressurize hydraulic systems and disconnect hydraulic ground power cart.

(5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT; MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

To check authorized play at spoiler trailing edges.

2. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 27-60-00, P. Block 301	Spoilers and Speedbrakes (Extension - Retraction of Spoilers)
- 27-61-51, P. Block 601	Spoilers 3 and 4
- 27-61-53, P. Block 601	Spoilers 5, 6 and 7
- 27-61-54, P. Block 601	Spoilers 1 and 2

3. Procedure

A. Job Set-Up

(1)Extend spoilers (Ref. 27-60-00, P. Block 301)

CAUTION : MAKE CERTAIN THAT THE THREE HYDRAULIC SYSTEMS ARE NOT PRESSURIZED.

B. Check of Authorized Play at Spoiler Trailing Edges

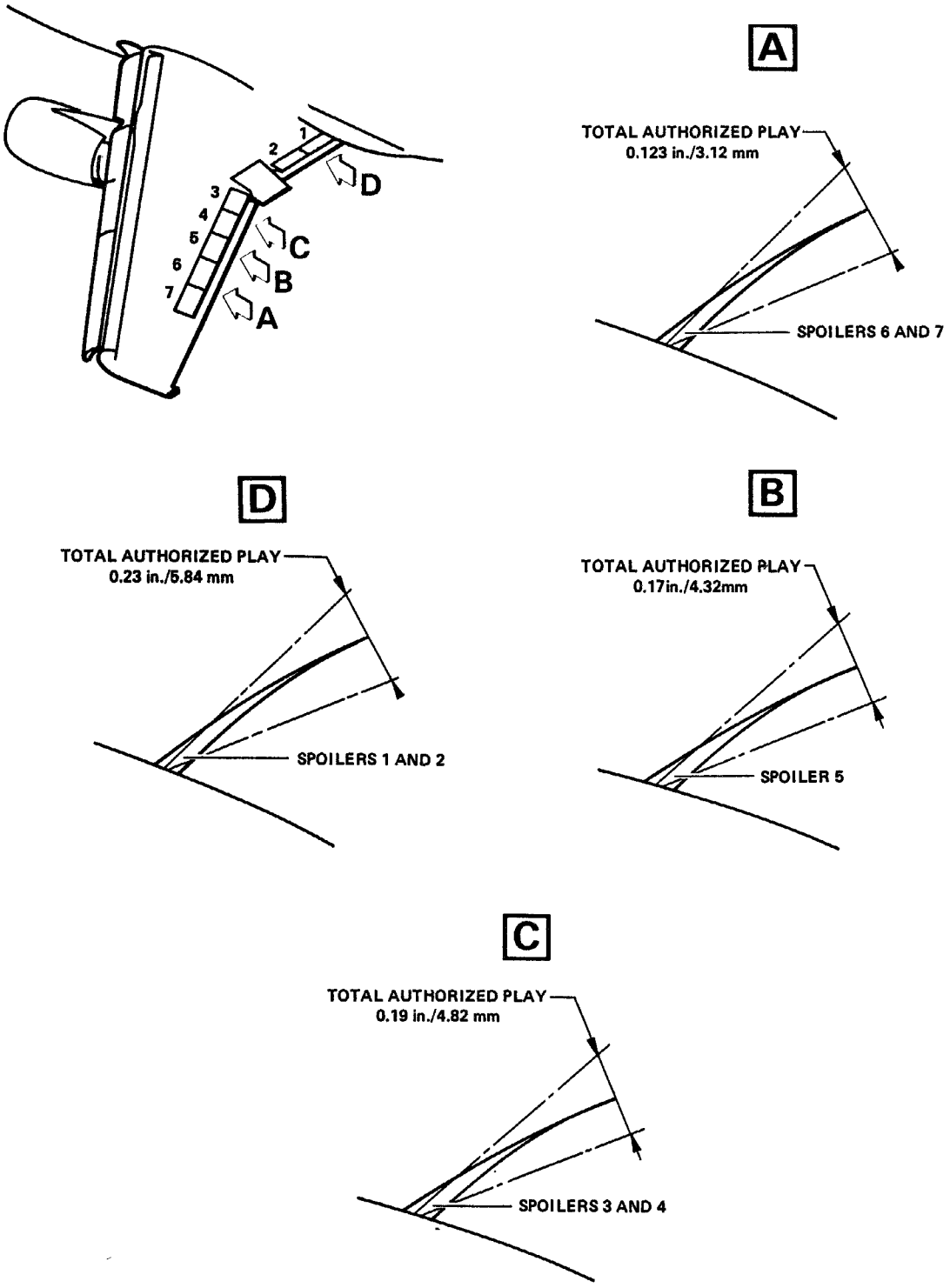
(1)On trailing edge, opposite center actuator, apply a force upward in order to eliminate any play with no bending of the surface and locate the position.

(2)On trailing edge, opposite center actuator, apply a force downward in order to eliminate any play with no bending of the surface and locate the position.

(3)Using the trailing edge of the wing as reference, measure the play between the two opposite position. If play exceeds total authorized value (Ref. Fig. 601), proceed with approved repairs at hinge fittings of spoilers and actuator (Ref. 27-61-54, P. Block 601 for spoilers 1 thru 2 ; Ref. 27-61-51, P. Block 601 for spoilers 3 thru 4 ; Ref. 27-61-53, P. Block 601 for spoilers 5 thru 7).

C. Close-Up

R (1)Retract ground spoilers (Ref. 27-60-00, P. Block 301).
R (2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (3)Close access door.



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Check of Plays at Spoiler Trailing Edges
Figure 601

ELECTRICAL AND MECHANICAL CONTROL (SPOILERS AND SPEEDBRAKES) - DEACTIVATION/REACTIVATION

Ref. : MMEL Sect. 1-27, Item 15 (Ground Spoiler Control System)
CAUTION : USAGE OF THIS PROCEDURE IS SUBJECT OF LIMITATIONS IMPOSED BY THE MEL.
WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Deactivation

A. Reason for the Job
To make the ground spoiler function inoperative.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Warning Notice

C. Procedure
(1) Job set-up
R (a) Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU/LAND RECOVERY/ NORM SUPPLY/ SPLR/6 & 7	9CP	333/T66
133VU	FLT CTL/EFCU/LAND RECOVERY/ SUPPLY/SPLR/1 & 4	72CP	333/T67

R (b) On maintenance panel 472VU
1 Place ANN LT switch in READ position.
2 On C/B MONITOR section, check that OPEN legend of pushbutton switch corresponding to opened circuit breakers is on.
3 Press pushbutton switch concerned :
- OPEN legend goes off
- INHIB legend comes on.
4 Place ANN LT switch in OFF position.
R (c) Inform the crew of the presence of C/B MONITOR INHIB message on left ECAM display unit.
R (d) Install placard indicating that the ground spoiler function is

inoperative.

(2)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

R

2. Reactivation

A. Procedure

(1)Job set-up

R (a)Remove safety clips and tags and close the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU/LAND RECOVERY/ NORM SUPPLY/SPLR/6 & 7	9CP	333/T66
133VU	FLT CTL/EFCU/LAND RECOVERY/ SUPPLY/SPLR/1 & 4	72CP	333/T67

(b)On maintenance panel 472VU

1 Place ANN LT switch in READ position.

2 Press to release pushbutton switch with INHIB legend on (legend goes off)

3 Place ANN LT switch in OFF position.

(c)Perform a trouble shooting procedure (Ref. TSM 27-61).

(2)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

R

SPEED BRAKE CONTROL LEVER - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDINS WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A27603005000	Wrench - Rack
B. 98A27603006000	Pin - Rigging
C.	Access Platform, 2.50 m to 3 m (8.20 to 9.80 ft)
D. VG2-68	Pin - Rigging, Transducer Unit
E.	Warning Notice Prohibiting Operation of Controls on Center Pedestal
F.	Warning Notices Prohibiting Pressurization of Green, Blue and Yellow Hydraulic Systems
G.	Circuit Breaker Safety Clips
H. Material No. 04-004	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 27-61-00, P. Block 501	Electrical and Mechanical Control (Spoilers and Speedbrakes)
- 27-41-00, P. Block 501	Mechanical Control (T.H.S) - Adjustment Test

2. Procedure

A. Job Set-Up
(1)Install access platform.
(2)Open access door 121BL.
(3)In flight compartment, check that SPEEDBRAKE control lever is in RET position (ground spoiler function not preselected).
(4)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/2&3	5CP	335/R63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/6&7	7CP	335/R62
133VU	EFCU/NORM/SUPPLY/SPLR2&3	8CP	333/T62
133VU	EFCU/LAND RECOVERY/NORM SUPPLY/SPLR/6&7	9CP	333/T66
133VU	EFCU/NORM/SUPPLY/SPLR6&7	10CP	332/U62
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/1&4	53CP	334/S63
133VU	LAND/RECOVERY/SUPPLY/SPLR/1&4&6&7	54CP	334/S67

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/5	55CP	334/S64
133VU	EFCU/NORM/SUPPLY/SPLR5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM/SUPPLY/SPLR 1&4	71CP	331/V62
133VU	EFCU/LAND RECOVERY/SUPPLY/SPLR/1&4	72CP	333/T67

(5)Display warning notices prohibiting pressurization of hydraulic systems
- on ground connectors
- on HYD PWR panel 427VU in flight compartment.

(6)Immobilize transducer unit (7CS) with rigging pin VG2-68.

(7)Display a warning notice prohibiting operation of controls on center pedestal.

B. Removal

(Ref. Fig. 401)
(Ref. Fig. 402)
(Ref. Fig. 403)

(1)Remove covers (81) from pitch trim control wheel (84).

(2)Remove cotter pin and nut (82) attaching the pitch trim control wheel. Remove washer (83).

(3)Remove pitch trim control wheel and its indicators (84).

(4)Remove rings (85), drive gear (86) and adjusting spacer (87).

(5)Extract bearings (88) and remove adjusting washers (89).

(6)Remove axle (91) and retain bush (90).

R (7)Remove and disregard heat shrinkable tubing from handle (1).

(8)Remove pin (27) and handle (1).

(9)Remove screws (4) securing integrally lighted plate (3).

(10)Remove integrally lighted plate (3).

(11)Remove screws (2) securing protective cover (5) to SPEEDBRAKE control lever assy.

(12)Remove protective cover (5).

R (13)Remove cotter pin, nut (18), retain washer (19).

(14)Support adjustable rod (20) and remove bolt (17).

(15)Stow adjustable rod (20) against pedestal structure to prevent damage.

(16)Remove cotter pin, nut (10), retain washer (9).

(17)Remove bolt (6) and retain spacer (12).

(18)Disconnect link (11).

(19)Cut and remove lockwire, remove slotted nut (7) using equipment 98A27603005000 and retain washer (8).

(20)Remove cotter pin, nut (30), retain washer (31), remove screw (34), clamps (32) and spacer (33).

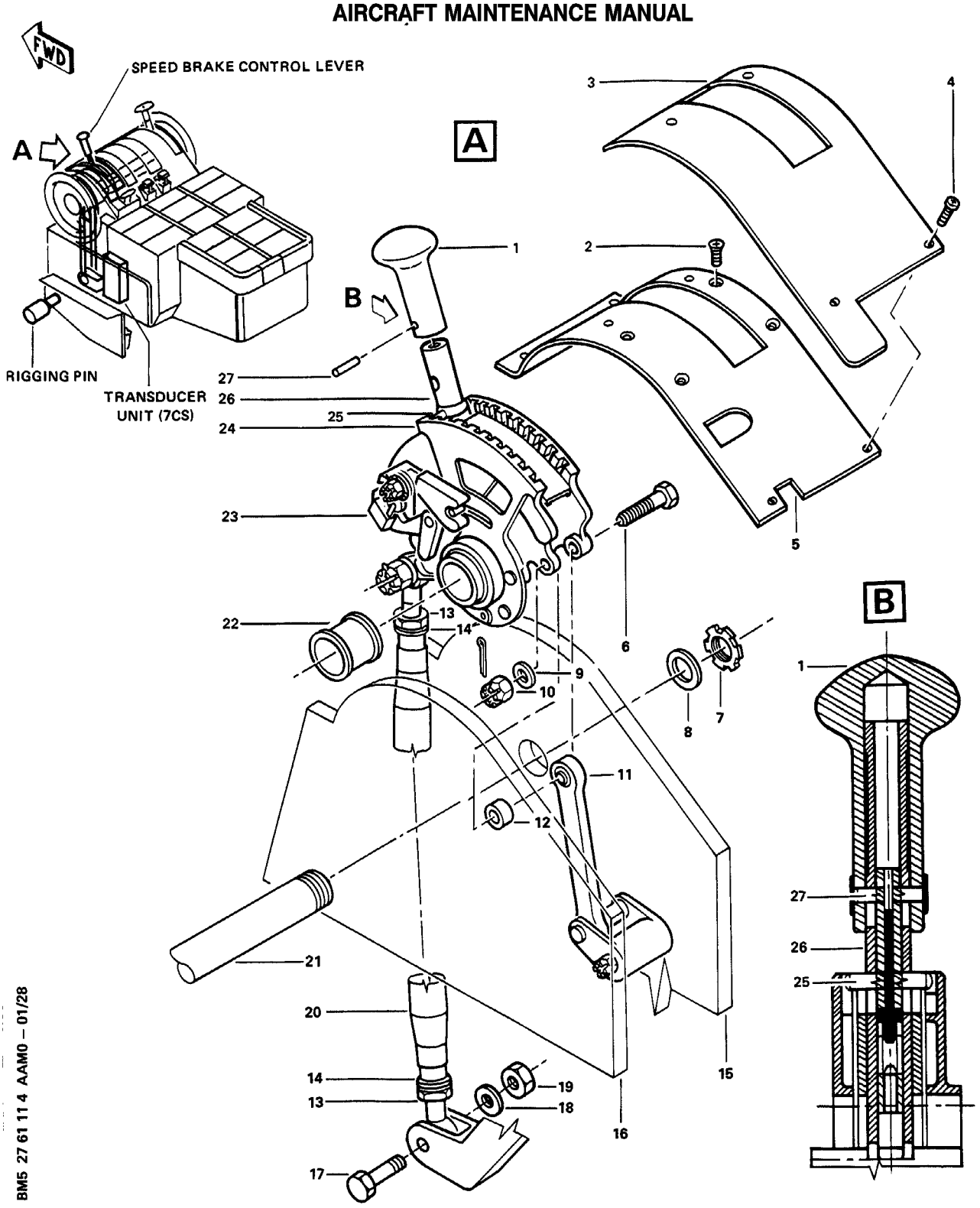
(21)Remove cotter pin, nut (35), retain washer (36), remove bolt (39), clamp (37) and spacer (38).

(22)Remove cotter pin, nut (40), retain washer (41), remove bolt (43) and clamp (42).

(23)Push out shaft assembly (21) using equipment 98A27603006000.

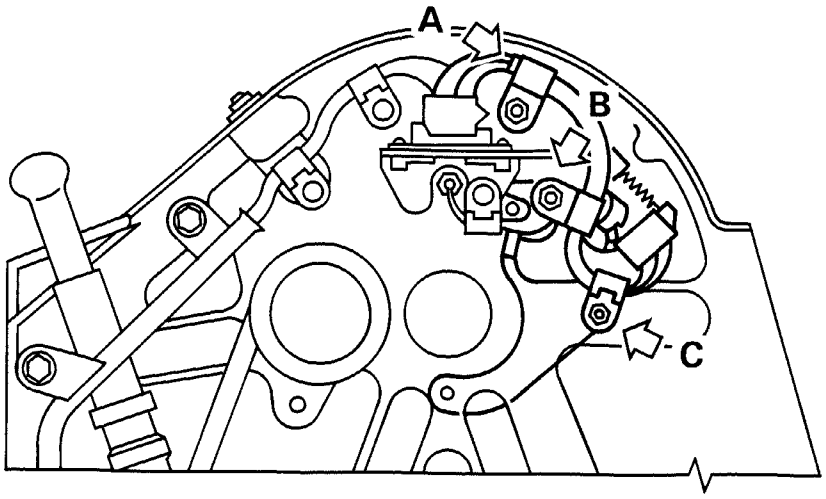
(24)Remove shaft assembly (21).

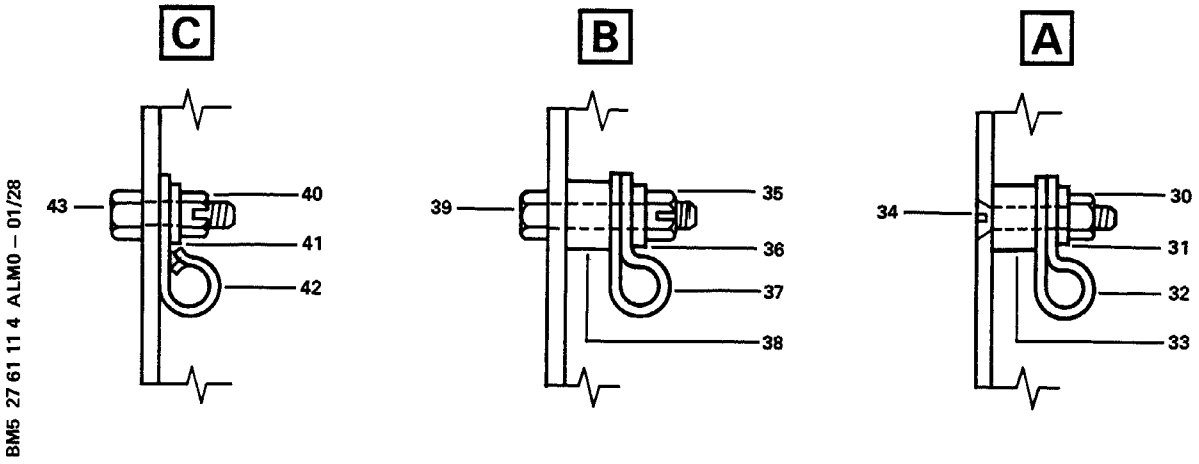
(25)Withdraw equipment 98A27603006000 from center pedestal sufficiently to free successively spacer (22) and SPEED BRAKE control lever assembly



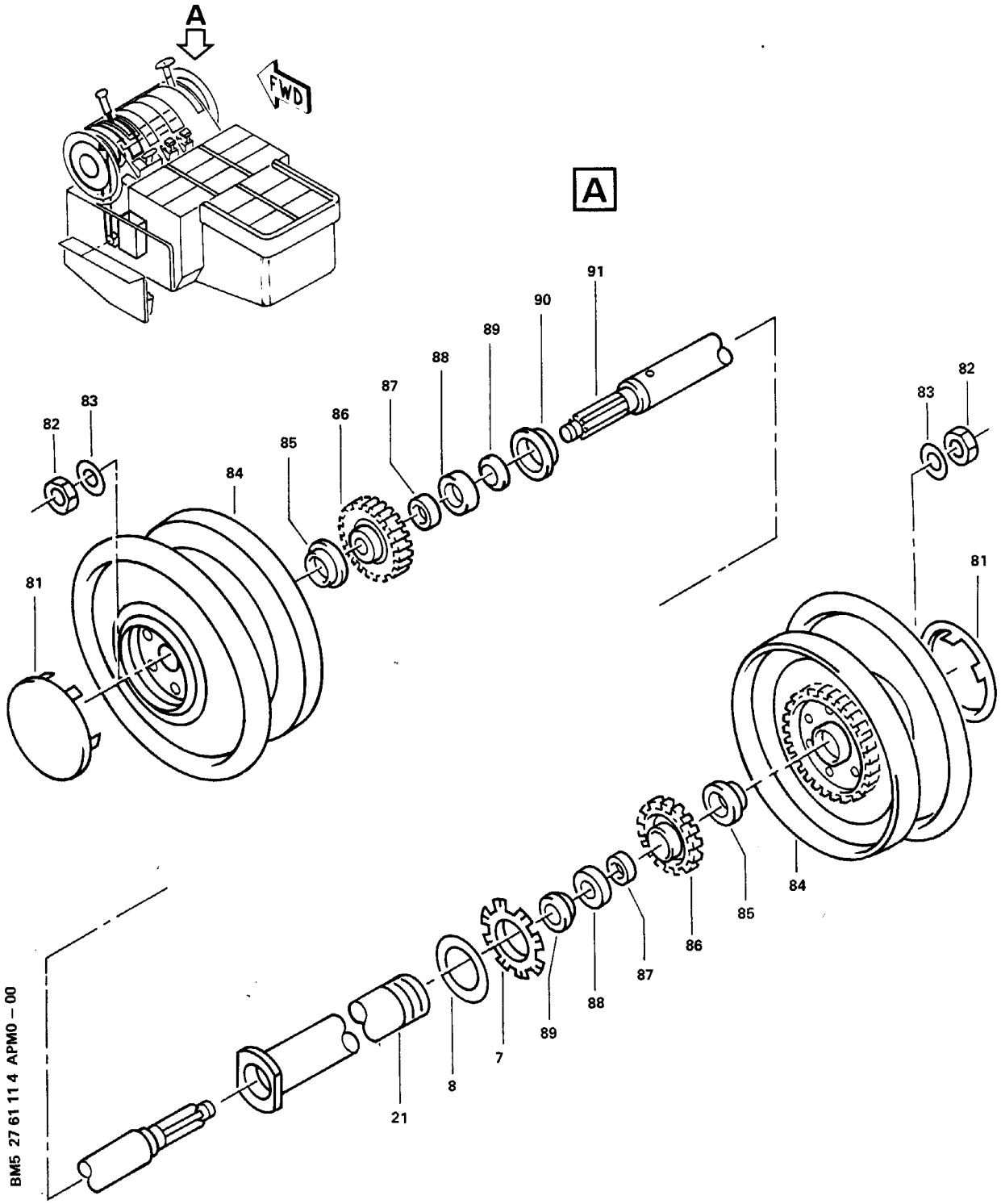
SPEEDBRAKE Control Lever
Figure 401

R





Microswitch 4CS and 41CS Electrical Wiring
Figure 402



Pitch Trim Control
Figure 403

(24).

R (26)Remove spacer (22) and SPEED BRAKE control lever assembly (24).

R (27)Fully engage equipment 98A27603006000.

R (28)Disengage microswitches (23) to enable removal of control lever assem-
R bly (24).

C. Preparation of Replacement Component

(1)Equip replacement SPEEDBRAKE control lever assy with microswtiches 4CS and 41CS (23) (Ref. 27-61-43, P. Block 401).

D. Installation

NOTE : Prior to assembly lubricate threads of bolts, nuts parts and mating surfaces using grease, Material 04-004 (Ref. 20-31-00).

(1)Install handle (1) on stem (26).

NOTE : Take care to align hole of handle (1) with hole of stem (26).

(2)Immobilize handle with pin (27).

(3)Secure pin (27) with the heat shrinkable tubing.

(4)Place handle (1) in notch 0 (RET position) and check that it is locked in this position.

(5)CAUTION : DURING THIS OPERATION, MOVE EQUIPMENT 98A27603006000 ONLY BY THE AMOUNT NECESSARY TO INSTALL SPACER (22) AND SPEED BRAKE CONTROL LEVER (24). EQUIPMENT MUST REST ON LEFT INNER SIDE PLATE (15).

Withdraw equipment 98A27603006000 and position spacer (22) and SPEED BRAKE control lever assembly (24).

(6)Engage shaft assembly (21) and gradually push out equipment 98A27603006000.

(7)On shaft assembly (21), engage washer (8).

(8)Engage and tighten slotted nut (7) using equipment 98A27603005000. TORQUE to 2 m.daN (14.75 lbf. ft).

(9)Safety slotted nut with lockwire.

(10)Position link (11) and connect to assembly (24) side plates using spacer (12) and bolt (6).

(11)On bolt (6), install washer (9), tighten and safety nut (10) with cotter pin.

(12)Position clamp (32), install bolt (34), spacer (33) and washer (31). Tighten nut (30) and safety with cotter pin.

(13)Position clamp (37), install bolt (39), spacer (38) and washer (36). Tighten nut (35) and safety with cotter pin.

(14)Position clamp (42), install bolt (43), washer (41). Tighten nut (40) and safety with cotter pin.

(15)Position protective cover (5) on SPEED BRAKE control lever assy (24) and secure on side plates (15) and (16) using screws (2).

(16)Position integrally lighted plate (3) on protective cover (5) and secure with screws (4).

(17)Position adjustable rod (20) connecting SPEED BRAKE control lever assembly (24) to transducer unit (7CS).

(18)Connect rod (20) to lever assembly (24) by inserting special bolt (17).

(19)If required, cut and remove lockwire and remove nuts (13), disengage

lockwashers (14) and adjust rod (20) body until special bolt (17) can be inserted. Install lockwashers (14), tighten nut (13) and safety lockwire.

(20) On special bolt (17), engage washer (18), tighten nut (19) and safety with cotter pin.

(21) Install axle (91) and bush (90).

(22) Install adjusting washers (89), bearing (88) and adjusting spacer (87).

(23) Install drive gear (86) and rings (85).

(24) Not applicable.

(25) Install pitch trim control wheel and indicator (84). Check that indicator displays zero.

(26) Install washers (83), tighten nut (82) and safety with cotter pin.

(27) Install cover (81) on pitch trim control wheel.

E. Adjustment

(1) With **SPEED BRAKE** control lever placed and locked in notch 0 (RET position), remove rigging pin VF2-68 from transducer unit 7CS.

(2) Move control lever through full operating range and make certain that control components operate freely without interfering of chafing against structure or adjacent controls.

(3) Return **SPEED BRAKE** control lever to RET position and check that transducer unit 7CS rigging pin VG2-68 can be inserted and withdrawn freely ; if not, repeat adjustment of rod (20).

(4) Remove rigging pin VG2-68 from transducer unit 7CS.

F. Test

(1) Remove safety clips and tags and close circuit breakers, 5CP, 7CP, 8CP, 9CP, 10CP, 53CP, 54CP, 55CP, 70CP, 71CP and 72CP.
CAUTION : CLOSE EFCU TRANSDUCERS C/Bs BEFORE EFCU C/Bs.

(2) Remove warning notices.

(3) Perform functional test (Speed brake test) described in 27-61-00, P. Block 501.

(4) Perform functional test of T.H.S actuator overfull travel range by reference to mechanical indicator, described in 27-41-00, P. Block 501.

G. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Close access door 121BL.

(3) Remove access platform.

TRANSDUCER UNIT 3CP (74CP) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A27901000000	Pin - Rigging, Aileron Control Wheel
B. 98A27901007000	Pin - Rigging, Elevator Control
C.	Circuit Breaker Safety Clips
D.	Sealing Plugs/Caps
E.	Lockwire - Corrosion Resistant Steel, dia. 0.8 mm (0.032 in)
F. Material No. 04-004	Common Greases (Ref. 20-31-00)
G.	Warning Notices Prohibiting Depressurization of Hydraulic Systems
H. 97A27302009000	Locking Equipment - Pitch Trim Control Wheel
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization

2. Procedure

A. Job Set-Up

Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
Make certain that electronics racks ventilation is correct.

(1) Connect hydraulic ground power cart and pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(2) Remove coverplate from Captain's (First Officer's) aileron control wheel.

(3) Make certain that Captain's and First Officer's aileron control wheels are at neutral. Immobilize Captain's (First Officer's) aileron control wheel using rigging pin 98A27901000000.

(4) Make certain that Captain's (First Officer's) pitch trim control wheel is at neutral. Immobilize with equipment 97A27302009000.

(5)Open access door 121BL.
(6)Immobilize Captain's (First Officer's) control column at neutral with rigging pin 98A27901007000.
(7)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/AIL/TRIM	3CG	331/V63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/2 & 3	5CP	335/R63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/6 & 7	7CP	335/R62
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/1 & 4	53CP	334/S63
133VU	LAND/RECOVERY/SUPPLY/SPLR/1 & 4 & 6 & 7	54CP	334/S67
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/5	55CP	334/S64

(Ref. Fig. 401)

B. Removal

CAUTION : DISPLAY A WARNING NOTICE ON HYDRAULIC GROUND POWER CART PROHIBITING DEPRESSURIZATION OF GREEN HYDRAULIC SYSTEM.

(1)Disconnect electrical connector and install sealing plugs.
(2)Disconnect rod (14) at level of transducer unit (4) by removing cotter pin (8), nut (9), and washer (10). Remove bolt (11).
(3)Support rod (14).
(4)Remove cotter pins (1), nuts (2), washers (3) and bolts (5).
(5)Remove transducer unit (4).

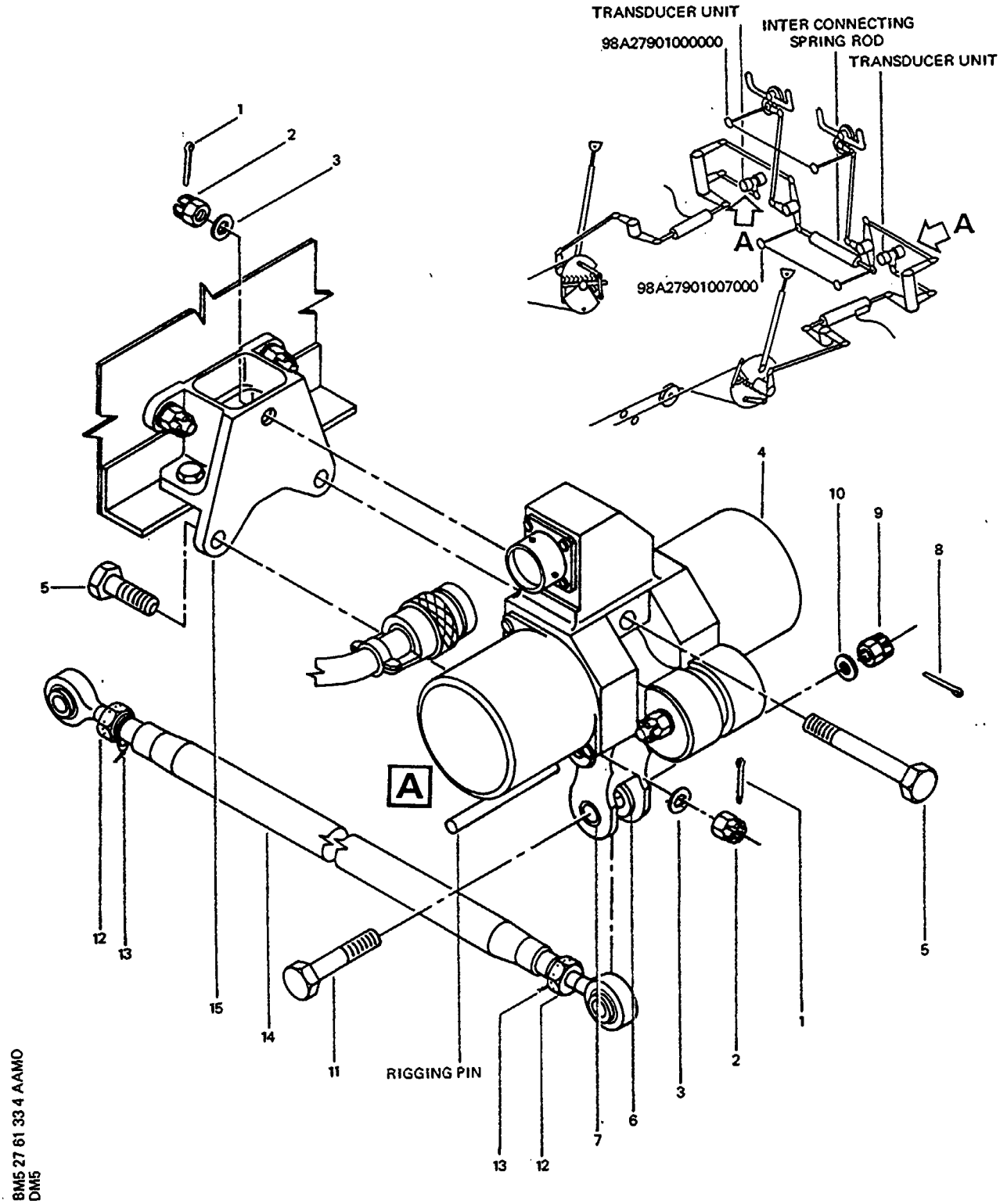
C. Preparation of Replacement Component

(1)Make certain that transducer unit is equipped with neutral setting rigging pin.
(2)Check that bushes (6) and (7) are in position.
(3)Affix identification plate 3CP on Captain's transducer unit (74CP on First Officer's transducer unit)

D. Installation

NOTE : Bolts are to be lubricated with material No.04-004.

(1)Position transducer unit (4) on support bracket (15) and secure using bolts (5), washers (3), nuts (2).
Tighten nuts (2) and safety with cotter pins (1).
(2)Connect rod (14) to transducer unit lever (4) using shouldered bolt (11). If required, cut lockwire, loosen nut (12), disengage washers (13) and move rod body so as to insert shouldered bolt (11).
(3)Install washer (10), tighten nut (9) and insert cotter pin (8).
(4)Position lockwashers (13), tighten adjusting nuts (12).
(5)Remove cotter pins immobilizing rigging pin mounted on transducer unit (4) and check that it can be freely removed/inserted. If not repeat adjustment of rod (14).
(6)Safety adjusting nut (12) with lockwire.
(7)Remove rigging pin mounted on transducer unit (4).
(8)Remove sealing plugs then connect connector. Check that wiring does not interfere with displacement of controls.
(9)Remove rigging pin 98A27901000000 from Captain's (First Officer's) aileron control wheel and rigging pin 98A27901007000 from Captain's



Transducer Unit - Removal/Installation
Figure 401

(First Officer's) control column.
(10)Remove locking equipment 97A27302009000 from Captain's (First Officer's) pitch trim control wheel.
(11)Install cover plate on Captain's (First Officer's) aileron control wheel.
(12)Remove safety clips and tags and close circuit breakers 3CG, 5CP, 7CP, 53CP, 54CP and 55CP.

E. Tests
Initial Conditions :
- Correct electrical power supply
- Forward services ventilation system operation
- Green hydraulic system pressurized
- Circuit breakers closed, particularly those associated with flight controls

ACTION	RESULT
1. On SERVO CTL section of panel 428VU : - make certain that SERVO CTL/G/(JAM/OFF) pushbutton switch is pressed and that OFF legend is off.	
2. On SPLR & SPD BRK section of panel 428VU : - make certain that SPLR & SPD BRK/5/(FAULT/OFF) pushbutton switch is pressed and that OFF legend is off.	
3. Fully move Captain's aileron control wheel to left	Check that LH spoiler 5 is extended and that RH spoiler 5 is retracted.
4. Fully move Captain's aileron conrol wheel to right	Check that RH spoiler 5 is extended and that LH spoiler 5 is retracted
5. Return Captain's aileron control wheel to neutral	Make certain that RH and LH spoilers No.5 are retracted.

F. Close-Up
(1)Depressurize Green hydraulic system and disconnect hydraulic ground power cart.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Close access doors.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking caps
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-61-00, P. Block 501	Electrical and Mechanical Control (Spoilers and Speed Brakes)
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

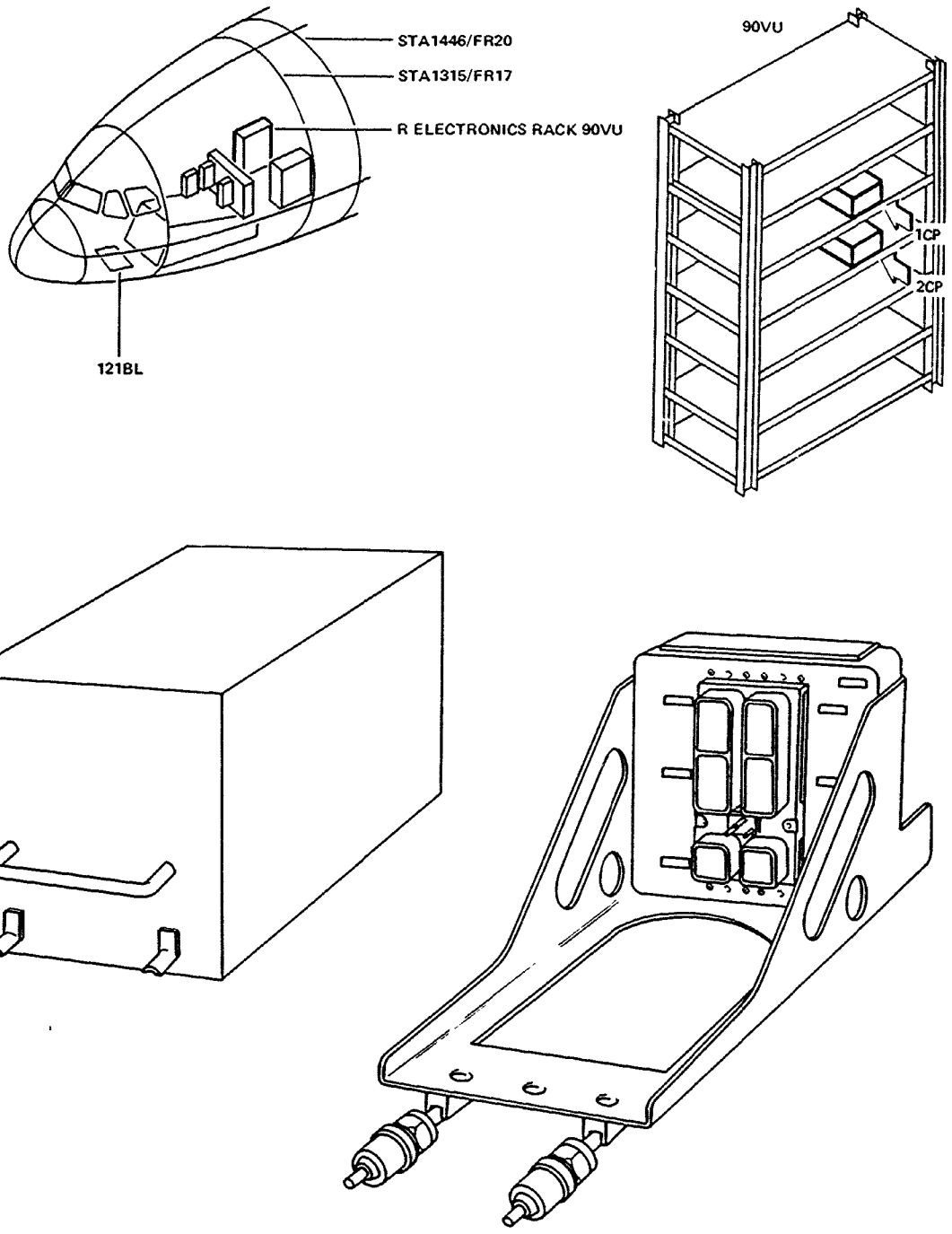
PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/2 & 3	5CP	335/R63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/6 & 7	7CP	335/R62
133VU	EFCU/NORM/SUPPLY/SPLR 2 & 3	8CP	333/T62
133VU	EFCU/LAND RECOVERY/NORM SUPPLY/SPLR/ 6 & 7	9CP	333/T66
133VU	EFCU/NORM/SUPPLY/SPLR 6 & 7	10CP	332/U62
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/1 & 4	53CP	334/S63
133VU	LAND/RECOVERY/SUPPLY/SPLR/1 & 4 & 6 & 7	54CP	334/S67
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/5	55CP	334/S64
133VU	EFCU/NORM/SUPPLY/SPLR/5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM/SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	EFCU/LAND RECOVERY/SUPPLY/SPLR/1 & 4	72CP	333/T67

(2)Open access door 121BL.
(3)Gain access to computer 1CP (2CP) installed in electronics rack 90VU.

B. Removal (Ref. Fig. 401)
(1)Loosen retaining nuts and disengage locking sliders to release unit studs.
(2)Withdraw unit from mount by pulling handle to disconnect electrical connector.
(3)Blank connectors.
(4)Remove unit.

C. Installation
(1)Clean and inspect unit and mount interface.
(2)Remove blanking caps from connectors and visually inspect contact pins.
(3)Position unit on its mount. Slowly push unit along its rails until a resistance is felt.
(4)Move locking device upwards and insert computer studs into recesses and engage locking sliders to secure unit studs. Tighten retaining nuts.
R CAUTION : MAKE SURE THAT THE EFCU IS CORRECTLY SECURED ON ITS MOUNT.
R A LOOSE EFCU CAN RESULT IN LOSS OF THE SPOILER FUNCTION.
(5)Remove safety clips and tags and close circuit breakers 5CP, 7CP, 53CP, 54CP, 55CP, 8CP, 9CP, 10CP, 70CP, 71CP, 72CP (Panel 133VU).
CAUTION : CLOSE EFCU TRANSDUCERS C/Bs BEFORE EFCU C/Bs.

D. Test
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(2)Perform ground spoiler operational test (Ref. 27-61-00, P. Block 501 para. 2 D (4)).
(3)Pressurize Green hydraulic system using electric pumps (Ref. 29-21-00, P. Block 301).
On SPLR & SPD BRK section of panel 428VU, FAULT legend of pushbutton switch 5 goes off.
(4)Pressurize Blue hydraulic system using PTU (Ref. 29-22-00, P. Block 301).
On SPLR & SPD BRK section of panel 428VU, FAULT legends of pushbutton switches 3 & 2 and 7 go off.
Release (out) PTU pushbutton switch.
On SPLR & SPD BRK section of panel 428VU, FAULT legends of pushbutton switches 3 & 2 and 7 come on.
(5)Pressurize Yellow hydraulic system using PTU (Ref. 29-23-00, P. Block 301).
On SPLR & SPD BRK section of panel 428VU, FAULT legends of pushbutton switches 4 & 1 and 6 go off.
Release (out) PTU pushbutton switch.
On SPLR & SPD BRK section of panel 428VU, FAULT legends of pushbutton switches 4 & 1 and 6 come on.
(6)De-pressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).
On SPLR & SPD BRK section of panel 428VU, FAULT legend of pushbutton switch 5 comes on.
(7)On FLIGHT CONTROLS section of panel 471VU



EFCU 1CP-(2CP)
Figure 401

- make certain that BITE DISPLAY legend of EFCU annunciator is off.

E. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Close access door 121BL.

PRESELECTION OR THRUST REVERSER OPERATED MICROSWITCH 4CS/41CS REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.50 m to 3 m (8.20 to 9.80 ft.)
B.	Lockwire - Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
C.	Warning Notice Prohibiting Operation of Controls Located on Center Pedestal
D.	Warning Notices Prohibiting Pressurization of Hydraulic Systems
E.	Circuit Breaker Safety Clips
F. VG2-68	Pin - Rigging, Transducer Unit
G. Material No. 08-007	Bonding and Adhesive Compounds (Ref. 20-31-00)
Referenced Procedures	
- 27-61-00, P. Block 501	Electrical and Mechanical Control (Spoilers and Speedbrakes)
- 27-61-11, P. Block 401	SPEED BRAKE Control Lever

2. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Open access door 121BL
(3)In flight compartment, check that SPEED BRAKE control lever is in RET position and that ground spoiler function is not preselected.
(4)Open, safety and tag the following circuit breakers.

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/2 & 3	5CP	335/R63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/6 & 7	7CP	335/R62
133VU	EFCU/NORM/SUPPLY/SPLR 2 & 3	8CP	333/T62

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/LAND RECOVERY/NORM SUPPLY/SPLR/ 6 & 7	9CP	333/T66
133VU	EFCU/NORM/SUPPLY/SPLR 6 & 7	10CP	332/U62
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/1 & 4	53CP	334/S63
133VU	LAND RECOVERY/SUPPLY/SPLR/1 & 4 & 7	54CP	334/S67
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/5	55CP	334/S64
133VU	EFCU/NORM/SUPPLY/SPLR 5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM/SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	EFCU/LAND RECOVERY/SUPPLY/SPLR/1 & 4	72CP	333/T67

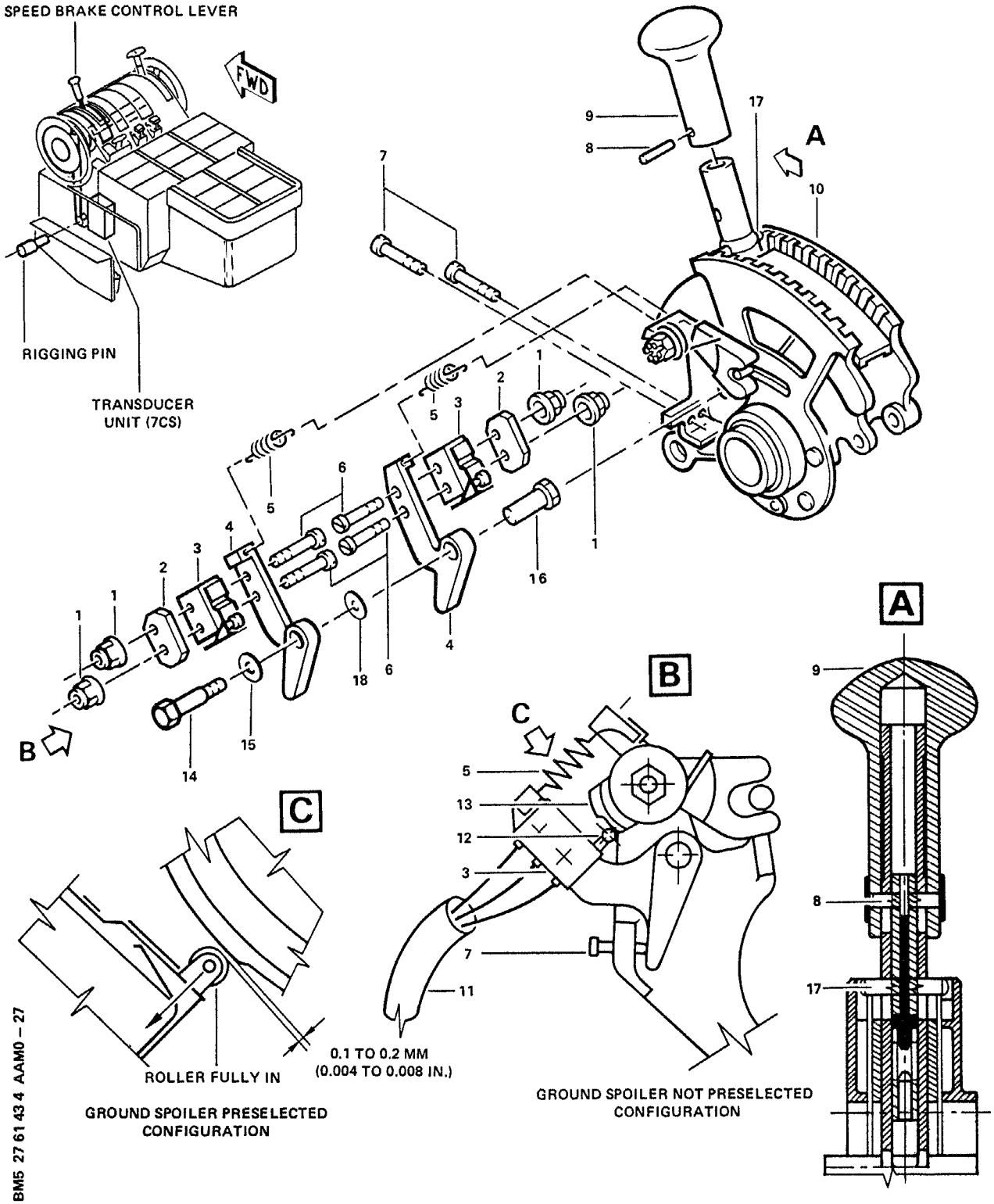
(5)Display warning notices prohibiting pressurization of hydraulic systems
- on ground connectors
- on HYD PWR panel 427VU, in flight compartment

(6)Immobilize transducer unit (7CS) using rigging pin VG2-68.
(7)Display a warning notice on center pedestal prohibiting operation of controls.
(8)Remove SPEED BRAKE control lever assembly (Ref. 27-61-11, P. Block 401).

B. Removal
(Ref. Fig. 401)
(1)On SPEED BRAKE control lever assembly (10) remove the two extension springs (5) from microswitch (3) brackets (4).
(2)Cut and remove lockwire, remove screw (14), retain washer (15) and (18) and remove bush (16).
(3)Remove brackets (4) equipped with microswitches (3) and electrical sleeve (11).
(4)On brackets (4), remove and discard self locking nuts (1), disengage each microswitch (3), retain shims (2) and screws (6).
(5)Remove microswitches 4CS and 41CS (3) equipped with electrical cables (11).

C. Preparation of Replacement Component
(1)Install replacement microswitches (3) on brackets (4).
(2)Immobilize with screws (6), shims (2) and self-locking nuts (1).
(3)On SPEED BRAKE control lever assembly (10), install handle (9) on stem
NOTE : Take care to align hole of handle (9) with hole of stem.
(4)Push down pin (17)
(5)Immobilize handle with pin (8)
NOTE : Before releasing pin (17) make certain that hole in the middle of pin is vertical. To this end, slot of pin must be aligned with the vertical position.

D. Installation
(1)Position brackets (4) equipped with microswitches (3) on SPEED BRAKE control lever assembly (10).
(2)Immobilize brackets (4) using bush (16), washer (15) and (18), and screw (14). Safety screw (14) with lockwire.
(3)Install the two extension springs (5).



Preselection Microswitch 4CS/41CS
Figure 401

(4)Place SPEED BRAKE control lever (9) in position corresponding to the RET position on center pedestal.
(5)Pull control lever (9) upwards to the Ground Spoiler function preselected position.
(6)Slightly loosen microswitch (3) adjustment screws (7).
(7)With cam (13) in Ground Spoiler Preselection position, place rollers (12) of each microswitch (3) in contact with cam (13).
Press brackets (4) against screws (7) and check that residual travel of rollers (12) is between 0,1 mm and 0,2 mm (0.004 in to 0.008 in). If not, tighten or loosen adjustment screws (7) to obtain required residual travel.
(8)When microswitches are correctly adjusted, safety adjustment screws (7) using material No. 08-007.
(9)Push SPEED BRAKE control lever (9) down to Ground Spoiler function not preselected configuration.
(10)Remove pin (8) and remove handle (9).
(11)Install SPEED BRAKE control lever assembly (10) on center pedestal (Ref. 27-61-11, P. Block 401).
NOTE : Make certain that rigging pin VG2-68 is removed.
(12)Remove warning notices.
(13)Remove safety clips and tags and close circuit breakers 5CP, 7CP, 8CP, 9CP, 10CP, 53CP, 54CP, 55CP, 70CP, 71CP and 72CP.
R CAUTION : CLOSE EFCU TRANSDUCERS C/Bs BEFORE EFCU C/Bs.

E. Test
Perform functional test (ground spoiler test) described in 27-61-00, P. Block 501.

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.
(3)Remove access platform.

SPEED BRAKE CONTROL TRANSDUCER UNIT - 7CS - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROL.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Lockwire - Corrosion Resistant Steel, 0.8 mm dia. (0.032 in.)
B.	Warning Notice to Prohibit Hydraulic System Pressurization
C.	Circuit Breaker Safety Clips
D.	Protective Caps
E. Material No. 04-004	Common Greases (Ref. 20-31-00)
Referenced Procedure - 27-61-00, P. Block 501	Electrical and Mechanical Control (Spoilers and Speedbrakes)

2. Procedure

A. Job set-up
(1) Open door 121BL.
(2) Make certain that SPEEDBRAKE control lever is in RET position, ground spoiler function not preselected.
(3) Open, safety and tag following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/2 & 3	5CP	335/R63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/6 & 7	7CP	335/R62
133VU	EFCU/NORM/SUPPLY/SPLR 2 & 3	8CP	333/T62
133VU	EFCU/LAND RECOVERY/NORM SUPPLY/SPLR/6 & 7	9CP	333/T66
133VU	EFCU/NORM/SUPPLY/SPLR 6 & 7	10CP	332/U62
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/1 & 4	53CP	334/S63
133VU	LAND/RECOVERY/SUPPLY/SPLR/1 & 4 & 6 & 7	54CP	334/S67
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/5	55CP	334/S64

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/NORM/SUPPLY/SPLR 5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM/SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	EFCU/LAND RECOVERY/SUPPLY/SPLR 1 & 4	72CP	333/T67

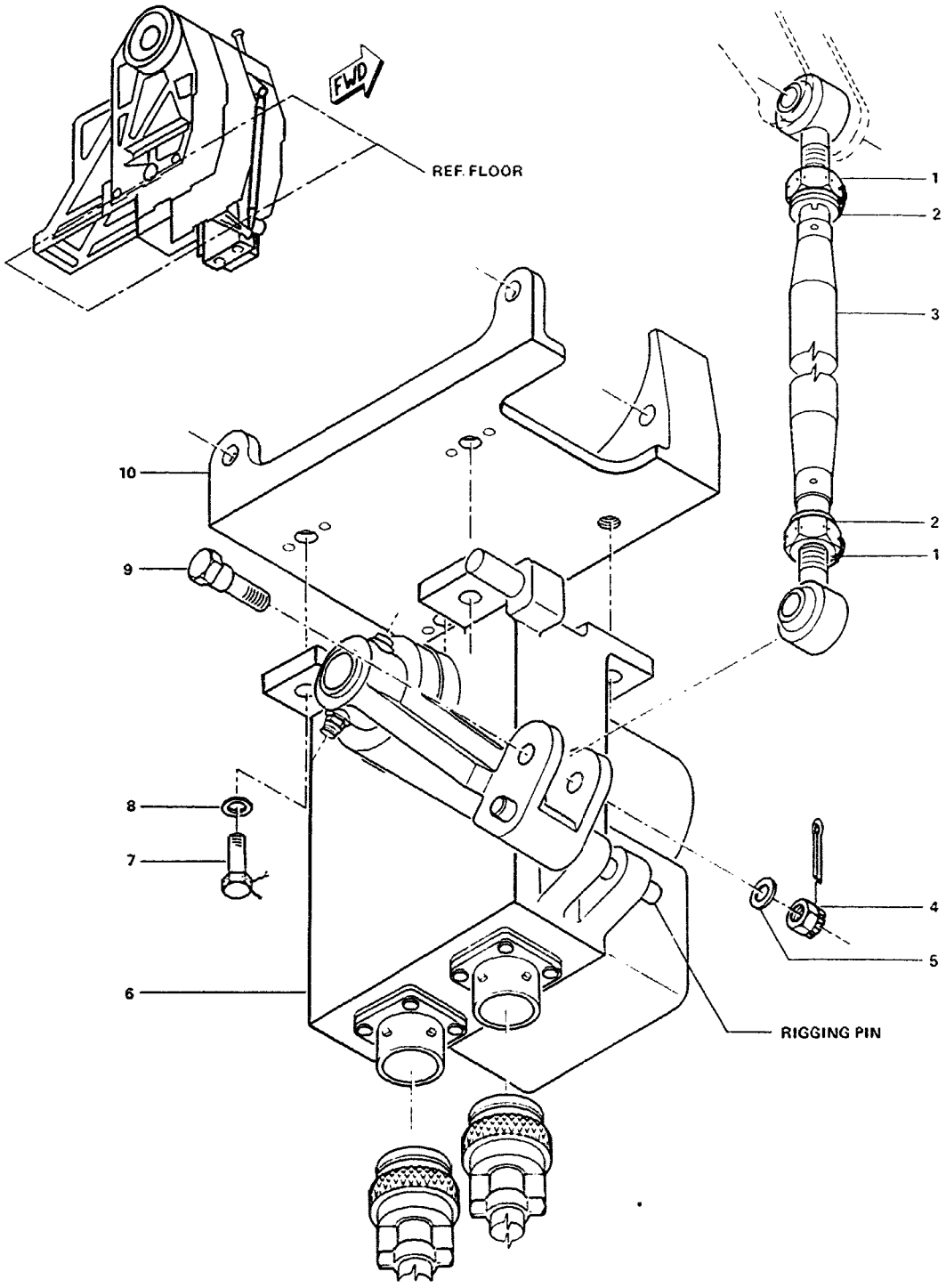
(4)On overhead panel, install a warning notice prohibiting hydraulic system pressurization.

B. Removal
(Ref. Fig. 401)
(1)Disconnect electrical connectors 7CS-A and 7CS-B and install protective caps.
(2)Remove cotter pin and nut (4), retain washer (5), remove bolt (9) and disengage rod (3).
(3)Cut lockwire, remove screws (7), retain washers (8) and remove transducer unit (6).

C. Preparation of Replacement Component
(1)Make certain that transducer unit is fitted with its rigging pin.
(2)Check that bellcrank rings are in place.
(3)Affix identification plate 7CS on transducer unit.

D. Installation
NOTE : Lubricate the screws using Mat. No. 04-004
(1)Position transducer unit (6) on its support (10) and secure using screws (7) and washers (8).
(2)Tighten screws and safety with lockwire.
(3)Connect rod (3) to transducer unit (6) control lever using bolt (9). If required, cut lockwire, loosen nuts (1), disengage washers (2) and adjust rod body to enable insertion of bolt (9).
(4)Install washer (5), screw nut (4) and safety with cotter pin.
(5)Position lock washers (2) and tighten adjusting nuts (1).
(6)Check that transducer unit (6) rigging pin can be easily removed and installed, otherwise adjust adjustable rod again (3).
(7)Safety adjusting nuts (1) using lockwire.
(8)Remove transducer unit (6) rigging pin.
(9)Remove protective caps and connect connectors 7CS-A and 7CS-B. Make certain that wiring does not interfere with operation of the controls.
(10)Operate control lever to its full travel and make certain that control lever units move freely without interference or friction against structure and neighboring controls. Return control lever to RET position.
(11)Close circuit breakers 5CP, 7CP, 8CP, 9CP, 10CP, 53CP, 54CP, 55CP, 70CP, 71CP and 72CP.
R CAUTION : CLOSE EFCU TRANSDUCERS C/Bs BEFORE EFCU C/Bs.
(12)Remove warning notice prohibiting hydraulic system pressurization.

E. Test
(1)Carry out functional test (Ref. 27-61-00, P. Block 501).



Speed Brake Control Transducer Unit
Figure 401

F. Close-up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.

R SPOILERS 3 AND 4 - REMOVAL/INSTALLATION

R WARNING : LANDING GEAR - MAKE SURE THAT THE GROUND SAFETIES AND CHOCKS ARE IN POSITION.

R FLIGHT CONTROLS - MAKE SURE THAT THE GROUND SAFTIES AND NOTICES ARE IN
R POSITION.

R HYDRAULICS - BEFORE YOU PRESSURIZE THE SYSTEM, MAKE SURE THAT THE
R CONTROL SURFACE POSITIONS AND THE FLIGHT CONTROL POSITIONS ARE THE
R SAME.

R MAKE SURE THAT YOU ISOLATE THE ELECTRICAL CIRCUITS UPON WHICH WORK IS
R IN PROGRESS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Torque Wrench: 11 to 147 lbf.ft (1.49 to 20 m.daN)
C. SL90.374 - .500	Wrench - Notched
D. SL90.374 - .750	Wrench - Notched
E. SL90.374 - .875	Wrench - Notched
F. SL90.314 - .500	Tool - Extraction
G. SL90.314 - .750	Tool - Extraction
H. SL90.314 - .875	Tool - Extraction
J. SL90.313 - .500	Tool - Installation
K. SL90.313 - .750	Tool - Installation
L. SL90.313 - .875	Tool - Installation
M. 98A27608010000	Guide Bullet - Spoiler/Airbrake Actuator Attaching Bolts
N. 98A27608014000	Safety Collar Set - Spoiler/Actuator Piston
P. 98A27608015000	Setting Gage Set - Actuator Adjustment
Q. 98A27608017000	Spanner Set - Spoiler Actuator Piston Rod Adjustment
R.	Feeler Gages
S.	Clinometer
T.	Warning Notices-Prohibiting Use of Flap Slat and Spoiler Systems
U.	Circuit Breaker Safety Clips and Tags
V.	Cotter-Pins
W.	Lockwire, Corrosion Resistant Steel,0.8mm (0.032in)dia
X. 98A27608011000	Control Box - Spoiler Valve Group
Y.	Blanking Caps
Z. Material No. 04-004	Common Greases (Ref. 20-31-00)
AA.Material No. 06-002	Lubricants (Ref. 20-31-00)
AB.Material No. 09-003	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 20-21-16, P. Block 1	STA-LOK Nuts and Lockwashers

ITEM	DESIGNATION
- 20-28-11, P. Block 1	Electrical Bonding
- 24-41-00, P. Block 301	AC External Power Control
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 27-50-00, P. Block 301	Flaps
- 27-60-00, P. Block 301	Spoilers and Speedbrakes
- 27-64-00, P. Block 1	Hydraulic Actuation (Spoilers and Speedbrakes)
- 29-10-00, P. Block 301	Main Hydraulic Power

2. Procedure

A. Job Set-Up
(1)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(2)Display warning notices.
(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR/1 & 4	53CP	334/S63
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR/5	55CP	334/S64
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR/2 & 3	5CP	335/R63
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR/6 & 7	7CP	335/R62
133VU	FLT CTL/LAND RECOVERY SUPPLY/SPLR/ 1 & 4 & 6 & 7	54CP	334/S67
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR/5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR/2 & 3	8CP	333/T62
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR/6 & 7	10CP	332/U62
133VU	FLT CTL/EFCU/LAND RECOVERY SUPPLY/SPLR/ 1 & 4	72CP	333/T67
133VU	FLT CTL/EFCU/LAND RECOVERY SUPPLY/SPLR/ 6 & 7	9CP	333/T66
133VU	FLT CTL/FLAPS/SYS 2/26 VAC	2CV	334/S62
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY SUPPLY/FLAPS/ SYS 1	10CV	335/R67
133VU	FLT CTL/FLAPS/SYS 1/26 VAC	1CV	335/R61

(4)Position access platform.
(5)Open access doors 581(681)BB, 581(681)CB, 581(681)DB and 581(681)EB as applicable.
(6)Turn maintenance device on valve group controlling spoiler to be worked

on to maintenance position M.

(7)Manually extend relevant spoiler and install safety collar PN 98A27608014000 on actuator piston.

B. Removal

(Ref. Fig. 401)

(Ref. Fig. 402)

(1)General

(a)At actuator attachment, detail F.

1 Remove nut (28), Hi-Lok pin (30) and anti-rotation plate (29).

2 Manually support spoiler (weight 97 lb (44 kg) in the extended position.

3 Manually support actuator (weight 20 lb (9 kg) and using tools SL90.374 - .875 and SL90.314 - .875, remove lockwasher (32) and nut (33) (Ref. 20-21-16, P. Block 1). Remove washer (31) and bolt (26). Disengage actuator eye-end from spoiler.

4 Lower actuator onto support bracket and remove bushes (27 and 34).

5 At detail A and D or E remove nuts (1), washers (2), bolts (4) and disconnect bonding straps (3) from spoiler.

(2)Spoiler 3

(a)At spoiler 4 inboard attachment, detail A.

1 Remove cotter-pin (11), nut (10), washer (12) and bolt (14). Swing hinge link (13) clear of spoiler 4.

(b)At outboard attachment, detail A.

1 Remove washer (5), nut (6) using tools SL90.374 - .500 and SL90.314 - .500 (Ref. 20-21-16, P. Block 1). Slide stud (7), complete with hinge link (13), clear of spoiler 3.

(c)At inboard attachment, detail D.

1 Remove washer (22) and nut (23) using tools SL90.374 - .500 and SL90.314 - .500 (Ref. 20-21-16, P. Block 1) and slide bolt (24) clear of hinge link (25).

(3)Spoiler 4

(a)At inboard attachment, detail A.

1 Remove cotter-pin (11), nut (10), washer (12) and bolt (14). Swing hinge link (13) clear of spoiler.

2 Remove washer (9) and nut (8) using tools SL90.374 - .500 and SL90.314 - .500 (Ref. 20-21-16, P. Block 1) and remove hinge link (13).

(b)At outboard attachment, detail E.

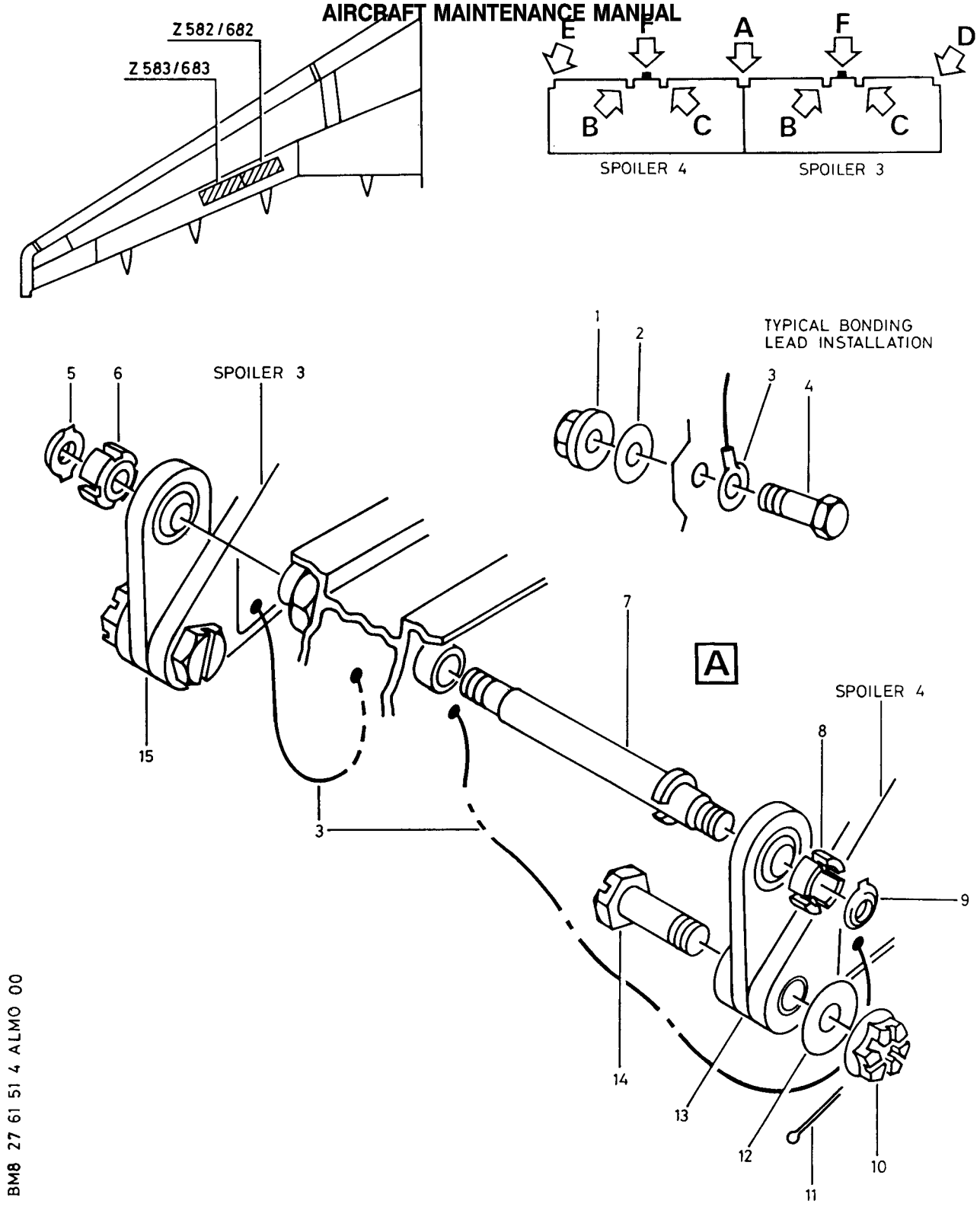
1 Remove washer (22) and nut (23) using tools SL90.374 - .500 and SL90.314 - .500 (Ref. 20-21-16, P. Block 1). Remove bolt (24).

(4)General

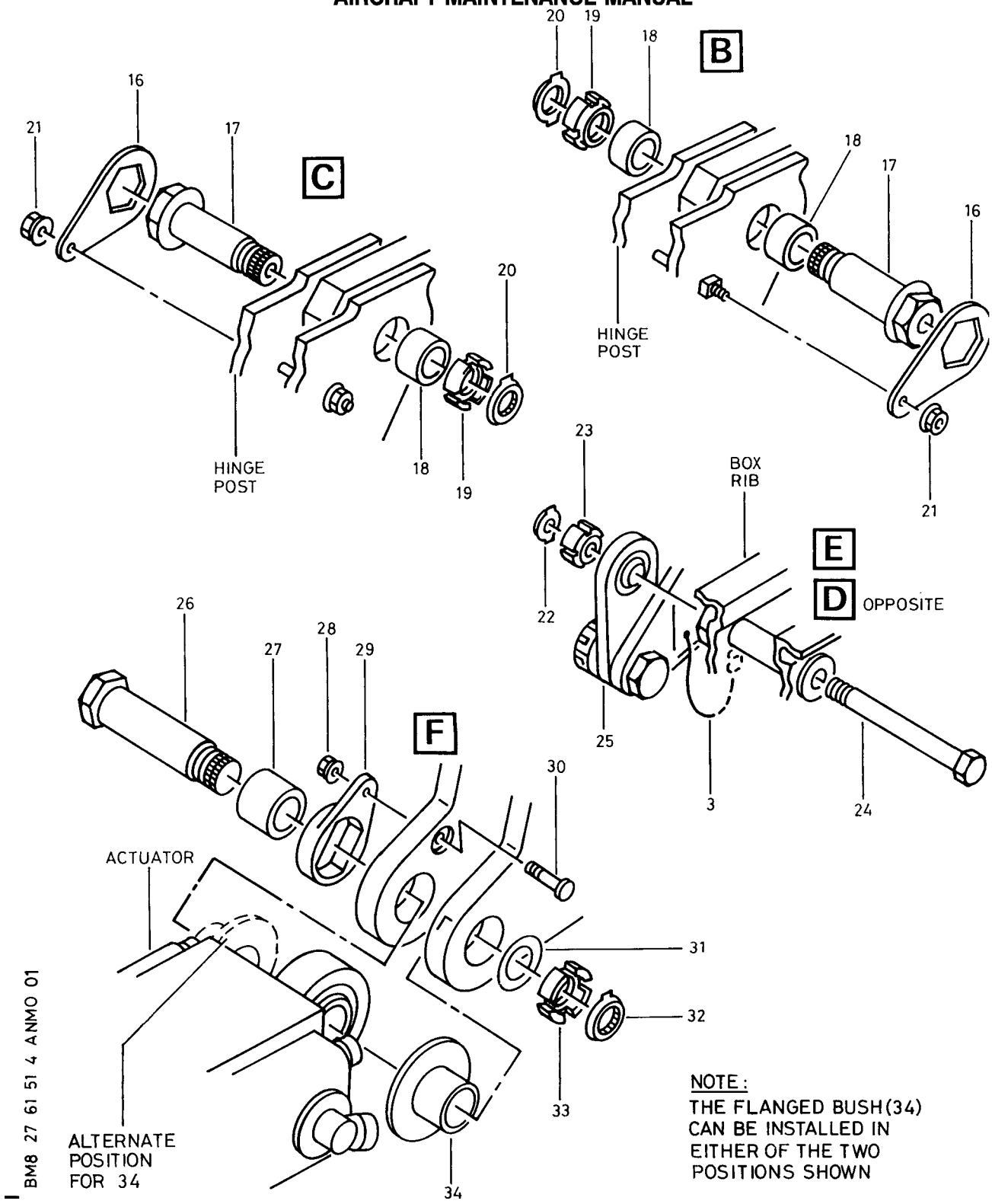
(a)At hinge points, detail B and C.

1 Remove nuts (21) and locking plates (16).

2 Remove washers (20) and nuts (19) using tools SL90.374 - .750 and SL90.314 - .750 (Ref. 20-21-16, P. Block 1). Remove hinge pins (17) and bushes (18). Lift spoiler clear of wing.



Spoilers 3 and 4 - Installation
Figure 401



Spoilers 3 and 4 - Installation
Figure 402

R

C. Installation
(Ref. Fig. 403)
(Ref. Fig. 404)

(1)General (Ref. Fig. 401, 402)
(a)Lubricate all hinge pins, bolts, screws and bushes with grease (Material No. 04-004).
(b)At hinge points, detail B and C.
1 Install bushes (18) in hinge posts.
2 Lift spoiler into position and align with hinge posts.
3 Install hinge pins (17) and nuts (19). Using tools SL90.374 - .750 and SL90.313 - .750, TORQUE nuts to between 55.3 and 59.7 lbf.ft (7.5 and 8.1 m.daN). Safety with washers (20) (Ref. 20-21-16, P. Block 1).
4 Install locking plates (16) and secure with nuts (21).

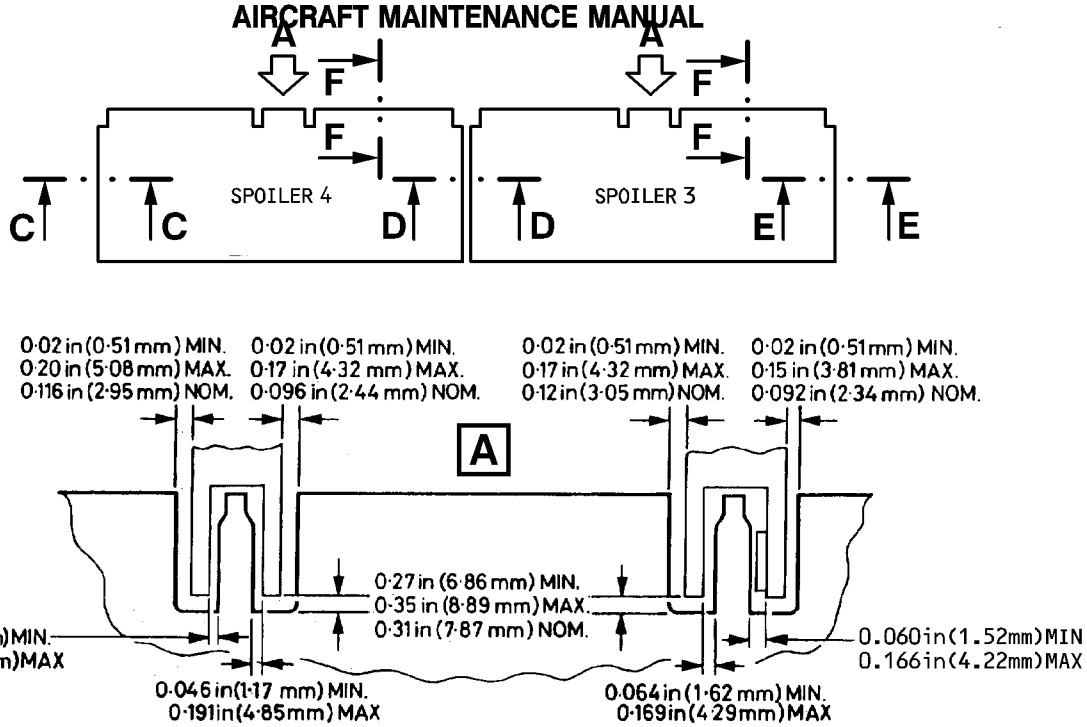
(2)Spoiler 3 (Ref. Fig. 403, 404).
(a)Make sure that the clearances (except clearance X) between the spoiler and the adjacent structure is within the limits given on the figures.
(b)Measure the gap between spoiler 3 and the inboard stop (clearance X).

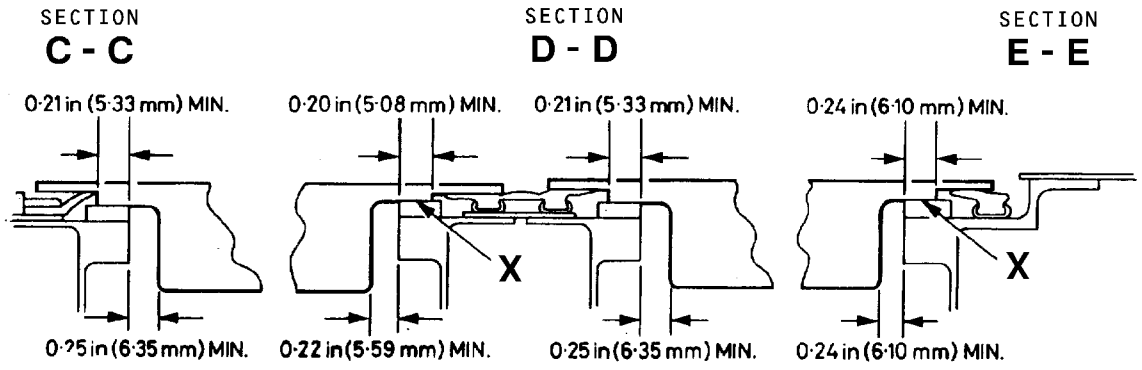
NOTE : A NEGATIVE VALUE FOR THE GAP BETWEEN SPOILER 3 AND ITS INBOARD STOP IS NOT WITHIN THE LIMITS.

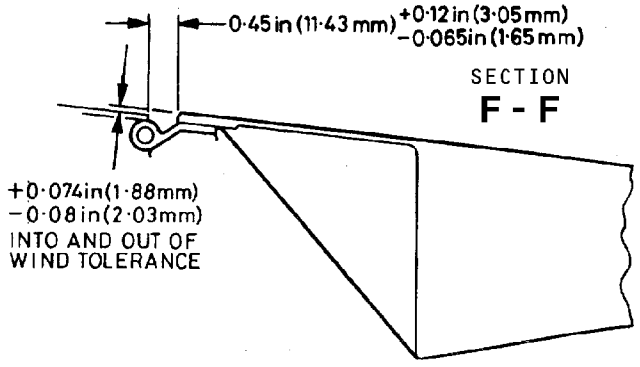
1 Make sure that spoiler 3 lightly touches the outboard stop. If spoiler 3 touches the inboard stop first, measure the gap at the outboard stop, and record as a negative value.
2 Measure the gap between spoiler 3 and the inboard (outboard) stop with feeler gauges.
3 Make sure that the clearance between spoiler 3 and the inboard stop
R is between 0.260 in (6.6 mm) and 0, the nominal value is 0.143 in (3.6 mm). If necessary install different shims under the stop pads.
4 If different shims are installed do steps (2)(a) and (2)(b) again.

(3)Spoiler 4 (Ref. Fig. 403, 404).
(a)Make sure that the clearances (except clearance X) between the spoiler and the adjacent structure is within the limits given on the figures.
(b)Measure the gap between spoiler 4 and the inboard stop (clearance X).
1 Make sure that spoiler 4 lightly touches the outboard stop. If spoiler 4 touches the inboard stop first, measure the gap at the outboard stop, and record as a negative value.
2 Measure the gap between spoiler 4 and the inboard (outboard) stop with feeler gauges.
3 Make sure that the clearance between spoiler 4 and the inboard stop is between 0.190 in (4.8 mm) and - 0.040 in (-1.0 mm), and the nominal value is 0.143 in (3.6 mm). If necessary install different shims under the stop pads.
4 If different shims are installed do steps (3)(a) and (3)(b) again.

(4)Spoiler 3 (Ref. Fig. 401, 402).
(a)At outboard attachment, detail A.
1 Align hinge link (15) with box rib and install stud (7)







CLEARANCE AT X WITH SPOILER JUST TOUCHING OUTBOARD STOP.

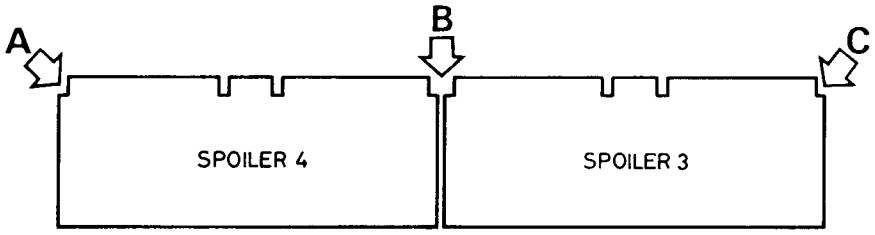
SPOILER	CLEARANCE X MIN. MAX.	CLEARANCE X NOM.
3	0.000 0.260in(6.6mm)	0.143in(3.6mm)
4	-0.040in(-1.0mm) 0.190in(4.8mm)	0.072in(1.9mm)

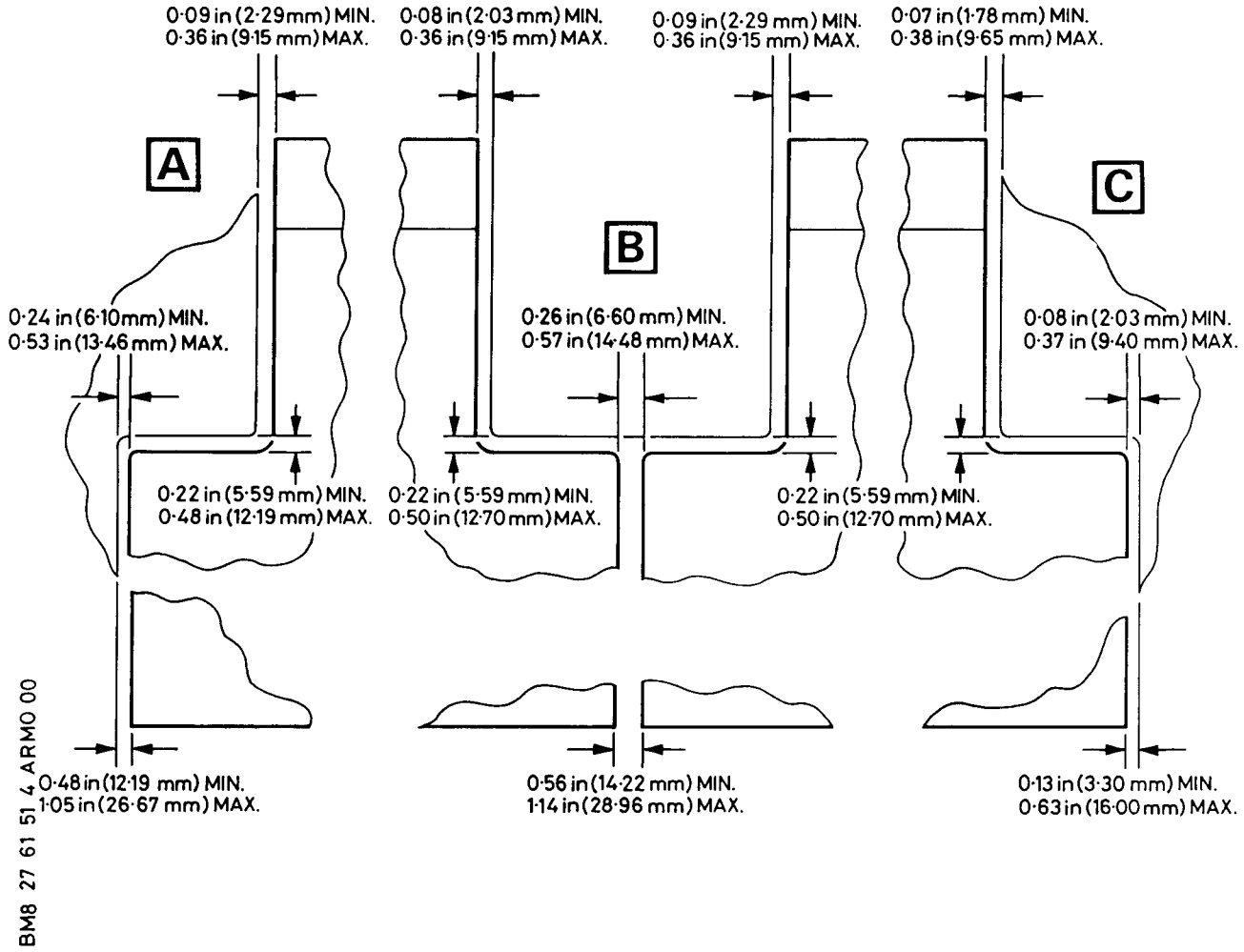
NEGATIVE VALUE INDICATES CLEARANCE AT OUTBOARD STOP. WITH INBOARD STOP (X) TOUCHING.

BM8 27 61 51 4 APMO 02

Spoilers 3 and 4 - Clearances
Figure 403

R




0·09 in (2·29 mm) MIN.
0·36 in (9·15 mm) MAX.
0·08 in (2·03 mm) MIN.
0·36 in (9·15 mm) MAX.
0·09 in (2·29 mm) MIN.
0·36 in (9·15 mm) MAX.
0·07 in (1·78 mm) MIN.
0·38 in (9·65 mm) MAX.
A
B
C
0·24 in (6·10 mm) MIN.
0·53 in (13·46 mm) MAX.
0·26 in (6·60 mm) MIN.
0·57 in (14·48 mm) MAX.
0·08 in (2·03 mm) MIN.
0·37 in (9·40 mm) MAX.
0·22 in (5·59 mm) MIN.
0·48 in (12·19 mm) MAX.
0·22 in (5·59 mm) MIN.
0·50 in (12·70 mm) MAX.
0·22 in (5·59 mm) MIN.
0·50 in (12·70 mm) MAX.
0·48 in (12·19 mm) MIN.
1·05 in (26·67 mm) MAX.
0·56 in (14·22 mm) MIN.
1·14 in (28·96 mm) MAX.
0·13 in (3·30 mm) MIN.
0·63 in (16·00 mm) MAX.
BM8 27 61 51 4 ARMO 00

Spoilers 3 and 4 - Clearances
Figure 404

R

complete with hinge link (13), and secure with nut (6). TORQUE nut to between 11 and 12 lbf.ft (1.49 and 1.63 m.daN) using tools SL90.374 - .500 and SL90.313 - .500 and safety with washer (5) (Ref. 20-21-16, P. Block 1).

(b)At spoiler 4 inboard attachment, detail A.

1 Locate hinge link (13) on spoiler 4 and install bolt (14), washer (12) and nut (10). Safety with cotter-pin (11).

(c)At inboard attachment, detail D.

1 Align hinge link (25) with box rib and install bolt (24) and nut (23). TORQUE nut to between 11 and 12 lbf.ft (1.49 and 1.63 m.daN) using tools SL90.374 - .500 and SL90.313 - .500 and safety with washer (22) (Ref. 20-21-16, P. Block 1).

(5)Spoiler 4 (Ref. Fig. 401, 402).

(a)At inboard attachment, detail A.

1 Install hinge link (13) on stud (7) and secure with nut (8). TORQUE nut to between 11 and 12 lbf.ft (1.49 and 1.63 m.daN) using tools SL90.374 - .500 and SL90.313 - .500 and safety with washer (9) (Ref. 20-21-16, P. Block 1).

2 Align hinge link (13) with spoiler 4 and install bolt (14), washer (12) and nut (10). Tighten nut and safety with cotter-pin (11).

(b)At outboard attachment, detail E.

1 Align hinge link (25) with box rib, and install bolt (24) and nut (23). TORQUE nut to between 11 and 12 lbf.ft (1.49 and 1.63 m.daN) using tools SL90.374 - .500 and SL90.313 - .500 and safety with washer (22) (Ref. 20-21-16, P. Block 1).

(6)General (Ref. Fig. 401, 402).

(a)Connect bonding straps (3) to spoiler and secure with bolts (4), washers (2) and nuts (1) (Ref. 20-28-11, P. Block 1).

R Manually operate the spoiler and make sure that the bonding straps do
R not touch the adjacent structure.

R (b)Extend the surface manually and use the clinometer to make sure that
R the minimum deflection angle is 80 deg.

(c)At actuator attachment, detail F.

1 Apply grease (Material No.04-004) to outer diameter of bushes (27, 34).

2 Install flanged bush (34) into spoiler fork-end on side with the greatest clearance between actuator eye-end and spoiler fork-end. Install bush (27) onto remaining leg of fork-end.

3 Align actuator eye end and spoiler attachment as follows:

a Disconnect electrical connector from valves group servo valve Cap free connector.

b Connect control box 98A27608011000 to valve group electrical connection. Make certain that selector switch is in EXTEND position.

c Place control box ON/OFF switch in ON position. Make certain that ON/OFF indicator light comes on.

d Remove safety collar from actuator.

e Pressurize hydraulic system (Ref. 29-10-00, P. Block 301):

- for spoiler 3, pressurize Blue system.
- for spoiler 4, pressurize Yellow system.

f Make certain that maintenance device on valve group has returned to 'O' position.

g Place control box selector switch in Retract position.

h Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).

j Make certain that spoiler is on the stops by pressing down on the appropriate end of the spoiler.

k Cut and remove lockwire and loosen actuator piston rod eye end locknut sufficiently to disengage the serrated lock-washers.

l Turn actuator eye end relative to actuator piston rod, to align actuator eye end and spoiler fork end attachment. Do not tighten locknut at this stage.

m Depressurize hydraulic system. (Ref. 29-10-00, P. Block 301).

n Place control box ON/OFF switch in OFF position and disconnect control box from valve group electrical connection.

p Remove protective cap. Check for correct condition and connect aircraft electrical connector to valve group.

R 4 Use the guide bullet PN 98A27608010000 to install the bolt (26).
R Remove the guide bullet.

5 Apply grease (Material No.06-002) to thread of hinge bolt (26) and mounting face of nut (33).

R 6 Install washer (31) and nut (33). Use the tools SL90.374 - .875 and
R SL90.313 - .875 to TORQUE the nut to between 81 and 88.5 lbf.ft
R (11 and 12 m.daN) and safety with the lockwasher (32) (Ref. 20-21-16,
R P. Block 1).

R 7 Apply sealant (Material No.09-003) to the mating face of the
R anti-rotation plate (29). Install the anti-rotation plate and secure
R with the Hi-Lok pin (30) and the nut (28).

(7)Rigging
(Ref. Fig. 405)

(a)Pressurize the applicable hydraulic system, reference paragraph 2. C. (4) (c) 3 e.

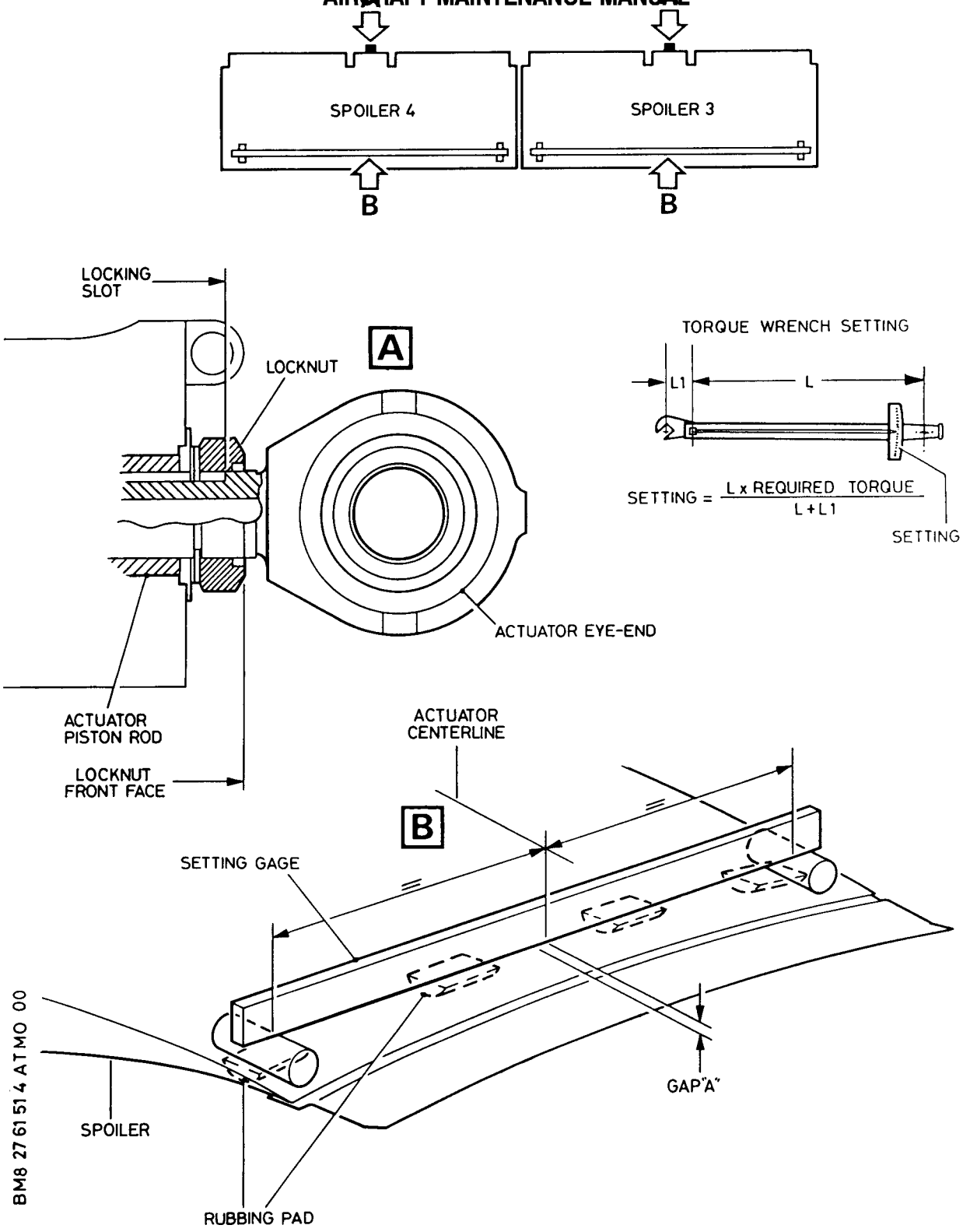
(b)With the spoiler fully retracted put the setting gage PN 98A27608015000 on the upper surface of the spoiler trailing edge, with the gage supports in front of the fasteners for the outer rubbing pads.

NOTE : Make sure that the setting gage is used in the correct configuration.

(c)Find the surface bow, make sure that gap A is within the limits given (Ref. Table 1).

SURFACE NO.	3	4
Gap A between setting gage and upper surface of spoiler on actuator centerline	Between 0.128 and 0.144 in (3.25 and 3.65 mm)	Between 0.150 and 0.165 in (3.8 and 4.2 mm)

Table 1



Spoilers 3 and 4 - Rigging
Figure 405

(d)If the bow is incorrect, remove the gage and refer to paragraph 2. D. Adjustment.
(e)Extend the spoiler, to extend the spoiler put the control-box selector switch in the EXTEND position.
(f)De-pressurize the Blue or Yellow hydraulic system, as applicable. (Ref. 29-10-00, P. Block 301).
(g)Turn the maintenance device on the valve group to the maintenance position 'M'.

CAUTION : DO NOT DAMAGE THE FLANGED BUSH (34) AND THE SPOILER FORK-END.

CAUTION : INSUFFICIENT TIGHTENING OF THE PISTON ROD LOCK NUT CAN LEAD TO SERIOUS DAMAGE OF THE ACTUATOR EYE-END.

(h)TORQUE the piston rod locknut to between 133 and 147 lbf.ft (18 and 20 m.daN). Make sure that the locking slot in the threaded end of the rod does not extend beyond the front face of the locknut. Safety the locknut with lockwire.

NOTE : If you use the spanner set PN 98A27608017000, calculate the torque wrench setting as follows:

$$\text{setting} = \frac{L \times \text{required torque}}{L + L1}$$

Where L = torque wrench length from midway along handle to center of square drive
L1 = 80 mm (3.15 in.) for tool PN 98A27608017002
= 80 mm (3.15 in.) for tool PN 98A27608017003

(j)Pressurize the hydraulic system, reference paragraph 2.C.(4)(c) 3 e.
(k)Make sure that the maintenance device on the valve group has gone back to the 'O' position.
(l)Retract the spoiler, to retract the spoiler put the control-box selector switch in the RETRACT position.

D. Adjustment - Surface Bow (Ref. Fig. 405)
(1)Pressurize the applicable hydraulic system, reference paragraph 2. C. (4) (c) 3 e.
(2)Extend the spoiler, to extend the spoiler put the control-box selector switch in the EXTEND position.
(3)De-pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Turn the maintenance device on the valve group to the maintenance position 'M'.

CAUTION : ADJUST FOR SURFACE BOW IN SMALL INCREMENTS. INCORRECT ADJUSTMENT OF THE ACTUATOR CAN CAUSE UNACCEPTABLE DEFORMATION OF THE SPOILER.

(5)Loosen the actuator locknut and, with a wrench, turn the actuator piston-rod counter-clockwise, to reduce the surface bow (Ref. Table 2).

PISTON ROD TURNED COUNTER-CLOCKWISE	REDUCTION OF SURFACE BOW SPOILERS 3 AND 4
360 deg	0.43 in (10.9 mm)

Table 2

(6)Tighten the locknut but do not safety it.
(7)Pressurize the relevant hydraulic system, reference paragraph 2. C. (4) (c) 3 e.
(8)Make sure that the maintenance device on the valve group has gone back to the 'O' position.
(9)Retract the spoiler, to retract the spoiler put the control-box selector switch in the RETRACT position.
(10)Put the setting gage on the upper surface of the spoiler trailing edge, with the gage supports in front of the fasteners for the outer rubbing pads.

NOTE : Make sure that the setting gage is used in the correct configuration.

(11)Measure the distance between the upper surface of the spoiler and the lower edge of the setting gage, gap A, to find the surface bow (Ref. Table 1).
(12)If the bow in incorrect, remove the gage and do paragraph 2. D. (1) thru (11) again until the surface bow is correct.
(13)When the surface bow is correct, do paragraph 2. C. (5) (h).
(14)De-pressurize the hydraulic system, (Ref. 29-10-00, P. Block 301).
(15)Put the control-box ON/OFF switch in the OFF position and disconnect the control box from the electrical connection of the valve group.
(16)Remove the protective cap. Examine for correct condition and connect the aircraft electrical connector to the valve group.

E. Test
(1)On panel 133VU, remove safety clips and tags and close circuit breakers 53CP(334/S63), 55CP(334/S64), 5CP(335/R63), 7CP(335/R62), 54CP(334/S67), 71CP(331/V62), 70CP(333/T65), 8CP(333/T62), 10CP(332/U62), 72CP(333/T67), and 9CP(333/T66).
(2)Pressurize Blue, Green and Yellow hydraulic systems (Ref. 29-10-00, P. Block 301).

NOTE:Maintenance device on valve group will return to the operating position.

(3)Perform the following:

ACTION	RESULT
1. On panel 428VU: - release SPLR & SPD BRK	On panel 428VU: - OFF/R legends come on

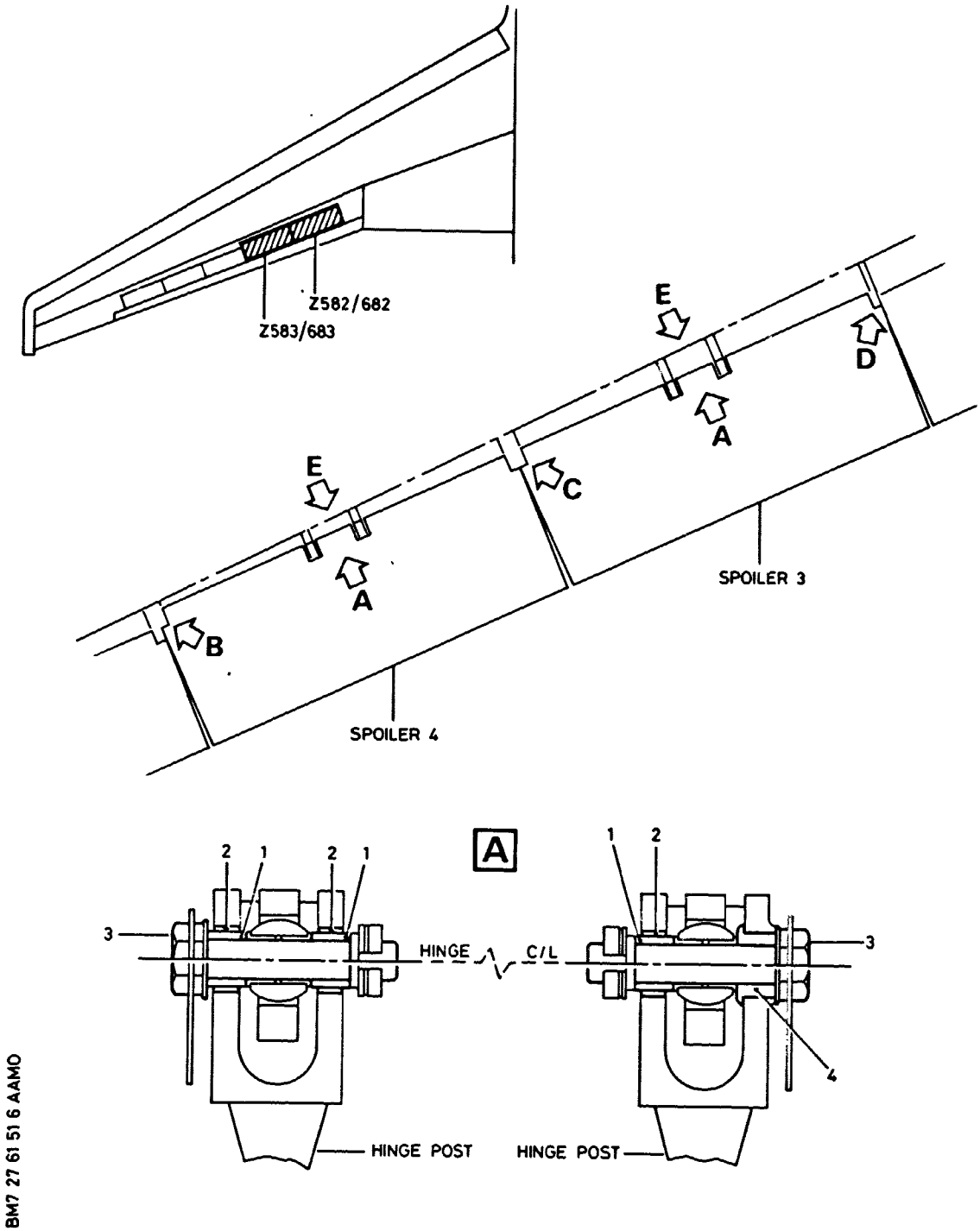
ACTION	RESULT
4 & 1 and 3 & 2 pushbutton switches	- spoilers 3 and 4 are held in the retracted position.
2. Fully extend spoilers 3 and 4 by hand (Ref. 27-60-00, P. Block 301)	- spoilers 3 and 4 are extended to full deflection
3. Measure deflection of spoilers 3 and 4.	- spoiler 3 deflection is 51 deg - spoiler 4 deflection is 50.5 deg.
4. Fully retract spoilers 3 and 4 by hand (Ref. 27-60-00, P. Block 301)	- spoilers 3 and 4 are retracted onto their stops
5. Make certain spoilers abut seals along box ribs.	
6. On panel 428VU: - press in SPLR & SPD BRK 4 & 1 and 3 & 2 pushbutton switches.	On panel 428VU: - spoilers 3 and 4 control systems are activated. - OFF/R legends go off.
7. Do a functional test (roll test) of the spoilers (Ref. 27-11-00, P. Block 501).	

F. Close-Up
(1)Remove safety clips and tags and close circuit breakers 2CV(334/S62), 6CV(331/V61), 5CV(332/U61), 10CV(335/R67) and 1CV(335/R61).
(2)Fully retract flaps (Ref. 27-50-00, P. Block 301).
(3)Depressurize aircraft hydraulic systems (Ref. 29-10-00, P. Block 301).
(4)Remove warning notices.
(5)Close access doors 581(681)BB, 581(681)CB, 581(681)DB and 581(681)EB.
(6)Remove access platform.
(7)Remove all ground handling and maintenance equipment, standard and special tools, together with replenishing equipment, all access equipment and miscellaneous items.

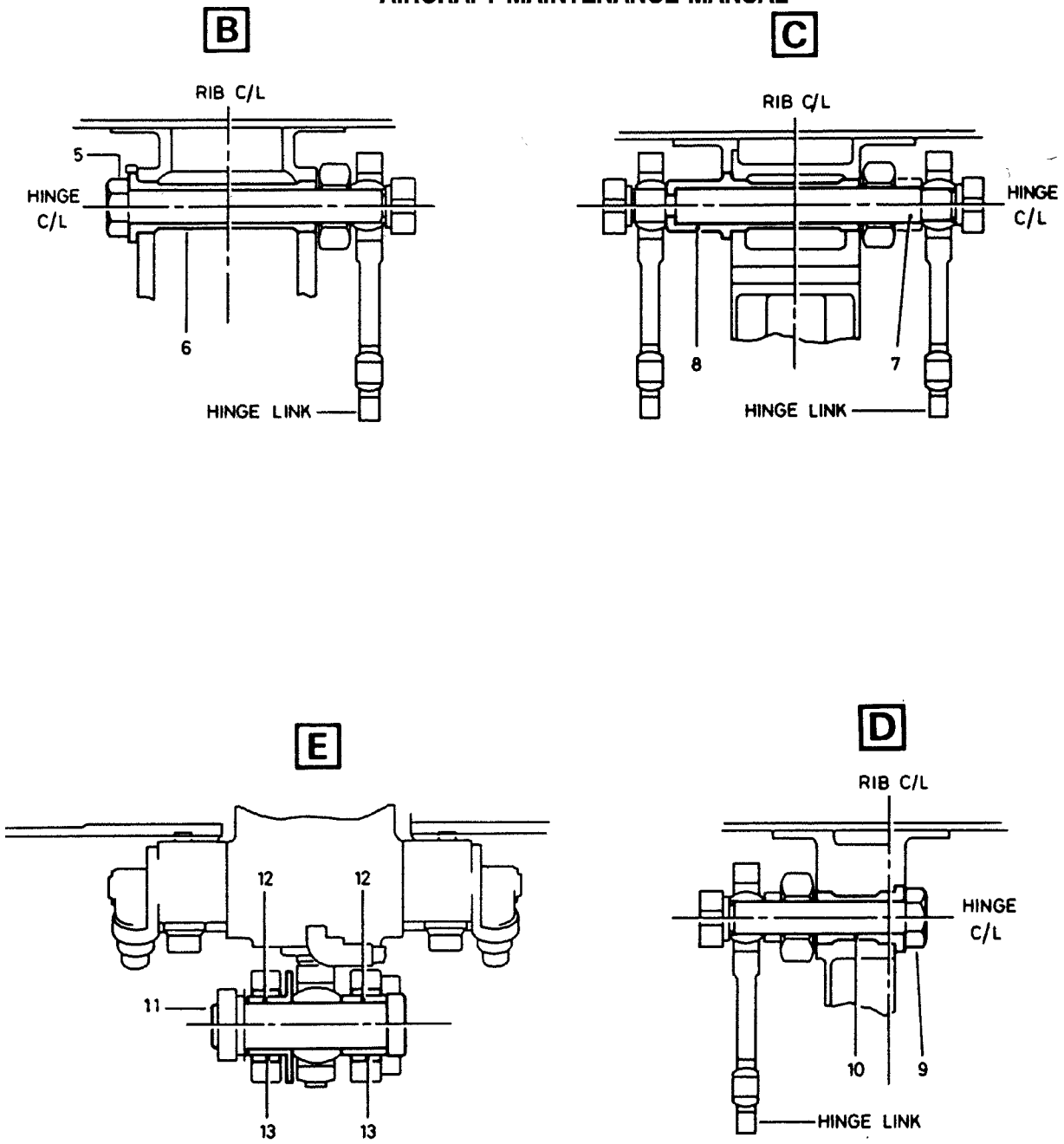
1. Reason for the Job

A. Check for fits and clearances.
With removal - Table of Fits and Clearances.
(Ref. Fig. 601)
(Ref. Fig. 602)
NOTE : Limits annotated with an asterisk *, only apply while there is a thickness of chrome plating remaining on the bearing surfaces.

Detail and Item No.	Original Mfg Limits: Dimension inches (Millimeters) Min.	Original Mfg Limits: Dimension inches (Millimeters) Max.	Original Mfg Limits: Assy. Clearance Inch.(Milli.) Min.	Original Mfg Limits: Assy. Clearance Inch.(Milli.) Max.	In Service Wear Limits: Dimension Limits Inch.(Milli.) Min.	In Service Wear Limits: Dimension Limits Inch.(Milli.) Max.	In Service Wear Limits: Max. Allow clear in. (mm)
A							
OD1	1.1241 (28.552)	1.1247 (28.567)			1.1230 (28.524)		
			0.0003 (0.008)	0.0021 (0.053)			0.0045 (0.114)
ID2	1.1250 (28.575)	1.1262 (28.605)			1.1275 (28.638)		
OD3	0.8742 (22.205)	0.8747 (22.217)			0.8735 (22.187) *		
			0.0003 (0.008)	0.0020 (0.050)			0.0035 (0.089)
ID1	0.8750 (22.225)	0.8762 (22.255)				0.8770 (22.276)	
OD3	0.8742 (22.205)	0.8747 (22.217)			0.8735 (22.187)		
			0.0003 (0.008)	0.0020 (0.050)	*		0.0035 (0.089)
ID4	0.8750 (22.225)	0.8762 (22.255)				0.8770 (22.276)	
B							
OD5	0.4988 (12.670)	0.4992 (12.680)			0.4980 (12.649)		
			0.0003 (0.008)	0.0017 (0.043)			0.0035 (0.089)
ID6	0.4995 (12.687)	0.5005 (12.713)				0.5015 (12.738)	



Spoilers 3 and 4
Figure 601



Spoilers 3 and 4
Figure 602

Detail and Item No.	Original Mfg Limits				In Service Wear Limits		
	Dimension inches (Millimeters)		Assy. Clearance Inch.(Milli.)		Dimension Limits Inch.(Milli.)		Max. Allow clear
	Min.	Max.	Min.	Max.	Min.	Max.	in. (mm)
C							
OD7	0.5615 (14.262)	0.5619 (14.272)			0.5605 (14.237)		
			0.0006 (0.015)	0.0020 (0.050)			0.0040 (0.102)
ID8	0.5625 (14.287)	0.5635 (14.313)				0.5645 (14.338)	
D							
OD9	0.4988 (12.670)	0.4992 (12.680)			0.4980 (12.649)		
			0.0003 (0.008)	0.0017 (0.043)			0.0035 (0.089)
ID10	0.4995 (12.687)	0.5005 (12.713)				0.5015 (12.738)	
E							
OD11	0.9980 (25.350)	0.9993 (25.381)			0.9970 (25.324)		
			0.0002 (0.007)	0.0020 (0.050)			0.0040 (0.102)
ID12	0.9995 (25.388)	1.0000 (25.400)				1.0010 (25.425)	
OD12	1.2492 (31.730)	1.2496 (31.741)			1.2480 (31.699)		
			0.0009 (0.022)	0.0023 (0.058)			0.0050 (0.127)
ID13	1.2505 (31.763)	1.2515 (31.788)				1.2530 (31.826)	

Ref. MMEL SECT. 1-27 Item 1

CAUTION : THIS PROCEDURE IS TO BE USED IN ACCORDANCE WITH THE REQUIREMENTS OF THE MMEL.

WARNING : LANDING GEAR - MAKE SURE THAT THE GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE SURE THAT THE GROUND SAFETIES AND NOTICES ARE IN POSITION.

FLIGHT CONTROLS - MAKE SURE THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

HYDRAULICS - BEFORE YOU PRESSURIZE THE SYSTEM, MAKE SURE THAT THE CONTROL SURFACE POSITIONS AND FLIGHT CONTROL POSITIONS ARE THE SAME.

MAKE SURE THAT YOU ISOLATE THE ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS.

1. Deactivation

A. Reason for the Job
(1)Deactivation of the spoiler servo control.

B. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Warning Notices - that prevent the use of Hydraulic, Flap, Slat and Spoiler Systems
C.	Warning Notice - Specified Defective Spoiler(s) are OFF and must stay OFF
D.	Circuit Breaker Safety Clips and Tags
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-64-13, P. Block 401	Spoiler/Speedbrake Valve Groups (Surfaces 3 thru 7)
R - 27-65-00, P. Block 1	Control Surface Position Indicating
- 29-10-00, P. Block 301	Main Hydraulic Power

C. Deactivation Of Inoperative Spoiler(s)

CAUTION : TOTAL NUMBER OF INOPERATIVE SPOILER SURFACES AFTER DEACTIVATION MUST NOT EXCEED TWO SURFACES PER WING.

CAUTION : DO NOT DO THIS DEACTIVATION PROCEDURE IF THERE IS EXTERNAL LEAKAGE ON THE UNSERVICEABLE SERVO-CONTROL. AN EXTERNAL LEAKAGE CAUSES AN UNSERVICEABLE HYDRAULIC SYSTEM.

(1)Energize the aircraft electrical network and make sure that the electronic racks are ventilated (Ref. 24-41-00, P. Block 301).
(2)Set, the defective Spoiler, pushbutton on the overhead flight control panel 428VU to OFF.
(3)Install warning notices on the Captain and First Officer's instrument panels to warn pilots that the specified defective spoiler(s) are OFF and must stay OFF.
(4)Check the defective Spoiler position on the SD F/CTL page on the right
R ECAM display unit (Ref. 27-65-00, P. Block 1):
- if the defective spoiler is extended go to Para. (5)
- if the defective spoiler is retracted go to Para. (6).
(5)If necessary retract the defective spoiler as follows:
(a)Make sure that there is no hydraulic leak on the relevant servo controls.
(b)Fully extend flaps (Ref. 27-50-00, P. Block 301), to clear under-wing spoiler access panels.
(c)Make sure that the relevant hydraulic system is depressurized (Ref. 29-10-00, P. Block 301):
- Spoiler 3 (Blue)
- Spoiler 4 (Yellow).
(d)Install warning notice(s) that prevent the use of the hydraulic, flap, slat and spoiler systems.
(e)Put the access platform in position.
(f)Open the relevant access doors:
- Spoiler 3 : 581CB (681CB)
- Spoiler 4 : 581DB (681DB) and 581EB (681EB).
(g)Open, safety and tag the circuit breakers that follow:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR 1 & 4	53CP	334/S63
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR 2 &3	5CP	335/R63
133VU	FLT CTL/LAND RECOVERY SUPPLY/SPLR 1 & 4 & 6 & 7	54CP	334/S67
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 2 & 3	8CP	333/T62
133VU	FLT CTL/EFCU/LAND RECOVERY SUPPLY/ SPLR 1 & 4	72CP	333/T67
133VU	FLT CTL/FLAPS/SYS 2/26 VAC	2CV	334/S62
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/FLAPS/ SYS 1	10CV	335/R67
133VU	FLT CTL/FLAPS/SYS 1/26 VAC	1CV	335/R61

(h)At the relevant access door in the wings:
- Spoiler 3 : 581CB (681CB)
- Spoiler 4 : 581DB (681DB) and 581EB (681EB)
locate the spoiler valve group and use a spanner to turn the maintenance device on the affected valve group to 'M' position, (Ref. 27-64-13, P. Block 401).

(j)Manually retract the defective spoiler.

(k)Reset the maintenance device by turning the spanner to 'O' position.

(l)Make sure that the work area is clean and clear of tools and all other items of equipment.

(m)Close the relevant access doors:
- Spoiler 3 : 581CB (681CB)
- Spoiler 4 : 581DB (681DB) and 581EB (681EB)

(n)Remove the access platform.

(p)On panel 133VU, remove safety clips and tags and close circuit breakers 53CP(334/S63), 5CP(335/R63), 72CP(333/T67), 54CP(334/S67), 71CP(333/V62), 8CP(333/T62), 2CV(334/S62), 6CV(331/V61), 5CV(332/U61), 10CV(335/R67) and 1CV(335/R61).

(q)Remove warning notice(s) that prevent the use of the hydraulic, flap, slat and spoiler systems.

(r)Fully retract the flaps (Ref. 27-50-00, P. Block 301).

(6)Check that the deactivated spoilers are OFF as follows:

(a)Pressurize the three hydraulic systems (Ref. 29-10-00, P. Block 301). Set ELEC PUMP and PTUs as required.

(b)On the flight controls center pedestal, panel 9VU, slowly set Speedbrake lever to half position.

(c)Check on the SD F/CTL page on the Right ECAM Display Unit, that the inoperative spoiler(s) remain in the retracted position.

(d)On the flight controls center pedestal, panel 9VU, slowly set the Speedbrake lever to RET.

(e)Slowly give roll left then right order whilst checking the SD F/CTL page on the Right ECAM Display Unit that the deactivated spoiler surfaces remain in the retracted position.

(7)Close-Up

R (a)Depressurize the three hydraulic systems (Ref. 29-10-00, P. Block 301). Set the ELEC PUMP and PTUs to off.

R (b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R (c)Do not remove the warning notices on the Captain and the First Officer's instrument panels to warn the pilots that the specified defective spoilers are OFF and must stay OFF.

R (d)Make an appropriate entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

	ITEM	DESIGNATION
R	A.	Warning notices - that prevent the use of Hydraulic, Flap, Slat and Spoiler System
	Referenced Procedures	
	- 24-41-00, P. Block 301	AC External Power Control
	- 27-60-00, P. Block 301	Spoilers and Speedbrakes
R	- 27-61-00, P. Block 1	Electrical and Mechanical Control
R	- 27-65-00, P. Block 1	Control Surface Position Indicating
	- 29-10-00, P. Block 301	Main Hydraulic Power
R	- TSM 27-61-00	Fault Isolation

B. Procedure

(1)Job Set-up

(a)Energize the aircraft electrical network and make sure that electronics racks are ventilated (Ref 24-41-00, P. Block 301).

(b)Install warning notices that prevent the use of hydraulic, flap, slat and spoiler systems.

(c)Pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).

R (d)Identify any defective spoiler surfaces:

- by visual identification of warning notices in the flight compartment and check the SD F/CTL page on the Right ECAM Display Unit (Ref. 27-65-00, P. Block 1).

(2)Fault Isolation

(a)Release-out pushbutton(s) on the overhead flight control panel 428VU associated with defective spoiler surface(s) (set to OFF during spoiler deactivation).

(b)Do the trouble-shooting procedure (Ref. TSM 27-61-00).

(3)Test

(a)Reset the appropriate EFCU BITE display (Ref. 27-61-00, P. Block 1).

(b)Make sure that the spoilers are fully retracted (Ref. 27-60-00, P. Block 301).

(c)Fully extend the spoilers and make sure that the spoiler deflection is at least 51 deg.

(d)Fully retract the spoilers (Ref. 27-60-00, P. Block 301).

R (e)De-pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).

R (f)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(4)Close-Up

(a)Make sure that the work area is clean and clear of all tools and any other items of equipment.

R (b)Remove the warning notices on the Captain and the First officer's instrument panels to warn the pilots that the specified defective spoilers are OFF and must stay OFF.

R (c)Remove the warning notices that prevent the use of the hydraulic, flap, slat and spoiler systems.

R (d)Make appropriate entries in the aircraft technical log.

R SPOILERS 5, 6 AND 7 - REMOVAL/INSTALLATION

R WARNING : LANDING GEAR - MAKE SURE THAT THE GROUND SAFETIES AND CHOCKS ARE IN POSITION.

R FLIGHT CONTROLS - MAKE SURE THAT THE GROUND SAFETIES AND NOTICES ARE
R IN POSITION.

R FLIGHT CONTROLS - MAKE SURE THAT THE TRAVEL RANGES OF THE CONTROL
R SURFACES ARE CLEAR.

R HYDRAULICS - BEFORE YOU PRESSURIZE THE SYSTEM, MAKE SURE THAT THE
R CONTROL SURFACE POSITIONS AND THE FLIGHT CONTROL POSITIONS ARE THE
R SAME.

R MAKE SURE THAT YOU ISOLATE THE ELECTRICAL CIRCUITS UPON WHICH WORK IS
R IN PROGRESS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 3.8m (12 ft)
B.	Torque Wrench: 0 to 80 lbf.ft (0 to 11 m.daN)
C. SL90.374-.500	Wrench-Notched
D. SL90.374-.625	Wrench-Notched
E. SL90.374-.875	Wrench-Notched
F. SL90.314-.500	Tool-Extraction
G. SL90.314-.625	Tool-Extraction
H. SL90.314-.875	Tool-Extraction
J. SL90.313-.500	Tool-Installation
K. SL90.313-.625	Tool-Installation
L. SL90.313-.875	Tool-Installation
M. 98A27608010000	Guide Bullet - Spoiler/Airbrake Actuator Attaching Bolts
N. 98A27608015000	Setting Gage Set - Actuator Adjustment
P. 98A27608017000	Spanner Set - Spoiler Actuator Piston Rod Adjustment
Q. 98A27608013000	Safety Collar Set - Spoiler/Actuator Piston
R.	Cotter-Pins
S.	Lockwire, Corrosion Resistant Steel 0.8 mm (0.032 in) dia.
T.	Warning Notices - Prohibiting Use of Flap, Slat and Spoiler Systems
U.	Clinometer
V.	Circuit Breaker Safety Clips and Tags
W. Material No. 04-004	Common Greases (Ref. 20-31-00)
X. Material No. 06-002	Lubricants (Ref. 20-31-00)
Y. Material No. 09-003	Sealants (Ref. 20-31-00)
Z. 98A27608011000	Control Box - Spoiler, Valve Group
Referenced Procedures	
- 20-21-16, P. Block 1	STA-LOK Nuts and Lockwashers

ITEM	DESIGNATION
- 20-28-11, P. Block 1	Electrical Bonding
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 27-50-00, P. Block 301	Flaps
- 27-60-00, P. Block 301	Spoilers and Speedbrakes
- 27-64-00, P. Block 1	Hydraulic Actuation (Spoilers and Speedbrakes)
- 29-10-00, P. Block 301	Main Hydraulic Power

A. Job Set-Up
(1)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(2)Display warning notices.
(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR/1 & 4	53CP	334/S63
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR/5	55CP	334/S64
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR/2 & 3	5CP	335/R63
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR/6 & 7	7CP	335/R62
133VU	FLT CTL/LAND RECOVERY SUPPLY/ SPLR/1 & 4 & 6 & 7	54CP	334/S67
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR/1 & 4	71CP	331/V62
133VU	FLT CTL.EFCU/NORM SUPPLY/SPLR/5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR/2 & 3	8CP	333/T62
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR/6 & 7	10CP	332/U62
133VU	FLT CTL/EFCU/LAND RECOVERY SUPPLY/ SPLR/1 & 4	72CP	333/T67
133VU	FLT CTL/EFCU/LAND RECOVERY SUPPLY/ SPLR/6 & 7	9CP	333/T66
133VU	FLT CTL/FLAPS/SYS 2/26 VAC	2CV	334/S62
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/FLAPS/SYS 1/26 VAC	1CV	335/R61

(4)Position access platform.
(5)Open access doors 581(681)FB, 581(681)GB, 581(681)HB or 581(681)JB as applicable.
(6)Turn maintenance device on valve group controlling spoiler to be worked on to maintenance position M.
(Ref. 27-64-00, P. Block 1).
(7)Manually extend applicable spoiler and install safety collar PN 98A27608013000 on actuator piston.

B.Removal
(Ref. Fig. 401)
(Ref. Fig. 402)
(Ref. Fig. 403)
(Ref. Fig. 404)
(Ref. Fig. 405)

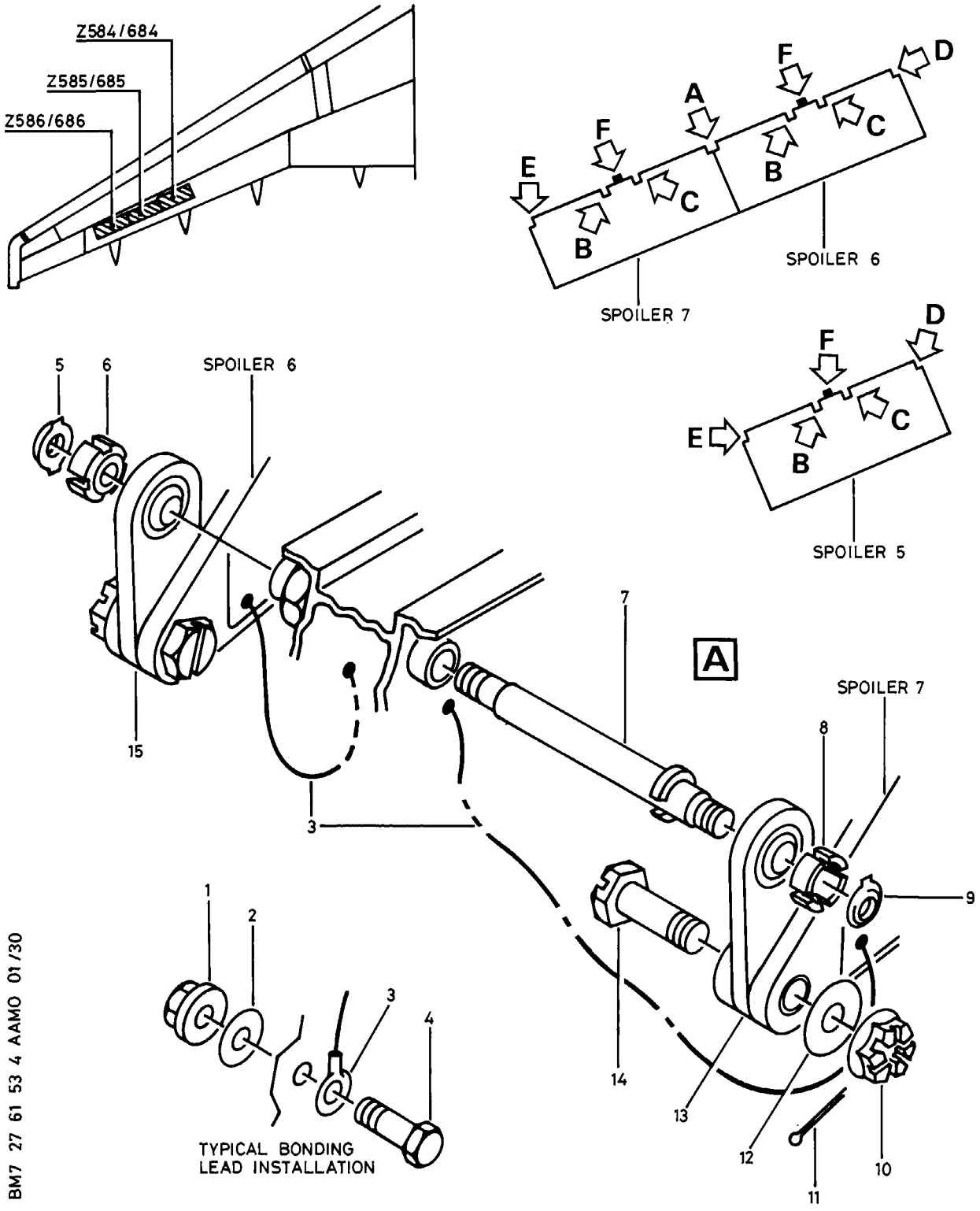
(1)General
(a)At actuator attachment, detail F.
1 Remove nut (28), Hi-Lok pin (30) and anti-rotation plate (29).
2 Manually support spoiler (weight 32 lb (14.5 kg)) in the extended position.
3 Manually support actuator (weight 14.15 lb (6.42 kg)) and, using tools SL 90.374-.875 and SL90.314-.875, remove lockwasher (32) and nut (33) (Ref. 20-21-16, P. Block 1). Remove washer (31) and bolt (26). Disengage actuator eye-end from spoiler.
4 Lower actuator onto support bracket and remove bushes (27, 34).
5 Remove nuts (1), washers (2), bolts (4) and disconnect bonding leads (3) from spoiler.

(2)Spoiler 5
(a)At inboard and outboard attachments, detail D and E.
1 Remove washers (22) and nuts (23), using tools SL90.374-.500 and SL90.314-.500 (Ref. 20-21-16, P. Block 1), and slide bolts (24) clear of hinge links (25).

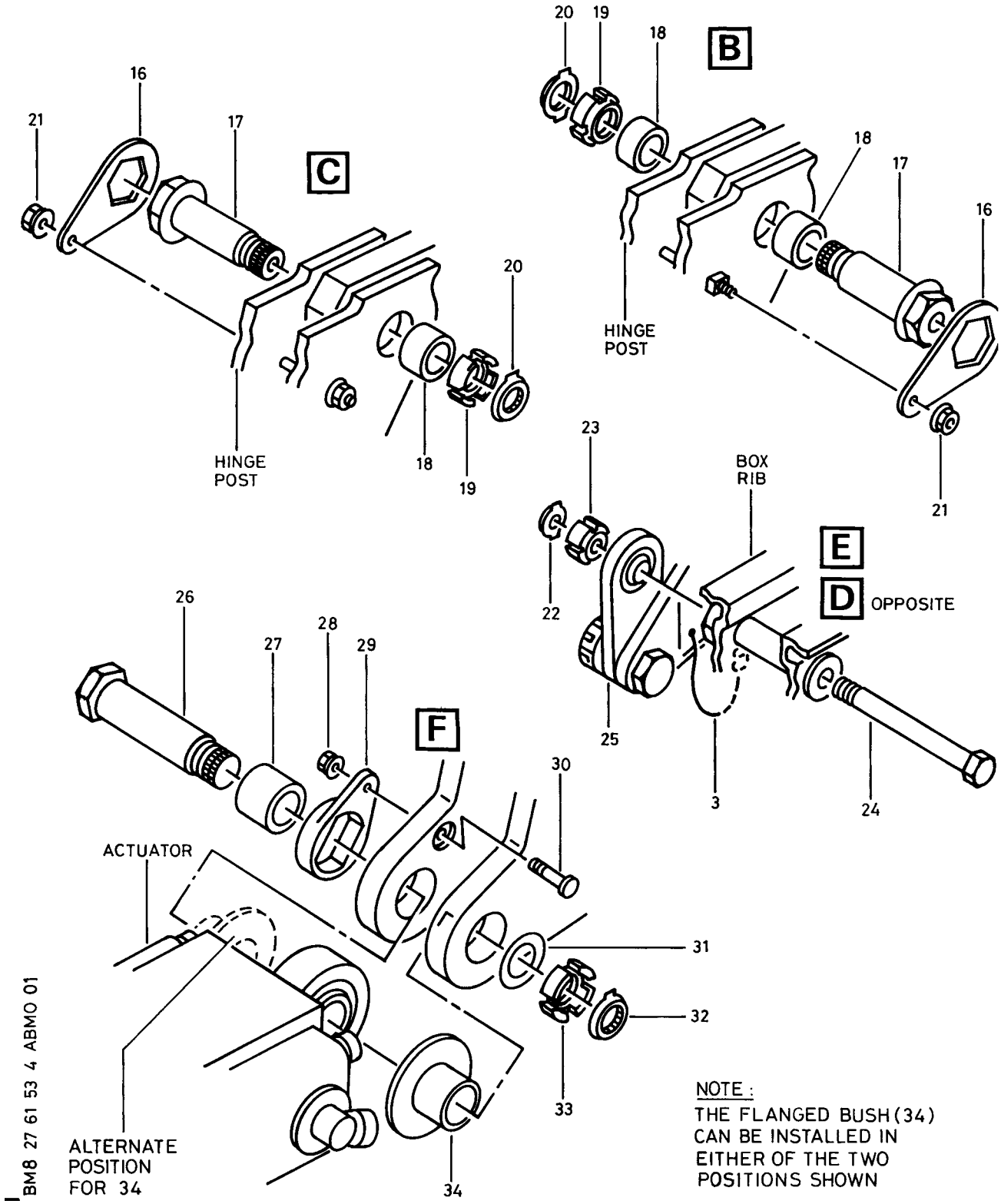
(3)Spoiler 6
(a)At spoiler 7 inboard attachment, detail A.
1 Remove cotter-pin (11), nut (10), washer (12) and bolt (14). Swing hinge link (13) clear of spoiler 7.
(b)At outboard attachment, detail A.
1 Remove washer (5) and nut (6), using tools SL90.374-.500 and SL90.314-.500 (Ref. 20-21-16, P. Block 1). Slide stud (7), complete with hinge link (13), clear of spoiler 6.
(c)At inboard attachment , detail D.
1 Remove washer (22) and nut (23) using tools SL90.374-.500 and SL90.314-.500 (Ref. 20-21-16, P. Block 1) and slide bolt (24) clear of hinge link (25).

(4)Spoiler 7
(a)At inboard attachment, detail A.
1 Remove cotter-pin (11), nut (10), washer (12) and screw (14). Swing hinge link (13) clear of spoiler 7.
2 Remove washer (9) and nut (8), using tools SL90.374-.500 and SL90.314-.500 (Ref. 20-21-16, P. Block 1), and remove hinge link (13).
(b)At outboard attachment, detail E.
1 Remove washers (22) and nuts (23) using tools SL90.374-.500 and SL90.314-.500 (Ref. 20-21-16, P. Block 1). Remove bolts (24).

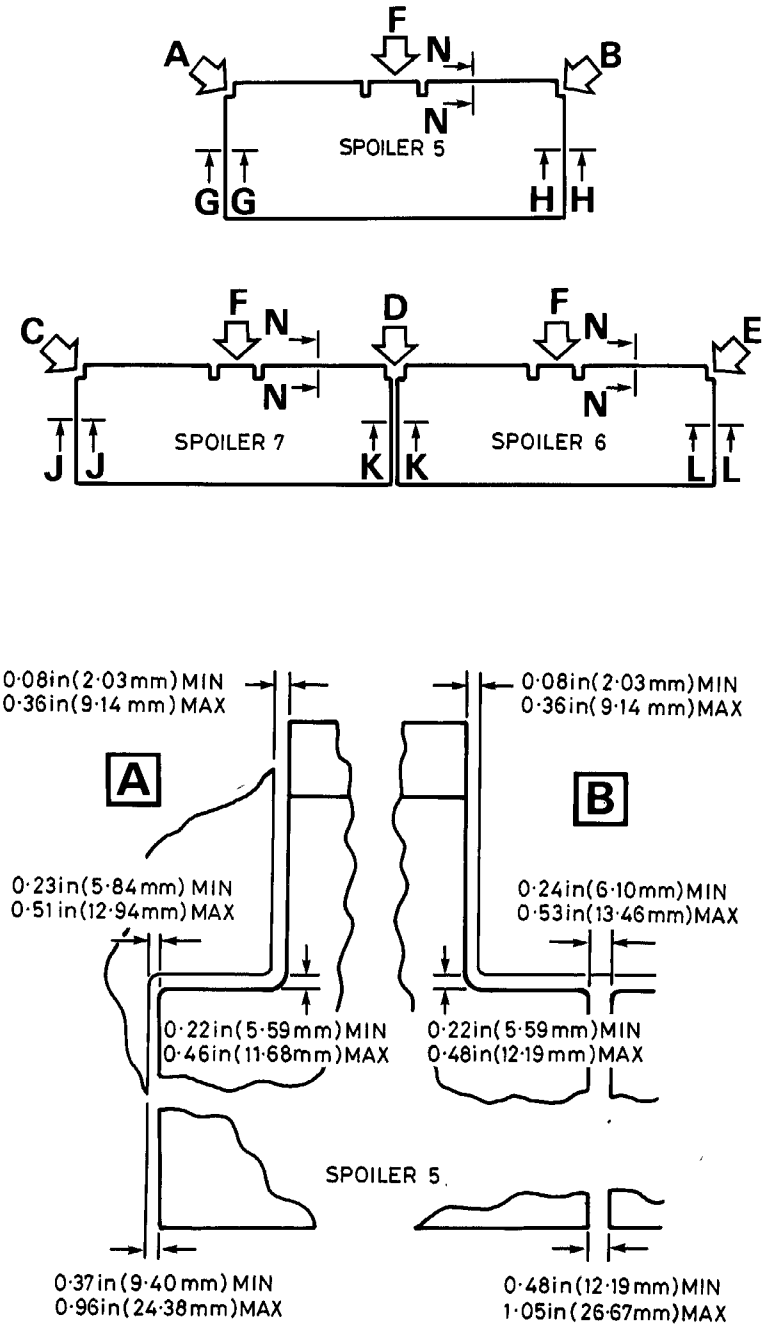
(5)General
(a)At hinge points, detail B and C.
1 Remove nuts (21) and lockings plates (16).
2 Remove washers (20) and nuts (19) using tools SL90.374-.625 and SL90.314-.625 (Ref. 20-21-16, P. Block 1). Remove hinge pins (17) and bushes (18). Lift spoiler clear of wing.



Spoilers 5, 6 and 7 - Installation
Figure 401

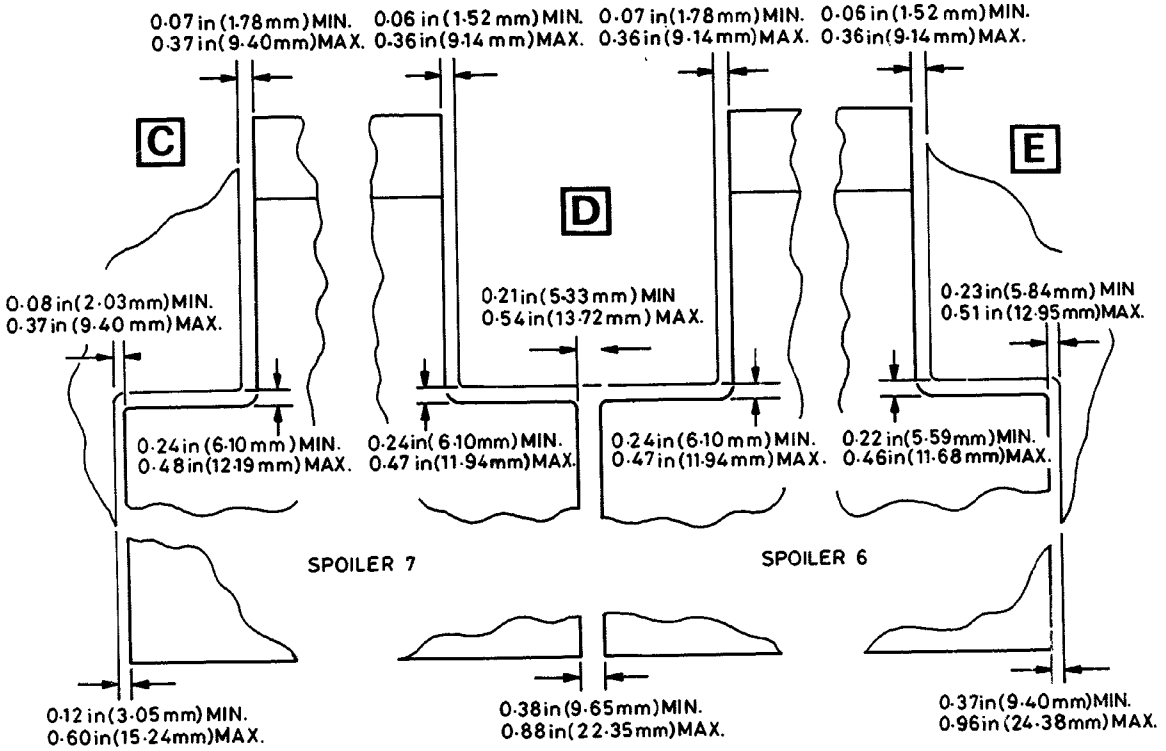


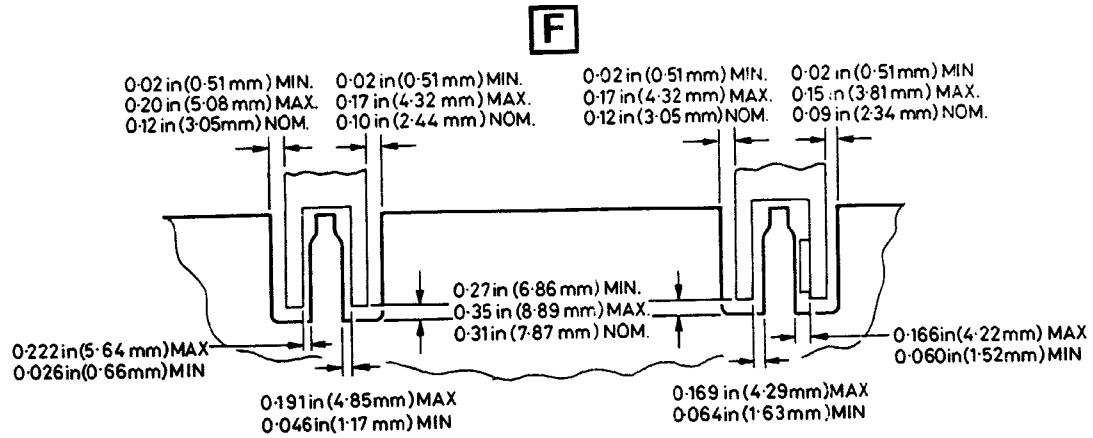
Spoilers 5, 6 and 7 - Installation
Figure 402



BM7 27 61 53 4 ACMO

Spoilers 5, 6 and 7 - Clearances
Figure 403


0·07 in (1·78 mm) MIN.
0·37 in (9·40 mm) MAX.
0·06 in (1·52 mm) MIN.
0·36 in (9·14 mm) MAX.
0·07 in (1·78 mm) MIN.
0·36 in (9·14 mm) MAX.
0·06 in (1·52 mm) MIN.
0·36 in (9·14 mm) MAX.
C
D
E
0·08 in (2·03 mm) MIN.
0·37 in (9·40 mm) MAX.
0·21 in (5·33 mm) MIN
0·54 in (13·72 mm) MAX.
0·23 in (5·84 mm) MIN
0·51 in (12·95 mm) MAX.
0·24 in (6·10 mm) MIN.
0·48 in (12·19 mm) MAX.
0·24 in (6·10 mm) MIN.
0·47 in (11·94 mm) MAX.
0·24 in (6·10 mm) MIN.
0·47 in (11·94 mm) MAX.
0·22 in (5·59 mm) MIN.
0·46 in (11·68 mm) MAX.
SPOILER 7
SPOILER 6
0·12 in (3·05 mm) MIN.
0·60 in (15·24 mm) MAX.
0·38 in (9·65 mm) MIN.
0·88 in (22·35 mm) MAX.
0·37 in (9·40 mm) MIN.
0·96 in (24·38 mm) MAX.


F
0·02 in (0·51 mm) MIN.
0·20 in (5·08 mm) MAX.
0·12 in (3·05 mm) NOM.
0·02 in (0·51 mm) MIN.
0·17 in (4·32 mm) MAX.
0·10 in (2·44 mm) NOM.
0·02 in (0·51 mm) MIN.
0·17 in (4·32 mm) MAX.
0·12 in (3·05 mm) NOM.
0·02 in (0·51 mm) MIN
0·15 in (3·81 mm) MAX.
0·09 in (2·34 mm) NOM.
0·27 in (6·86 mm) MIN.
0·35 in (8·89 mm) MAX.
0·31 in (7·87 mm) NOM.
0·222 in (5·64 mm) MAX
0·026 in (0·66 mm) MIN
0·166 in (4·22 mm) MAX
0·060 in (1·52 mm) MIN
0·191 in (4·85 mm) MAX
0·046 in (1·17 mm) MIN
0·169 in (4·29 mm) MAX
0·064 in (1·63 mm) MIN

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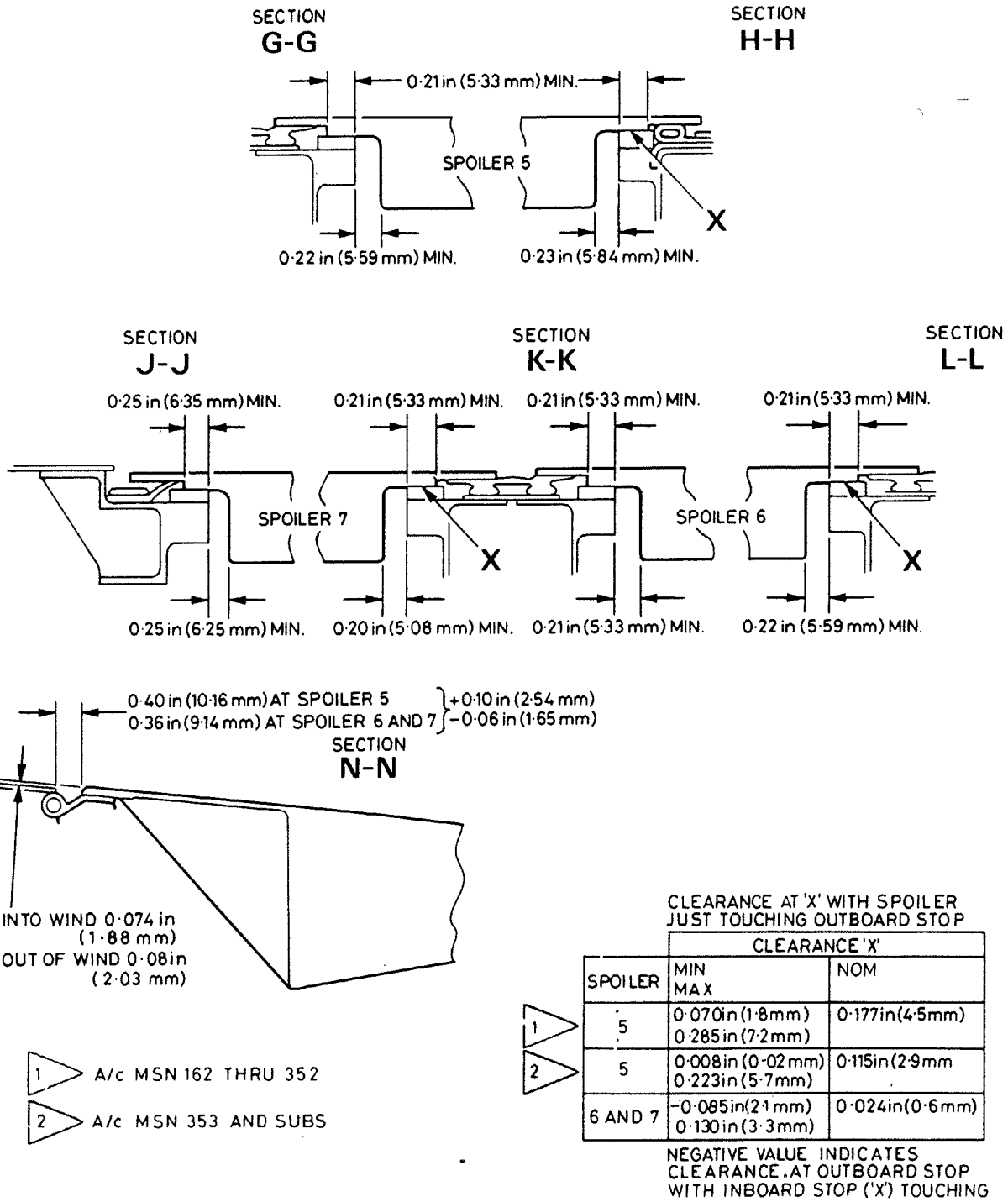
Spoilers 5, 6 and 7 - Clearances
Figure 404


SECTION G-G
SECTION H-H
0·21 in (5·33 mm) MIN.
SPOILER 5
X
0·22 in (5·59 mm) MIN.
0·23 in (5·84 mm) MIN.
SECTION J-J
SECTION K-K
SECTION L-L
0·25 in (6·35 mm) MIN.
0·21 in (5·33 mm) MIN.
0·21 in (5·33 mm) MIN.
0·21 in (5·33 mm) MIN.
SPOILER 7
SPOILER 6
X
X
0·25 in (6·25 mm) MIN.
0·20 in (5·08 mm) MIN.
0·21 in (5·33 mm) MIN.
0·22 in (5·59 mm) MIN.
0·40 in (10·16 mm) AT SPOILER 5
0·36 in (9·14 mm) AT SPOILER 6 AND 7
+0·10 in (2·54 mm)
−0·06 in (1·65 mm)
SECTION N-N
INTO WIND 0·074 in (1·88 mm)
OUT OF WIND 0·08 in (2·03 mm)
1 A/c MSN 162 THRU 352
2 A/c MSN 353 AND SUBS

CLEARANCE AT 'X' WITH SPOILER JUST TOUCHING OUTBOARD STOP

	SPOILER	CLEARANCE 'X' MIN MAX	CLEARANCE 'X' NOM
1	5	0·070 in (1·8 mm) 0·285 in (7·2 mm)	0·177 in (4·5 mm)
2	5	0·008 in (0·02 mm) 0·223 in (5·7 mm)	0·115 in (2·9 mm
	6 AND 7	−0·085 in (2·1 mm) 0·130 in (3·3 mm)	0·024 in (0·6 mm)

NEGATIVE VALUE INDICATES CLEARANCE AT OUTBOARD STOP WITH INBOARD STOP ('X') TOUCHING

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Spoilers 5, 6 and 7 - Clearances
Figure 405

C.Installation

(1)General

R (a)Lubricate all hinge pins, bolts, screws, studs and bushes with grease
R (Material No. 04-004).

(b)At hinge points, detail B and C.

1 Install slip bushes (18) in hinge posts.

2 Lift spoiler into position and align with hinge posts.

3 Install hinge pins (17) and nuts (19). Using tools SL90.374-.625 and SL90.313-.625, TORQUE nuts to between 23 and 34 lbf.ft (3.13 and 4.62 m.daN) and safety with washers (20) (Ref. 20-21-16, P. Block 1).

4 Install locking plates (16) and secure with nuts (21).

(c)Make certain that clearances between spoiler and adjacent structure, and into and out-of-wind tolerances, are within limits given on figure.

(2)Spoiler 5(Ref. Fig. 401, 402).

(a)At inboard and outboard attachments, detail D and E.

1 Align hinge links (25) with box ribs and install bolts (24) and nuts (23).TORQUE nuts to between 11 and 12 lbf.ft (1.49 and 1.63 m.daN) using tools SL90.374-.500 and SL90.313-.500 and safety with washers (22)(Ref. 20-21-16, P. Block 1).

(3)Spoiler 6(Ref. Fig. 401, 402)

(a)At outboard attachment, detail A.

1 Align hinge link (15) with box rib and install stud (7) complete with hinge link (13) and nut (6). TORQUE nut to between 11 and 12 lbf.ft (1.49 and 1.63 m daN) using tools SL90.374-.500 and SL90. 313-.500 and safety with washer (5) (Ref. 20-21-16 P. Block 1).

(b)At spoiler 7 inboard attachment, detail A.

1 Locate hinge link (13) on spoiler 7 and install screw (14), washer (12) and nut (10). Safety with cotter-pin (11).

(c)At inboard attachment, detail D.

1 Align hinge link (25) with box rib and install bolt (24) and nut (23). TORQUE nut to between 11 and 12 lbf.ft (1.49 and 1.63 m.daN) using tools SL90.374-.500 and SL90.313-.500 and safety with washer (22) (Ref. 20-21-16 P. Block 1).

(4)Spoiler 7(Ref. Fig. 401, 402)

(a)At inboard attachment, detail A.

1 Install hinge link (13) on stud (7) and secure with nut (8). TORQUE nut to between 11 and 12 lbf.ft (1.49 and 1.63 m.daN) using tools SL90.374-.500 and SL90.313-.500 and safety with washer (9) (Ref. 20-21-16, P. Block 1).

2 Align hinge link (13) with spoiler 7 and install screw (14), washer (12) and nut (10). Tighten nut and safety with cotter-pin (11).

(b)At outboard attachment, detail E.

1 Align hinge link (25) with box rib, and install bolt (24) and nut (23). TORQUE nut to between 11 and 12 lbf.ft (1.49 and 1.63 m.daN) using tools SL90.374-.500 and SL90.313-.500 and safety with washer (22) (Ref. 20-21-16, P. Block 1).

(5)General(Ref. Fig. 401, 402)

(a)Connect the bonding leads (3) to the spoiler and secure them with the bolts (4), washers (2) and the nuts (1) (Ref. 20-28-11, P. Block 1).

(b)Extend the surface manually:

R - make sure that the bonding leads do not touch the adjacent structure.

- use the clinometer to make sure that the spoiler is free to move a

R minimum of 80 deg. before it touches the trailing edge of the wing.

(c)At actuator attachment, detail F.

1 Apply grease (Material No.04-004) to outer diameter of bushes (27, 34).

2 Install flanged bush (34) into spoiler fork-end on the side with the greatest clearance between actuator eye-end and spoiler fork-end. Install bush (27) into remaining leg of fork-end.

3 Align actuator eye-end and spoiler attachment as follows:

- disconnect electrical connector from valve group servo valve (Ref. 27-64-00, P. Block 1). Cap free connector.
- connect control box 98A27608011000 to valve group electrical connection. Make certain that selector switch is in **EXTEND** position.
- place control box **ON/OFF** switch in **ON** position. Make certain that **ON/OFF** indicator light comes on.
- remove safety collar from actuator.

4 Pressurize hydraulic system (Ref. 29-10-00, P. Block 301):

- for spoilers 3 and 7, pressurize Blue system.
- for spoilers 4 and 6, pressurize Yellow system.
- for spoiler 5, pressurize Green system.

5 Make certain that maintenance device on valve group has returned to '0' position.

6 Place control box selector switch in **RETRACT** position.

7 Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).

8 Make certain that spoiler is on the stops by pressing down on the appropriate end of the spoiler.

9 Cut and remove lockwire and loosen actuator piston rod eye-end locknut sufficiently to disengage the serrated lockwashers.

10 Turn actuator eye-end relative to actuator piston rod, to align actuator eye-end and spoiler fork-end attachment. Do not tighten locknut at this stage.

11 Using guide bullet PN 98A27608010000, install bolt (26). Remove guide bullet.

12 Apply grease (Material No. 06-002) to thread of bolt (26) and interface of nut (33).

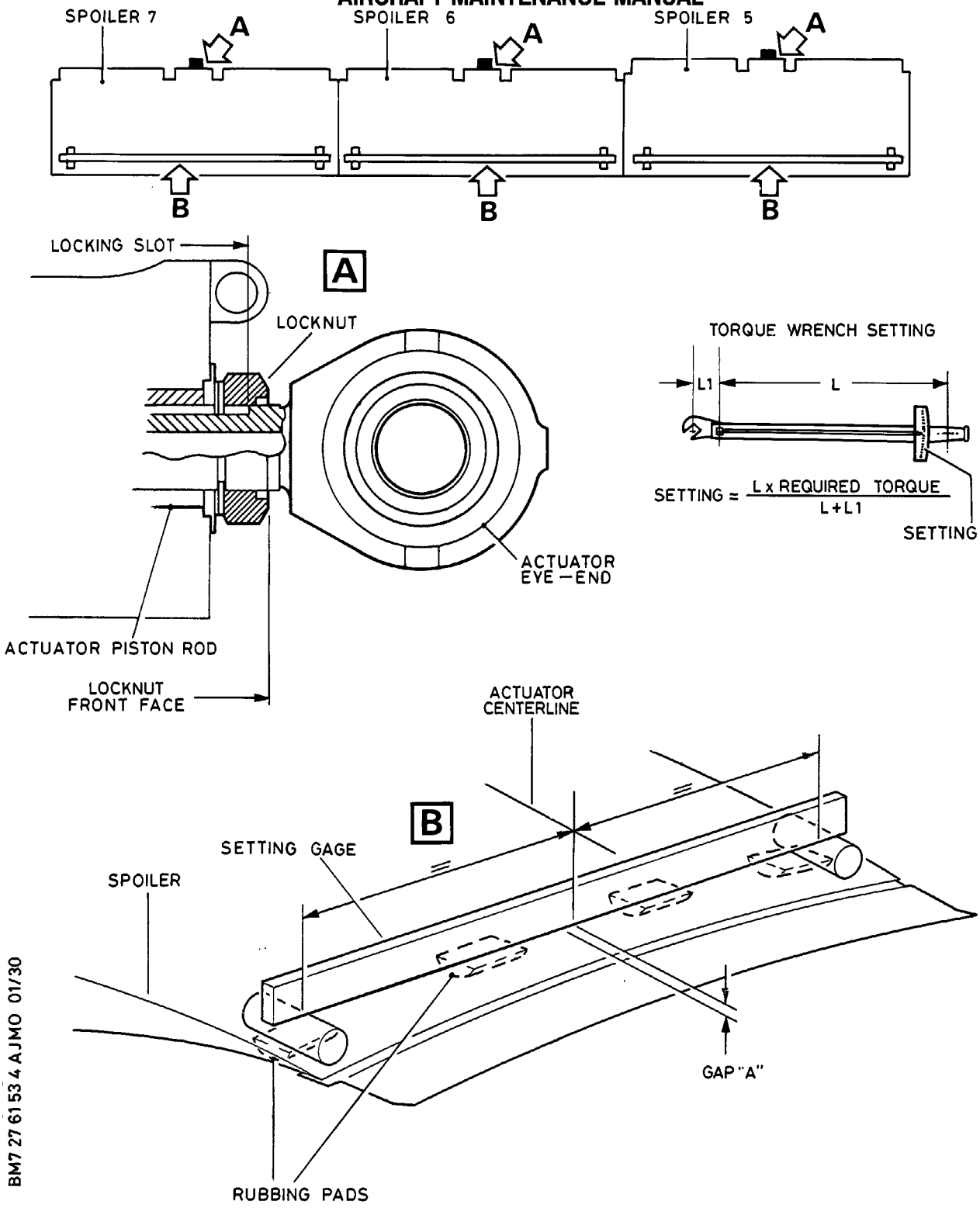
13 Install washer (31) and nut (33). Using tools SL90.374-.875 and SL 90.313-.875 **TORQUE** nut to 73 lbf.ft (10 m.daN) and safety with lockwasher (32) (Ref. 20-21-16, P. Block 1).

14 Apply sealant (Material No. 09-003) to mating face of anti-rotation plate (29). Install anti-rotation plate and secure with Hi-Lok pin (30) and nut (28).

(6)Rigging

(Ref. Fig. 406)

(a)Pressurize the applicable hydraulic system, step 2. C. (5) (c)3 e.



Spoilers 5, 6 and 7 - Rigging
Figure 406

(b)With the spoiler fully retracted put the setting gage PN 98A27608015000 on the upper surface of the spoiler trailing edge, with the gage supports in front of the fasteners for the outer rubbing pads.

NOTE: Make sure that the setting gage is used in the correct configuration.

(c)Find the surface bow, make sure that gap A is within the limits given (Ref. Table 1).

SURFACE NO.	5	6	7
Gap A between setting gage and upper surface of spoiler on actuator centerline	Between 0.126 and 0.142 in (3.2 and 3.6mm)	Between 0.122 and 0.138 in (3.10 and 3.50mm)	Between 0.106 and 0.122 in (2.7 and 3.1mm)

Table 1

(d)If the bow is incorrect, remove the gage and refer to paragraph 2. D. Adjustment.
(e)Extend the spoiler, to extend the spoiler put the control-box selector switch in the EXTEND position.
(f)De-pressurize the Blue, Green or Yellow hydraulic system, as applicable (Ref. 29-10-00, P. Block 301).
(g)Turn the maintenance device on the valve group to the maintenance position 'M'.

CAUTION : DO NOT DAMAGE THE FLANGED BUSH (34) AND THE SPOILER FORK-END.

CAUTION : INSUFFICIENT TIGHTENING OF PISTON ROD LOCK NUT CAN LEAD TO SERIOUS DAMAGE TO THE ACTUATOR EYE-END.

(h)TORQUE the piston rod locknut to between 59 and 66.2 lbf.ft. (8.0 and 9.0 m.daN). Make sure that the locking slot in the threaded end of the rod does not extend beyond the front face of the locknut. Safety the locknut with lockwire.

NOTE : If you use the spanner set PN 98A27608017000, calculate the torque wrench setting as follows:

$$\text{setting} = \frac{L \times \text{required torque}}{L + L1}$$

where L = torque wrench length from midway along handle to center of square drive
L1 = 65 mm (2.56 in.) for tool PN 98A27608017001
= 80 mm (3.15 in.) for tool PN 98A27608017002

(j)Pressurize the applicable hydraulic system, step 2. C. (5) (c)3 e.

(k)Make sure that the maintenance device on the valve group has gone back to the 'O' position.
(l)Retract the spoiler, to retract the spoiler put the control-box selector switch in the RETRACT position.

D. Adjustment - Surface Bow(Ref. Fig. 406)
(1)Pressurize the applicable hydraulic system, step 2. C. (5) (c) 3 e.
(2)Extend the spoiler, to extend the spoiler put the control-box selector switch in the EXTEND position.
(3)De-pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Turn the maintenance device on the valve group to the maintenance position 'M'.

CAUTION : ADJUST FOR SURFACE BOW IN SMALL INCREMENTS. INCORRECT ADJUSTMENT OF THE ACTUATOR CAN CAUSE UNACCEPTABLE DEFORMATION OF THE SPOILER.

(5)Loosen the actuator locknut and, with a wrench, turn the actuator piston-rod counter-clockwise to reduce the surface bow (Ref. Table 2).

PISTON ROD TURNED COUNTER-CLOCKWISE	REDUCTION OF SURFACE BOW SPOILER 5	SPOILER 6	SPOILER 7
360 deg	0.378 in (9.6 mm)	0.338 in (8.6 mm)	0.275 in (7.0 mm)

Table 2

(6)Tighten the locknut but do not safety it.
(7)Pressurize the applicable hydraulic system, step 2. C. (5) (c) 3 e.
(8)Make sure that the maintenance device on the valve group has gone back to the 'O' position.
(9)Retract the spoiler, to retract the spoiler put the control-box selector switch in the RETRACT position.
(10)Put the setting gage on the upper surface of the spoiler trailing edge, with the gage supports in front of the fasteners for the outer rubbing pads.

NOTE : Make sure that the setting gage is used in the correct configuration.

(11)Measure the distance between the upper surface of the spoiler and the lower edge of the setting gage, gap A, to find the surface bow (Ref. Table 1).
(12)If the bow is incorrect, remove the gage and do steps 2. D. (1) thru (11) again until the surface bow is correct.
(13)When the surface bow is correct, do step 2. C. (6) (h).
(14)De-pressurize the hydraulic system. (Ref. 29-10-00, P. Block 301).
(15)Put the control box ON/OFF switch in the OFF position and disconnect the control box from the electrical connection of the valve group.
(16)Remove the protective cap. Examine for correct condition and connect the aircraft electrical connector to the valve group.

E. Test

(1)On panel 133VU, remove safety clips and tags and close circuit breakers: 53CP(334/S63), 55CP(334/S64), 5CP(335/R63), 7CP(335/R62), 54CP(334/S67), 71CP(331/V62), 70CP(333/T65), 8CP(333/T62), 10CP(332/U62), 72CP(333/T67) and 9CP(333/T66).

(2)Perform the following:

ACTION	RESULT
1. On panel 428VU: - release SPLR & SPD BRK 5, 6 and 7 pushbutton switches.	On panel 428VU: - OFF/R legends come on - spoilers 5, 6 and 7 are held in the retracted position.
2. Fully extend spoilers 5, 6 and 7 by hand (Ref. 27-60-00, P. Block 301)	- spoilers 5, 6 and 7 are extended to full deflection.
3. Measure deflection of spoilers 5, 6 and 7.	- spoilers 5 and 7 deflection is 51 deg - spoiler 6 deflection is 50.5 deg.
4. Fully retract spoilers 5, 6 and 7 by hand (Ref. 27-60-00, P. Block 301)	- spoilers 5, 6 and 7 are retracted onto their stops.
5. Make certain spoilers abut seals along box ribs.	
6. On panel 428VU: - press in SPLR & SPD BRK 5, 6 and 7 pushbutton switches.	On panel 428VU: - spoilers 5, 6 and 7 control systems are activated. - the OFF/R legends go off.
7. Do a functional test (roll test) of the spoilers (Ref. 27-11-00, P. Block 501).	

F. Close-Up

(1)On panel 133VU, remove safety clips and tags and close circuit breakers 2CV(334/S62), 6CV(331/V61), 5CV(332/U61), 10CV(335/R67) and 1CV(335/R61).

(2)Fully retract flaps (Ref. 27-50-00, P. Block 301).

(3)Depressurize aircraft hydraulic systems(Ref.29-10-00, P. Block 301).

(4)Remove warning notices.

(5)Close access doors 581(681)FB, 581(681)GB, 581(681)HB, or 581(681)JB, as applicable.

(6)Remove access platform.

(7)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

1. Reason for the Job

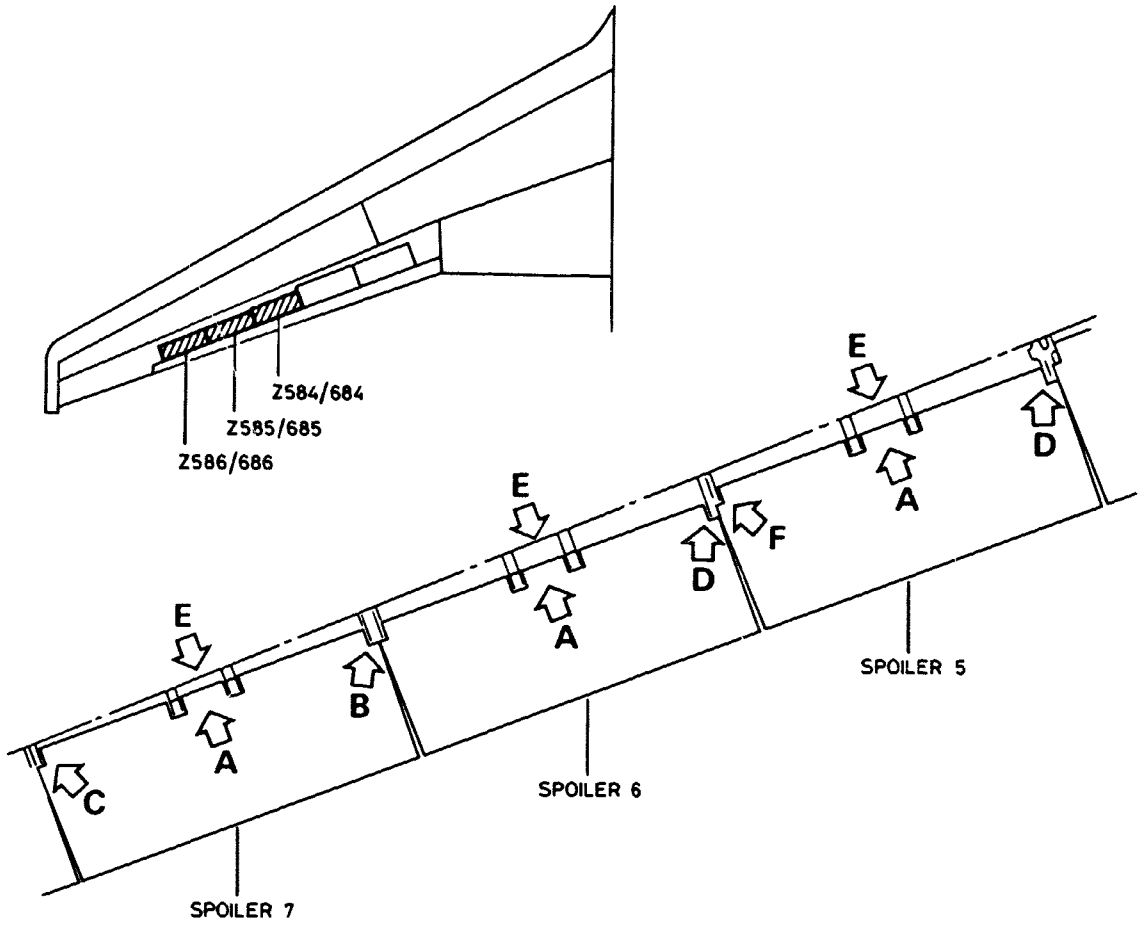
A. Check of fits and clearances.

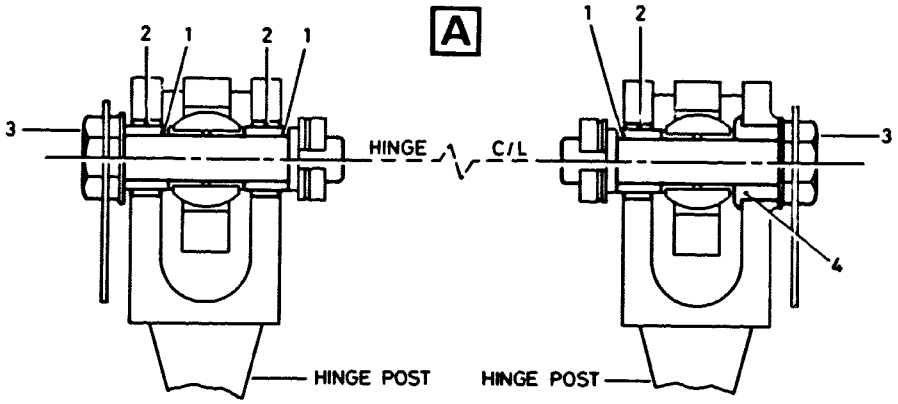
With removal - Table of Fits and Clearances

(Ref. Fig. 601)
(Ref. Fig. 602)
NOTE : Limits annotated with an asterisk *, only apply while there is a thickness of chrome plating remaining on the bearing surface.

Detail and Item No.	Original Mfg Limits				In Service Wear Limits		
	Dimension inches (Millimeters)		Assy. Clearance Inch.(Milli.)		Dimension Limits Inch.(Milli.)		Max. Allow clear
	Min.	Max.	Min.	Max.	Min.	Max.	in. (mm)
A							
OD 1	0.8742 (22.204)	0.8747 (22.217)			0.8735 (22.187)		
			0.0003 (0.008)	0.0020 (0.051)			0.0035 (0.089)
ID 2	0.8750 (22.225)	0.8762 (22.255)				0.8770 (22.276)	
OD 3	0.6242 (15.854)	0.6247 (15.867)			0.6235 (15.837)		
			0.0003 (0.008)	0.0020 (0.051)	*		0.0035 (0.089)
ID 1	0.6250 (15.875)	0.6262 (15.905)				0.6270 (15.926)	
OD 3	0.6242 (15.854)	0.6247 (15.867)			0.6235 (15.837)		
			0.0003 (0.008)	0.0018 (0.046)	*		0.0035 (0.089)
ID 4	0.6250 (15.875)	0.6260 (15.900)				0.6270 (15.926)	
B							
OD 5	0.5615 (14.262)	0.5619 (14.272)			0.5605 (14.237)		
			0.0006 (0.015)	0.0020 (0.051)			0.0040 (0.102)
ID 6	0.5625 (14.287)	0.5635 (14.313)				0.5645 (14.338)	

Detail and Item No.	Original Mfg Limits: Dimension inches (Millimeters) Min.	Original Mfg Limits: Dimension inches (Millimeters) Max.	Original Mfg Limits: Assy. Clearance Inch.(Milli.) Min.	Original Mfg Limits: Assy. Clearance Inch.(Milli.) Max.	In Service Wear Limits: Dimension Limits Inch.(Milli.) Min.	In Service Wear Limits: Dimension Limits Inch.(Milli.) Max.	In Service Wear Limits: Max. Allow clear in. (mm)
C							
OD 7	0.4988 (12.669)	0.4992 (12.679)			0.4980 (12.649)		
			0.0003 (0.008)	0.0017 (0.043)			0.0035 (0.089)
ID 8	0.4995) (12.687)	0.5005 (12.712)				0.5015 (12.738)	
D							
OD 9	0.4988 (12.669)	0.4992 (12.679)			0.4980 (12.649)		
			0.0003 (0.008)	0.0017 (0.043)			0.0035 (0.089)
ID 10	0.4995 (12.669)	0.5005 (12.679)				0.5015 (12.738)	
E							
OD 11	0.9980 (25.350)	0.9993 (25.381)			0.9970 (25.324)		
			0.0002 (0.007)	0.0020 (0.050)			0.0040 (0.102)
ID 12	0.9995 (25.388)	1.0000 (25.400)				1.0010 (25.425)	
OD 12	1.2492 (31.730)	1.2496 (31.741)			1.2480 (31.699)		
			0.0009 (0.022)	0.0023 (0.058)			0.0050 (0.127)
ID 13	1.2505 (31.763)	1.2515 (31.788)				1.2530 (31.826)	
F							
OD 14	0.4988 (12.669)	0.4992 (12.679)			0.4980 (12.649)		
			0.0003 (0.008)	0.0017 (0.043)			0.0030 (0.089)
ID 15	0.4995 (12.669)	0.5005 (12.679)				0.5015 (12.738)	





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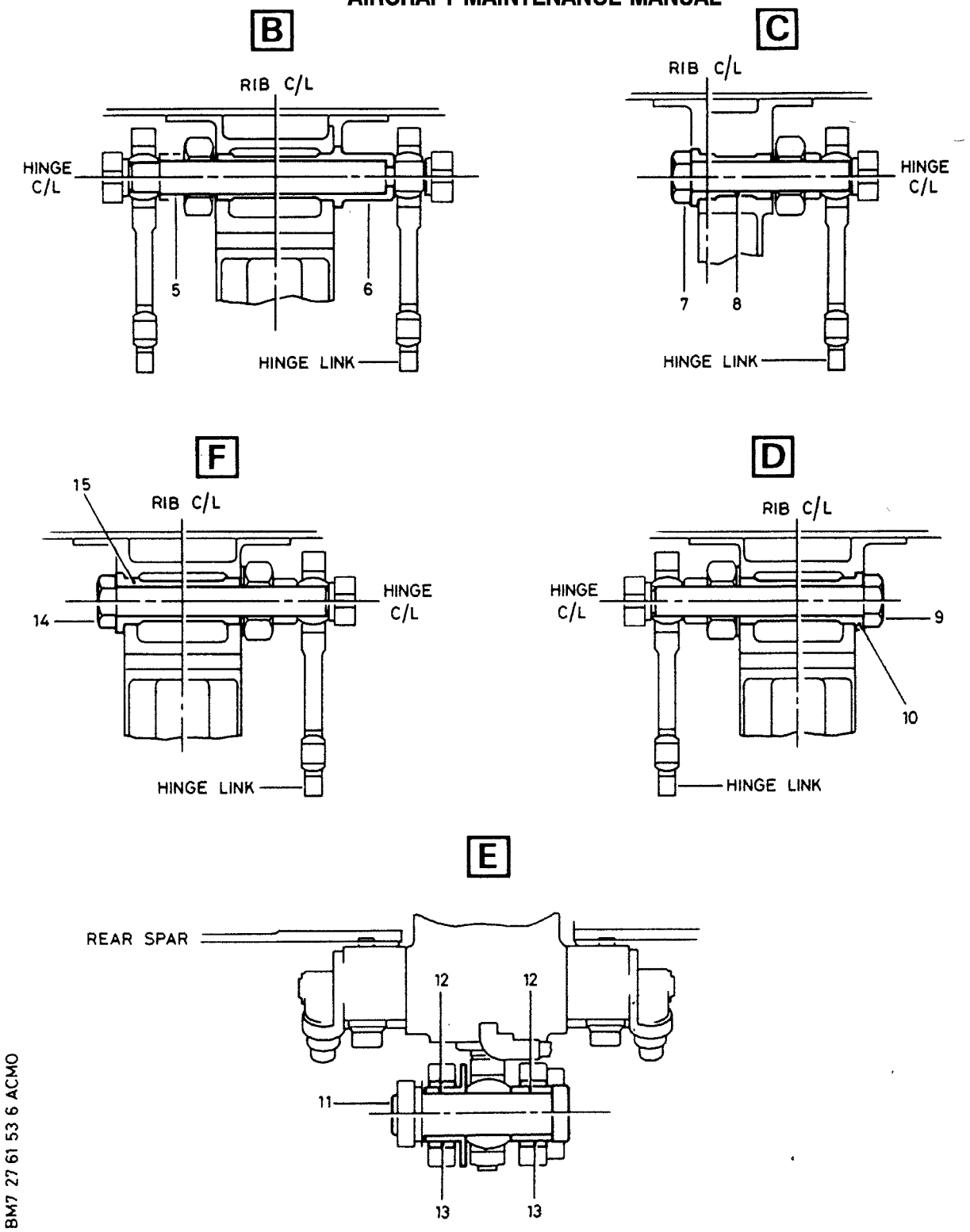
Spoilers 5, 6 and 7
Figure 601



Spoilers 5, 6 and 7
Figure 602

Ref. MMEL SECT. 1-27 Item 1

CAUTION : THIS PROCEDURE IS TO BE USED IN ACCORDANCE WITH THE REQUIREMENTS OF THE MMEL.

WARNING : LANDING GEAR - MAKE SURE THAT THE GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE SURE THAT THE GROUND SAFETIES AND NOTICES ARE IN POSITION.

FLIGHT CONTROLS - MAKE SURE THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

HYDRAULICS - BEFORE YOU PRESSURIZE THE SYSTEM, MAKE SURE THAT THE CONTROL SURFACE POSITIONS AND THE FLIGHT CONTROL POSITIONS ARE THE SAME.

MAKE SURE THAT YOU ISOLATE THE ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS.

1. Deactivation

A. Reason for the Job

(1)Deactivation of the spoiler servo control.

B. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Warning Notices - that prevent the use of Hydraulic, Flap, Slat and Spoiler Systems
C.	Warning Notices - Specified Defective Spoiler(s) are OFF and must stay OFF
D.	Circuit Breaker Safety Clips and Tags
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-64-13, P. Block 401	Spoiler/Speedbrake - Valve Group (Surfaces 3 thru 7)
R - 27-65-00, P. Block 1	Control Surface Position Indicating
- 29-10-00, P. Block 301	Main Hydraulic Power

C. Deactivation Of Inoperative Spoiler(s)

CAUTION : TOTAL NUMBER OF INOPERATIVE SPOILER SURFACES AFTER DEACTIVATION MUST NOT EXCEED TWO SURFACES PER WING.

CAUTION : DO NOT DO THIS DEACTIVATION PROCEDURE IF THERE IS EXTERNAL LEAKAGE ON THE UNSERVICEABLE SERVO-CONTROL. AN EXTERNAL LEAKAGE CAUSES AN UNSERVICEABLE HYDRAULIC SYSTEM.

(1)Energize the aircraft electrical network and make sure that the electronic racks are ventilated (Ref. 24-41-00, P. Block 301).
(2)Set, the defective Spoiler, pushbutton on the overhead flight control panel 428VU to OFF.
(3)Install warning notices on the Captain and First Officer's instrument panels to warn pilots that the specified defective spoiler(s) are OFF and must stay OFF.
(4)Check the defective Spoiler position on the SD F/CTL page on the right ECAM display unit:
- if the defective spoiler is extended go to Para. (5)
- if the defective spoiler is retracted go to Para. (6).
(5)If necessary retract the defective spoiler as follows:
(a)Make sure that there is no hydraulic leak on the related servo Controls.
(b)Fully extend flaps (Ref. 27-50-00, P. Block 301), to clear under-wing spoiler access panels.
(c)Make sure that the relevant hydraulic system is depressurized (Ref. 29-10-00, P. Block 301):
- Spoiler 5 (Green)
- Spoiler 6 (Yellow)
- Spoiler 7 (Blue).
(d)Install warning notice(s) that prevent the use of the hydraulic, flap, slat and spoiler systems.
(e)Put the access platform in position.
(f)Open the relevant access doors:
- Spoiler 5 : 581FB (681FB)
- Spoiler 6 : 581GB (681GB)
- Spoiler 7 : 581JB (681JB).
(g)Open, safety and tag the circuit breakers that follow:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR 5	55CP	334/S64
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR 6 & 7	7CP	335/R62
133VU	FLT CTL/LAND RECOVERY SUPPLY/SPLR 1 & 4 & 6 & 7	54CP	334/S67
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 6 & 7	10CP	332/U62
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 5	70CP	333/T65
133VU	FLT CTL/EFCU/LAND RECOVERY SUPPLY/ SPLR 6 & 7	9CP	333/T66
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/FLAPS/ SYS 1	10CV	335/R67
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61

(h)At the relevant access door in the wings:
- Spoiler 5 surface 581FB (672FB)
- Spoiler 6 surface 581GB (672GB)
- Spoiler 7 surface 581JB (681JB)

locate the spoiler valve group and use a spanner to turn the maintenance device on the affected valve group to 'M' position, (Ref. 27-64-13, P. Block 401).

(j)Manually retract the defective spoiler.

(k)Reset the maintenance device by turning the spanner to 'O' position.

(l)Make sure that the work area is clean and clear of tools and all other items of equipment.

(m)Close the relevant access doors:
- Spoiler 5 : 581FB (681FB)
- Spoiler 6 : 581GB (681GB)
- Spoiler 7 : 581JB (681JB).

(n)Remove the access platform.

(p)On panel 133VU, remove safety clips and tags and close circuit breakers 55CP(334/S64), 7CP(335/R62), 54CP(334/S67), 10CP(332/U62), 70CP(333/T65), 9CP(333/T66), 2CV(334/S62), 6CV(331/V61), 5CV(332/U61), 10CV(335/R67) and 1CV(335/R61).

(q)Remove warning notice(s) that prevent the use of the hydraulic, flap, slat and spoiler systems.

(r)Fully retract the flaps (Ref. 27-50-00, P. Block 301).

(6)Check that the deactivated spoilers are OFF as follows:

(a)Pressurize the three hydraulic systems (Ref. 29-10-00, P. Block 301). Set ELEC PUMP and PTUs as required.

(b)On the flight controls center pedestal, panel 9VU, slowly set Speedbrake lever to half position.

(c)Check on the SD F/CTL page on the Right ECAM Display Unit, that the inoperative spoiler(s) remain in the retracted position.

(d)On the flight controls center pedestal, panel 9VU, slowly set the Speedbrake lever to RET.

(e)Slowly give roll left then right order whilst checking the SD F/CTL page on the Right ECAM Display Unit that the deactivated spoiler surfaces remain in the retracted position.

(7)Close-Up

R (a)Depressurize the three hydraulic systems (Ref. 29-10-00, P. Block 301).
R Set the ELEC PUMP and PTUs to off.
R (b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R (c)Do not remove the warning notices on the Captain and the First Officer's instrument panels to warn the pilots that the specified defective spoilers are OFF and must stay OFF.
R (d)Make an appropriate entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM		DESIGNATION
R	A.	Warning notices - that prevent the use of Hydraulic, flap, Slat and Spoiler System
	Referenced Procedures	
	- 24-41-00, P. Block 301	AC External Power Control
	- 27-60-00, P. Block 301	Spoilers and Speedbrakes
	- 27-61-00, P. Block 1	Electrical and Mechanical Control
R	- 27-65-00, P. Block 1	Control Surface Position Indicating
	- 29-10-00, P. Block 301	Main Hydraulic Power
R	- TSM 27-61-00	Fault Isolation

B. Procedure

(1)Job Set-Up

(a)Energize the aircraft electrical network and make sure that the electronic racks are ventilated (Ref. 24-41-00, P. Block 301).

(b)Install warning notices that prevent the use of the hydraulic, flap, slat and spoiler systems.

(c)Pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).

R (d)Identify any defective spoiler surfaces:

- by visual identification of warning notices in the flight compartment and check the SD F/CTL page on the Right ECAM Display Unit (Ref. 27-65-00 P. Block 1).

(2)Fault Isolation

(a)Release-out pushbutton(s) on the overhead flight control panel 428VU associated with defective spoiler surface(s) (set to OFF during spoiler deactivation).

(b)Do the trouble-shooting procedure (Ref. TSM 27-61-00).

(3)Test

(a)Reset the appropriate EFCU BITE display (Ref. 27-61-00, P. Block 1).

(b)Make sure that the spoilers are fully retracted (Ref. 27-60-00, P. Block 301).

(c)Fully extend the spoilers and make sure that the spoiler deflection is at least 51 deg.

(d)Fully retract the spoilers (Ref. 27-60-00, P. Block 301).

R (e)De-pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).

R (f)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(4)Close-Up

(a)Make sure that the work area is clean and clear of all tools and any other items of equipment.

R

R (b)Remove the warning notices from the Captain and First Officer's instrument panels to warn pilots that the specified defective Spoiler(s) are OFF and must stay OFF.

R (c)Remove the warning notices that prevent the use of the hydraulic, flap, slat and spoiler systems.

R (d)Make the appropriate entries in the aircraft technical log.

SPOILER 1 AND 2 - REMOVAL/INSTALLATION

R **WARNING** : LANDING GEAR - MAKE SURE THAT THE GROUND SAFETIES AND CHOCKS ARE IN POSITION.

R FLIGHT CONTROLS - MAKE SURE THAT THE TRAVEL RANGES OF THE CONTROL
R SURFACES ARE CLEAR.

R HYDRAULICS - BEFORE YOU PRESSURIZE THE SYSTEM, MAKE SURE THAT THE
R CONTROL SURFACE POSITIONS AND THE FLIGHT CONTROL POSITIONS ARE THE
R SAME.

R MAKE SURE THAT YOU ISOLATE THE ELECTRICAL CIRCUITS UPON WHICH WORK IS
R IN PROGRESS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Torque Wrench:15 to 147 lbf.ft (2 to 20 m.daN)
B. SL90.374 - .500	Wrench - Notched
C. SL90.374 - .625	Wrench - Notched
D. SL90.374 - .875	Wrench - Notched
E. SL90.314 - .500	Tool - Extraction
F. SL90.314 - .625	Tool - Extraction
G. SL90.314 - .875	Tool - Extraction
H. SL90.313 - .500	Tool - Installation
J. SL90.313 - .625	Tool - Installation
K. SL90.313 - .875	Tool - Installation
L. 98A27608010000	Guide Bullet- Actuator Attaching Bolts
M. 98A27608014000	Safety Collar Set
N. 98A27608015000	Setting Gage Set - Actuator Adjustment
P. 98A27608016000	Setting Gage Set - Adjustable Stops Spoiler/Speedbrake Surfaces 1 and 2
Q. 98A27608017000	Spanner Set - Spoiler Actuator Piston Rod Adjustment
R.	Lockwire, Corrosion Resistant Steel 0.8 mm (0.032 in) dia.
S. 98A27608011000	Control Box - Spoiler Valve Group
T.	Trestles
U.	Access Platform 4 m (13 ft)
V.	Warning Notices-Prohibiting Use of Flap, Slat and Spoiler Systems
W.	Clinometer
X.	Circuit Breaker Safety Clips and Tags
Y.	Blanking Caps
Z. Material No. 04-004	Common Greases (Ref. 20-31-00)
AA.Material No. 09-003	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 20-21-16, P. Block 1	STA-LOK Nuts and Lockwashers

ITEM	DESIGNATION
- 20-28-11, P. Block 1	Electrical Bonding
- 27-50-00, P. Block 301	Flaps
- 27-60-00, P. Block 301	Spoilers and Speedbrakes
- 27-61-00, P. Block 501	Electrical and Mechanical Control (Spoilers and Speedbrakes)
- 27-64-00, P. Block 1	Hydraulic Actuation (Spoilers and Speedbrakes)
- 29-10-00, P. Block 301	Main Hydraulic Power

2. Procedure

A. Job Set-Up
(1)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(2)Display warning notices.
(3)Open, safety and tag the following circuit breakers:
(a)For surfaces 1 and 2:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/FLAPS/ SYS 1	10CV	335/R67
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61

(b)For surface 1:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR/1 and 4	53CP	334/S63
133VU	FLT CTL/LAND RECOVERY SUPPLY/SPLR/ 1 & 4 & 6 & 7	54CP	334/S67
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR/1 & 4	71CP	331/V62
133VU	FLT CTL/EFCU/LAND RECOVERY SUPPLY/SPLR/ 1 & 4	72CP	333/T67

(c)For surface 2:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR/2 & 3	5CP	335/R63
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR/2 & 3	8CP	333/T62

(4)Position access platform.
(5)Open access doors 572(672)BB and 572(672)DB as applicable.

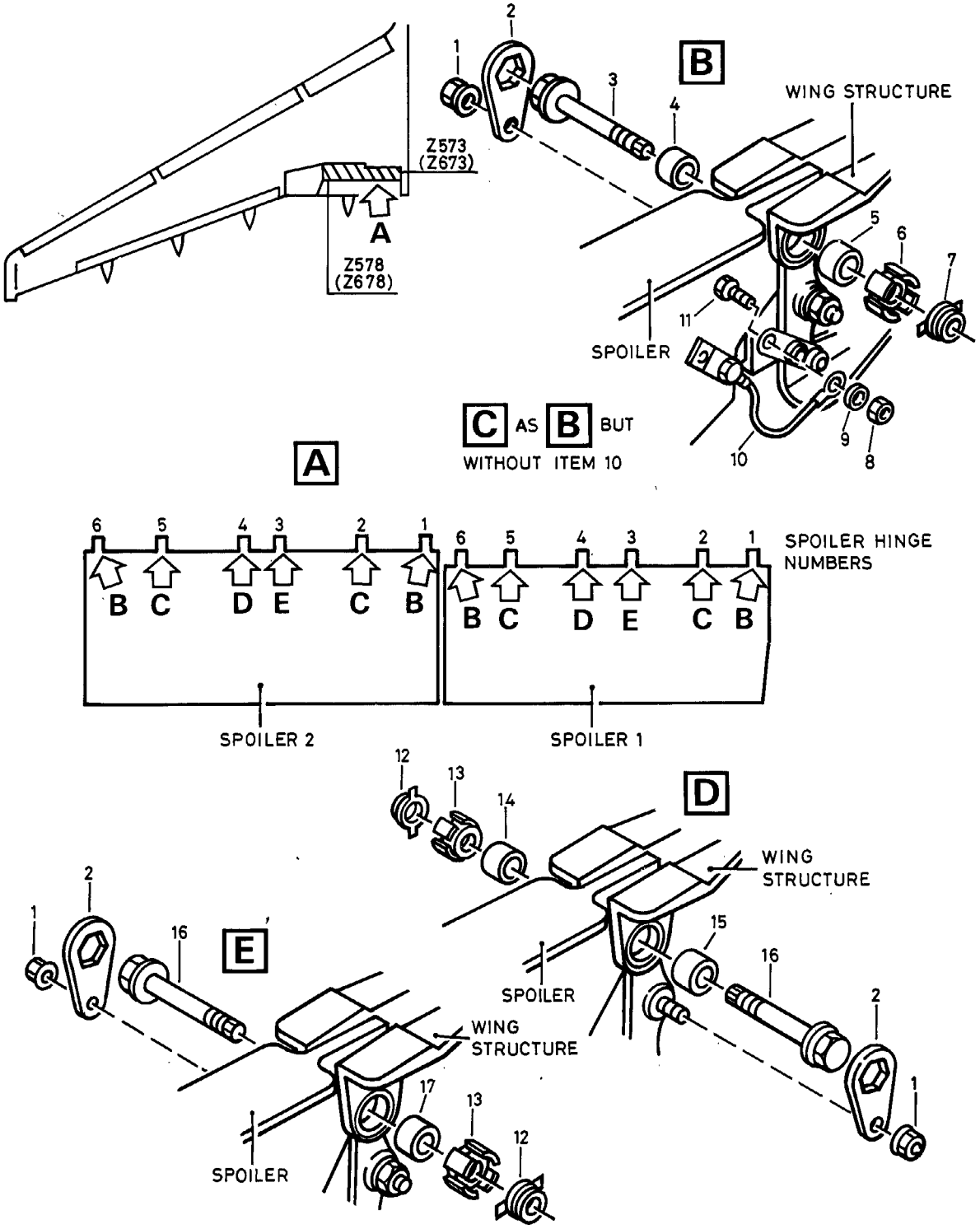
(6)Turn maintenance device on valve group controlling spoiler to be worked on to maintenance position M.
(7)Manually extend relevant spoiler and install safety collar PN98A27608014000 on actuator piston.

B. Removal
(Ref. Fig. 401)
(Ref. Fig. 402)
(1)At actuator attachment (Ref. Fig. 402)
(a)Refer detail A.
1 Remove nut (18), Hi-Lok pin (22) and anti-rotation plate (19).
2 Manually support spoiler (weight 94 lb (43 kg)) in the extended position.
3 Manually support actuator (weight 20lb (9 kg)) and using tools SL90.374 - .875 and SL90.314 - .875 remove lockwasher (25) and nut (24) (Ref. 20-21-16, P. Block 1). Remove washer (23) and bolt (20). Disengage actuator eye-end from spoiler.
4 Lower actuator onto support bracket and remove bushes (21 and 26).
(2)At spoiler hinge attachments (Ref. Fig. 401)
(a)At spoiler hinges 1 and 6, detail B.
1 Remove nuts (8), washers (9), bolts (11) and disconnect bonding straps (10) from spoiler.
2 Remove nuts (1) and locking plates (2) from spoiler hinges.
3 Using tools SL90.374:- .500 and SL90.314:- .500 remove washers (7) and nuts (6) (Ref.20-21-16, P. Block 1). Withdraw hinge pins (3) and slip bushes (4) and (5).
(b)At spoiler hinges 2 thru 5, details A, C and D.
1 Remove nuts (1) and locking plates (2) from spoiler hinges 2 thru 5.
2 At spoiler hinge 3 and 4, using tools SL90.374- .625 and SL90.314- .625 remove washers (12) and nuts (13) (Ref.20-21-16, P.Block 1). Withdraw hinge pins (16) and slip bushes (14), (15) and (17).
3 At spoiler hinges 2 and 5, using tools SL90.374- .500 and SL90.314- .500 remove washers (7) and nuts (6) (Ref.20-21-16, P. Block 1). Withdraw hinge pins (3) and slip bushes (4) and (5).
4 Lift spoiler clear of wing and place on support trestles.

C. Installation
(1)General (Ref. Fig. 401)

NOTE: Measurements are to be taken with A/C on wheels, engines fitted and wing tanks containing any quantity of fuel.

(a)Lubricate hinge pins (3) and (16) and slip bushes (4), (5), (14), (15) and (17) with grease (Material No.04-004).
(b)Lift spoiler into position and align with hinge posts.
(c)Install hinge pins (3) and (16) and slip bushes (4), (5), (14) and (15) on spoiler hinges 1, 2, 4, 5 and 6.
(2)At spoiler hinge 3, detail D
(a)Install hinge pin (16) and slip bush (17) on spoiler hinge 3. Install nut (13) and TORQUE to between 23 and 34 lbf.ft (3.12 and 4.61 m.daN) using tool SL90.374- .625. Safety nut with washer (12) using tool



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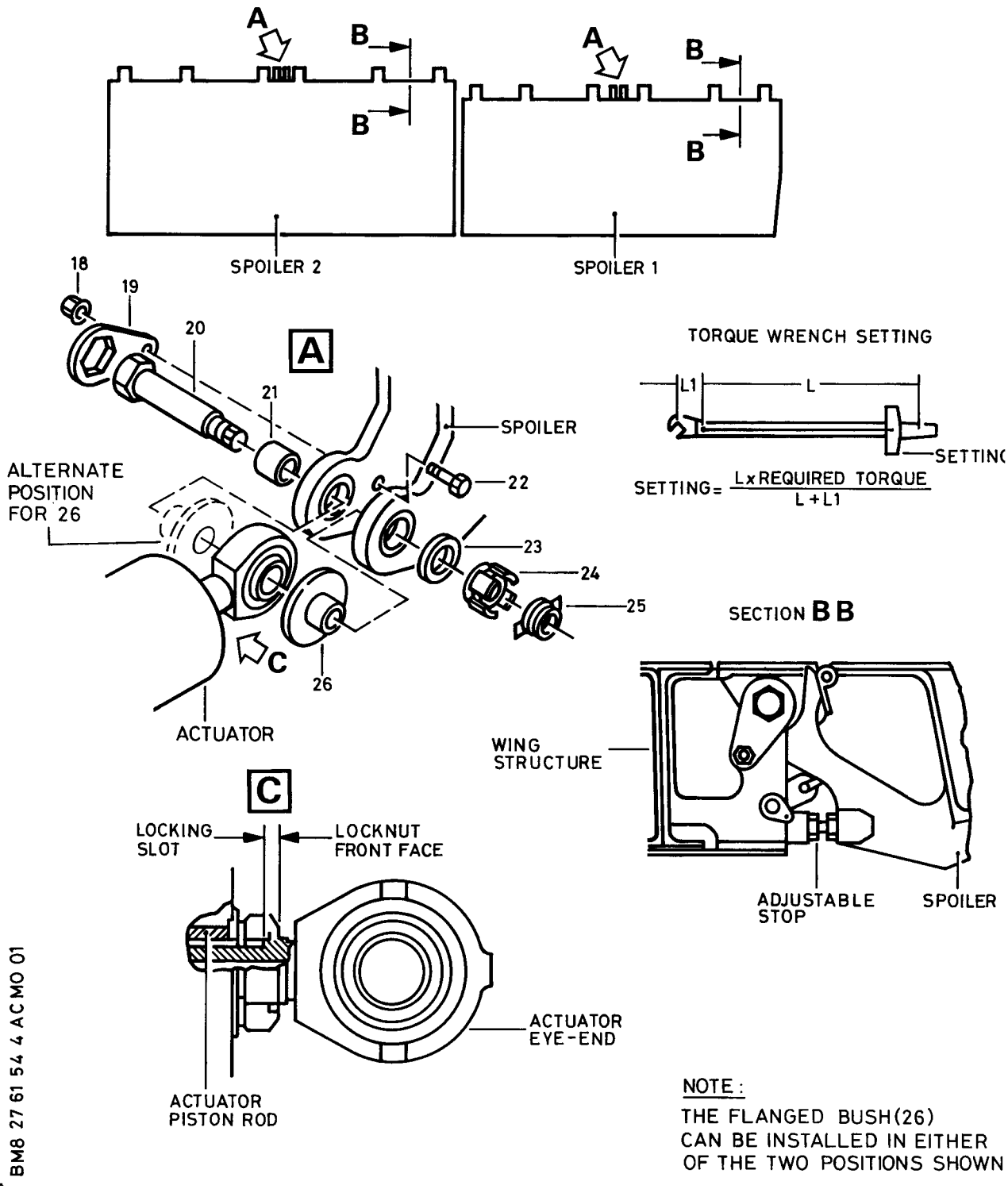
Spoiler 1 and 2 - Installation
Figure 401

R



Actuator - Installation
Figure 402

R

SL90.313- .625 (Ref.20-21-16, P. Block 1).

(3)General

(Ref. Fig. 403)

(a)Make sure that the clearances between the spoiler and the adjacent structure, and the into/out-of-wind tolerances, are within the limits shown (Ref. Fig. 403).

R (4)At spoiler hinge attachments (Ref. Fig. 401)

(a)Install nuts (6) on hinges 1, 2, 5 and 6. Using tools SL90.374- .500 TORQUE nuts (6) to between 15 and 25 lbf.ft (2.03 and 3.39 m.daN). Safety nuts with washers (7) using tool SL90.313- .500 (Ref.20-21-16, P. Block 1).

(b)Install nut (13) on hinge 4. Using tool SL90.374- .625 TORQUE nut (13) to between 23 and 34 lbf.ft (3.12 and 4.61 m.daN). Safety nut with washer (12) using tool SL90.313- .625 (Ref. 20-21-16, P. Block 1).

(c)Install locking plates (2) on spoiler hinges 1 thru 6 and secure with nuts (1).

(5)At spoiler hinges 1 and 6

(a)Connect bonding straps (10) to spoiler hinges 1 and 6 and secure with bolts (11), washers (9) and nuts (8) (Ref. 20-28-11, P. Block 1).

(6)General

(a)Extend the surface manually and, using a clinometer, make certain the minimum deflection angle is at least 70 deg.

(7)Rigging

(Ref. Fig. 404)

(a)On panel 133VU, remove safety clips and tags and close FLAPS circuit breakers 10CV(335/R67), 5CV(332/U61) and 6CV(331/V61) 1CV(335/R61), 2CV(334/S62).

(b)Fully retract flaps (Ref. 27-50-00, P. Block 302).

(c)Open, safety and tag circuit breakers 10CV(335/R67), 5CV(332/V61), 6CV(331/V61), 2CV(334/S62), 1CV(335/R61).

(d)If a new spoiler 1 has been installed:

1 Prepare the setting-gage set PN 98A27608016000, with the 6.4 to 6.8 mm (0.25 to 0.27 in) feeler.

2 Cut the lockwire, unscrew the locknuts and retract both of the
R adjustable stops on spoiler 1 (Ref. Fig. 402).

3 Install the setting-gage set PN 98A27608016000, between the flexible metal-trailing-edge of spoiler 1 and the flap rubbing strip, adjacent
R to the outboard adjustable stop (Ref. Fig. 404).

4 Push down on the outboard end of the spoiler until the feeler of the setting-gage set is clamped between the lower edge of the spoiler and the upper surface of the flap.

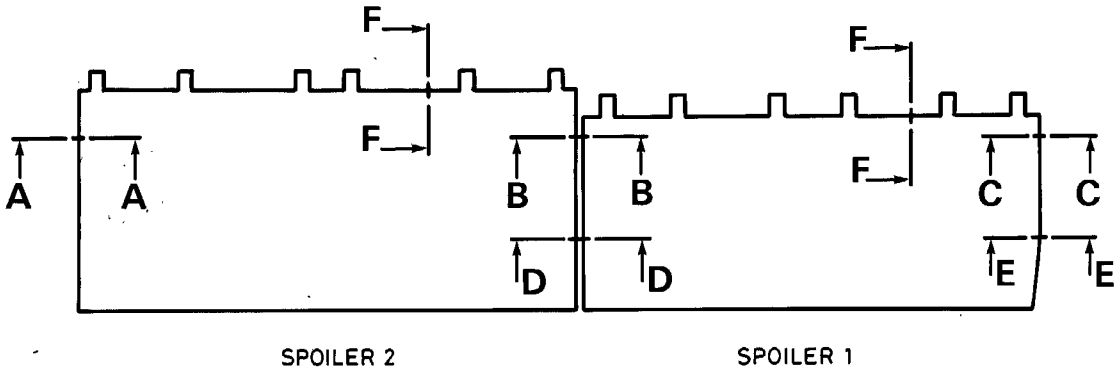
5 Turn the outboard adjustable stop until it just touches the stuctural bracket. Tighten the locknut and safety with lockwire.

6 Remove the setting-gage set PN 98A27608016000.

7 Install the setting-gage set PN 98A27608016000, between the flexible metal-trailing-edge of spoiler 1 and the flap rubbing strip, adjacent to the inboard adjustable stop.

8 Push down on the inboard end of spoiler 1 until the feeler of the setting-gage set is clamped between the lower edge of the spoiler and the upper surface of the flap.

9 Turn the inboard adjustable stop until it just touches the



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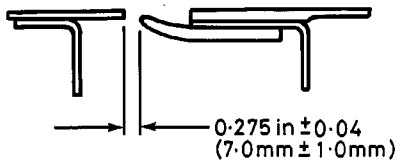

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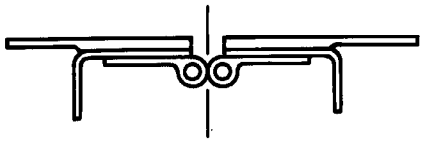

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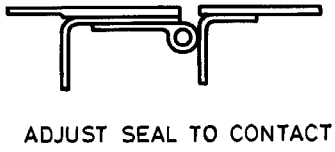

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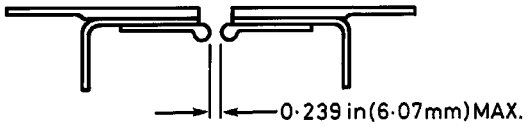
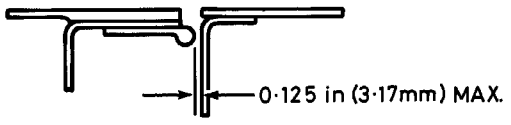


SECTION E-E



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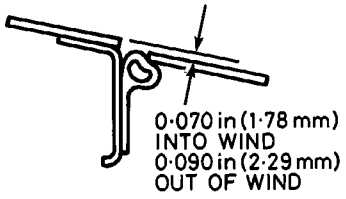

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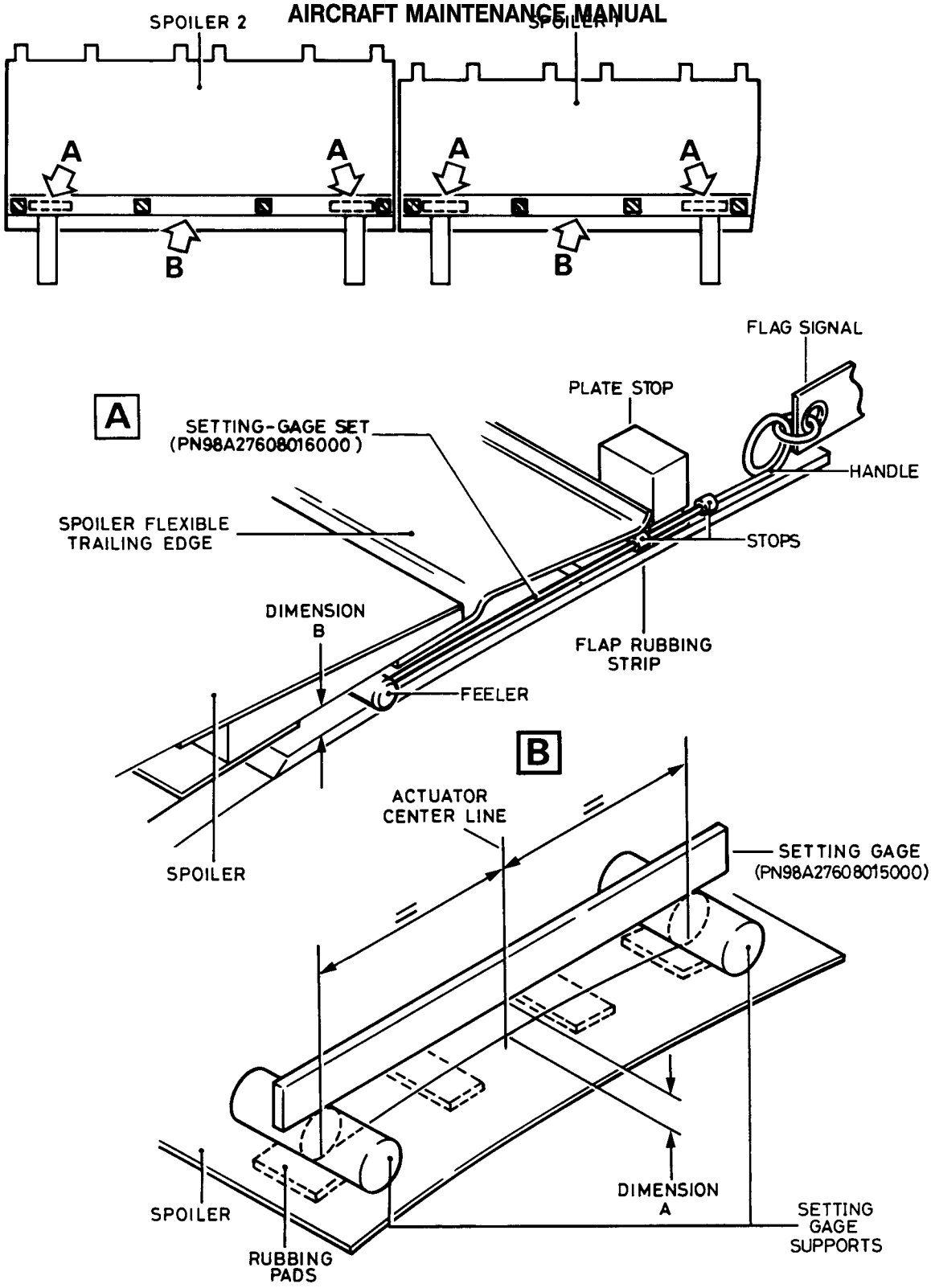
Spoiler Clearances
Figure 403



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Rigging Gages
Figure 404

R

structural bracket. Tighten the locknut and safety with lockwire.
10 Remove the setting-gage set PN 98A27608016000.

(e)If the original spoiler 1 has been installed:
1 Hold spoiler 1 down on the outboard and the inboard adjustable stops and use the feeler of the setting-gage set PN 98A27608016000 to measure the distance between the spoiler lower surface and the flap
R rubbing strip (Dimension B), (Ref. Fig. 404).
2 Make sure that Dimension B is between 6.4 and 6.8 mm (0.25 and 0.27 in) at both the outboard and the inboard locations.
3 If dimension B is incorrect, do the procedures in para 2.C.(7)(d).

(f)If a new spoiler 2 has been installed:
1 Prepare the setting-gage set PN 98A27608016000, with the 8.4 to 8.8 mm (0.33 to 0.35 in) feeler.
2 Cut the lockwire, unscrew the locknuts and retract both of the
R adjustable stops on spoiler 2 (Ref. Fig. 402).
3 Install the setting-gage set PN 98A27608016000, between the flexible metal-trailing-edge of spoiler 2 and the flap rubbing strip, adjacent
R to the outboard adjustable stop (Ref. Fig. 404).
4 Push down on the outboard end of spoiler 2 until the feeler of the setting-gage set is clamped between the lower edge of the spoiler and the upper surface of the flap.
5 Turn the outboard adjustable stop until it just touches the stuctural bracket. Tighten the locknut and safety with lockwire.
6 Remove the setting-gage set PN 98A27608016000.
7 Install the setting-gage set PN 98A27608016000, between the flexible metal-trailing-edge of spoiler 2 and the flap rubbing strip, adjacent to the inboard adjustable stop.
8 Push down on the inboard end of spoiler 2 until the feeler of the setting-gage set is clamped between the lower edge of the spoiler and the upper surface of the flap.
9 Turn the inboard adjustable stop until it just touches the stuctural bracket. Tighten the locknut and safety with lockwire.
10 Remove the setting-gage set PN 98A27608016000.

(g)If the original spoiler 2 has been installed:
1 Hold spoiler 2 down on the outboard and the inboard adjustable stops and use the feeler of the setting-gage set PN 98A27608016000 to measure the distance between the spoiler lower surface and the flap
R rubbing strip (Dimension B), (Ref. Fig. 404).
2 Make sure that Dimension B is between 8.4 and 8.8 mm (0.33 and 0.35 in) at both the outboard and the inboard locations.
3 If dimension B is incorrect, do the procedures in para 2.C.(7)(f).

(h)On panel 133VU, remove safety clips and tags and close FLAPS circuit breakers 10CV(335/R67), 5CV(332/U61) and 6CV(331/V61) 1CV(335/R61) 2CV(334/S62).
(j)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(k)Open safety and tag circuit breakers 10CV(335/R67), 5CV(332/U61), 6CV(331/V61, 2CV(334/S62) 1CV(335/R61).

(8)General (Ref. Fig. 402)
(a)At the actuator attachment, detail A:
1 Apply grease (Material No.04-004) to the outer diameter of the bushes (21) and (26).
2 Install the flanged bush (26) in the spoiler fork-end on the side with the greatest clearance between the actuator eye-end and the spoiler fork-end. Install the bush (21) into the remaining leg of the fork-end.
3 Align the actuator eye-end and the spoiler attachment as follows:
- Disconnect the electrical connector from the valve-group servo-valve (Ref. 27-64-00, P. Block 1). Cap the free connector.
- Connect the control box PN 98A27608011000 to the valve-group electrical connection. Make sure that the selector switch is in the EXTEND position.
- Put the control box ON/OFF switch in the ON position. Make sure that the ON/OFF indicator light comes on.
- Remove the safety collar from the actuator piston.
- Pressurize the hydraulic system (Ref. 29-10-00, P. Block 301):
  - for spoiler 1 - pressurize the Yellow system
  - for spoiler 2 - pressurize the Blue system.
- Make sure that the maintenance device on the valve group goes back to the '0' position.
- Put the control-box selector switch in the RETRACT position.
- De-pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).
- Make sure that the spoiler is on the stops by pressing down on the ends of the spoiler.
- Cut and remove the lockwire and loosen the locknut at the eye-end of the actuator piston rod. Discard the lockwire.
- Turn the actuator eye-end relative to the actuator piston rod, to align the actuator eye-end and the spoiler fork-end attachment. Do not tighten the locknut at this stage.

4 With the guide bullet PN 98A27608010000, install the bolt (20). Remove the guide bullet.
5 Apply grease (Material No.04-004) to the thread of the bolt (20) and the mounting face of the nut (24) and install the washer (23) and the nut (24).
6 With tools SL90.374 - .875 and SL90.313 - .875, TORQUE the nut (24) to between 11 and 12 m.daN (81.0 and 88.5 lbf.ft). Safety with the washer (25) (Ref. 20-21-16, P. Block 1).
7 Apply sealant (Material No.09-003) to the mating face of the anti-rotation plate (19). Install the anti-rotation plate and secure with the pin (22) and the nut (18).

(9)Rigging (Ref. Fig. 404)
(a)Pressurize the applicable hydraulic system, reference paragraph 2. C. (8) (a) 3.
(b)With the spoiler fully retracted put the setting gage PN 98A27608015000 on the upper surface of the spoiler trailing edge, with the gage supports in line with the rubbing pads on the spoiler lower surface.

NOTE : Make sure that the setting gage is used in the correct configuration.

(c)Find the surface bow, make sure that dimension A is within the limits given (Ref. Table 1).

SURFACE NO.	1	2
Dimension A between setting gage and upper surface of spoiler on actuator center line	Between 0.897 and 0.913 in. (22.8 and 23.2 mm)	Between 0.150 and 0.165 in. (3.8 and 4.2 mm)

Table 1

(d)If the bow is incorrect, remove the gage and refer to paragraph 2. D. Adjustment.
(e)If the bow is correct, extend the spoiler. To extend the spoiler put the control-box selector switch in the EXTEND position.
(f)De-pressurize the Blue or Yellow hydraulic system, as applicable (Ref. 29-10-00, P. Block 301).
(g)Turn the maintenance device on the valve group to the maintenance position 'M'.

CAUTION : DO NOT DAMAGE THE FLANGED BUSH (26) AND THE SPOILER FORK-END.

CAUTION : INSUFFICIENT TIGHTENING OF THE PISTON ROD LOCK NUT CAN LEAD TO SERIOUS DAMAGE TO THE ACTUATOR EYE-END.

(h)TORQUE the piston rod locknut to between 133 and 147 lbf.ft (18 and 20 m.daN). Make sure that the locking slot in the threaded end of the rod does not extend beyond the front face of the locknut. Safety the locknut with lockwire.

NOTE : If you use the spanner set PN 98A27608017000 calculate the torque wrench setting as follows:

$$\text{Setting} = \frac{L \times \text{required torque}}{L + L1}$$

where L = Torque wrench length from center of handle to center of square drive
LI = 80 mm (3.15 in.) for tool PN 98A27608017002
= 80 mm (3.15 in.) for tool PN 98A27608017003

(j)Pressurize the applicable hydraulic system, reference paragraph 2. C. (8) (a) 3.
(k)Make sure that the maintenance device on the valve group has gone back to the 'O' position.
(l)Retract the spoiler, to retract the spoiler put the control-box selector switch in the RETRACT position.
(m)De-pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).
(n)Disconnect the control box from the valve group.
(p)Remove the protective cap. Examine for correct condition and connect the aircraft electrical connection to the valve group.

D. Adjustment - Surface Bow (Ref. Fig. 402, 404)

(1)Pressurize the applicable hydraulic system, reference paragraph 2. C. (8) (a) 3.
(2)Extend the spoiler, to extend the spoiler put the control-box selector switch in the EXTEND position.
(3)De-pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Turn the maintenance device on the valve group to the maintenance position 'M'.

CAUTION : ADJUST FOR SURFACE BOW IN SMALL INCREMENTS. INCORRECT ADJUSTMENT OF THE ACTUATOR CAN CAUSE UNACCEPTABLE DEFORMATION OF THE SPOILER.

(5)Loosen the locknut on the actuator and, with a wrench, turn the piston-rod on the actuator counter-clockwise to reduce the surface bow and dimension A (Ref.Table 2).

PISTON TURNED COUNTER-CLOCKWISE	REDUCTION OF SURFACE BOW MEASURED AT SPOILER ACTUATOR CENTER LINE	
	SPOILER 1	SPOILER 2
90 deg	0.134 in (3.4 mm)	0.138 in (3.5 mm)
180 deg.	0.271 in (6.9 mm)	0.275 in (7.0 mm)
270 deg	0.409 in (10.4 mm)	0.413 in (10.5 mm)
360 deg	0.543 in (13.8 mm)	0.551 in (14.0 mm)

Table 2

(6)Tighten the locknut but do not safety it.
(7)Pressurize the applicable hydraulic system, reference paragraph 2. C. (8) (a) 3.
(8)Make sure that the maintenance device on the valve group has gone back to the 'O' position.
(9)Retract the spoiler, to retract the spoiler put the control-box selector switch in the RETRACT position.
(10)Put the setting gage on the upper surface of the spoiler trailing edge, with the gage supports in front of the fasteners for the outer rubbing pads.

NOTE : Make sure that the setting gage is used in the correct configuration.

(11)Measure the distance between the upper surface of the spoiler and the lower edge of the setting gage, dimension A, to find the surface bow (Ref.Table 1).
(12)If the bow is incorrect, remove the gage and do paragraph 2. D. (1) thru (11) again until the surface bow is correct.
(13)When the surface bow is correct, do paragraph 2. C. (9) (h).
(14)De-pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).
(15)Disconnect the control box from the valve group.
(16)Remove the protective cap. Examine for correct condition and connect the aircraft electrical connection to the valve group.
(17)On panel 133VU, remove safety clips and tags and close circuit breakers 2CV(334/S62), 1CV(233/R61), 6CV(331/V61), 5CV(332/V61) and 10CV(335/R67).

E. Test

ACTION	RESULT
1. On panel 428VU: - release SPLR & SPD BRK 4 & 1 and 3 & 2 pushbutton switches.	On panel 428VU: - OFF/R legends come on - spoilers 1, 2, 3 and 4 are held in the retracted position.
2. Fully extend spoilers 1 and 2 by hand (Ref. 27-60-00, P. Block 301).	- spoilers 1 and 2 are extended to full deflection.
R 3. Measure deflection of spoilers 1 and 2.	- spoilers 1 and 2 deflection is 70 deg.
4. Fully retract spoilers 1 and 2 by hand (Ref. 27-60-00, P. Block 301).	- spoilers 1 and 2 are retracted onto their stops.
5. Make certain spoilers abut seals along box ribs.	
6. On panel 428VU: - press in SPLR & SPD BRK 4 & 1 and 3 & 2 pushbutton switches.	On panel 428VU: - OFF/R legends are off - spoilers 4 & 1 and 3 & 2 control systems are activated.
7. Do a functional test of the speed brakes (Ref. 27-61-00, P. Block 501).	

F. Close-Up

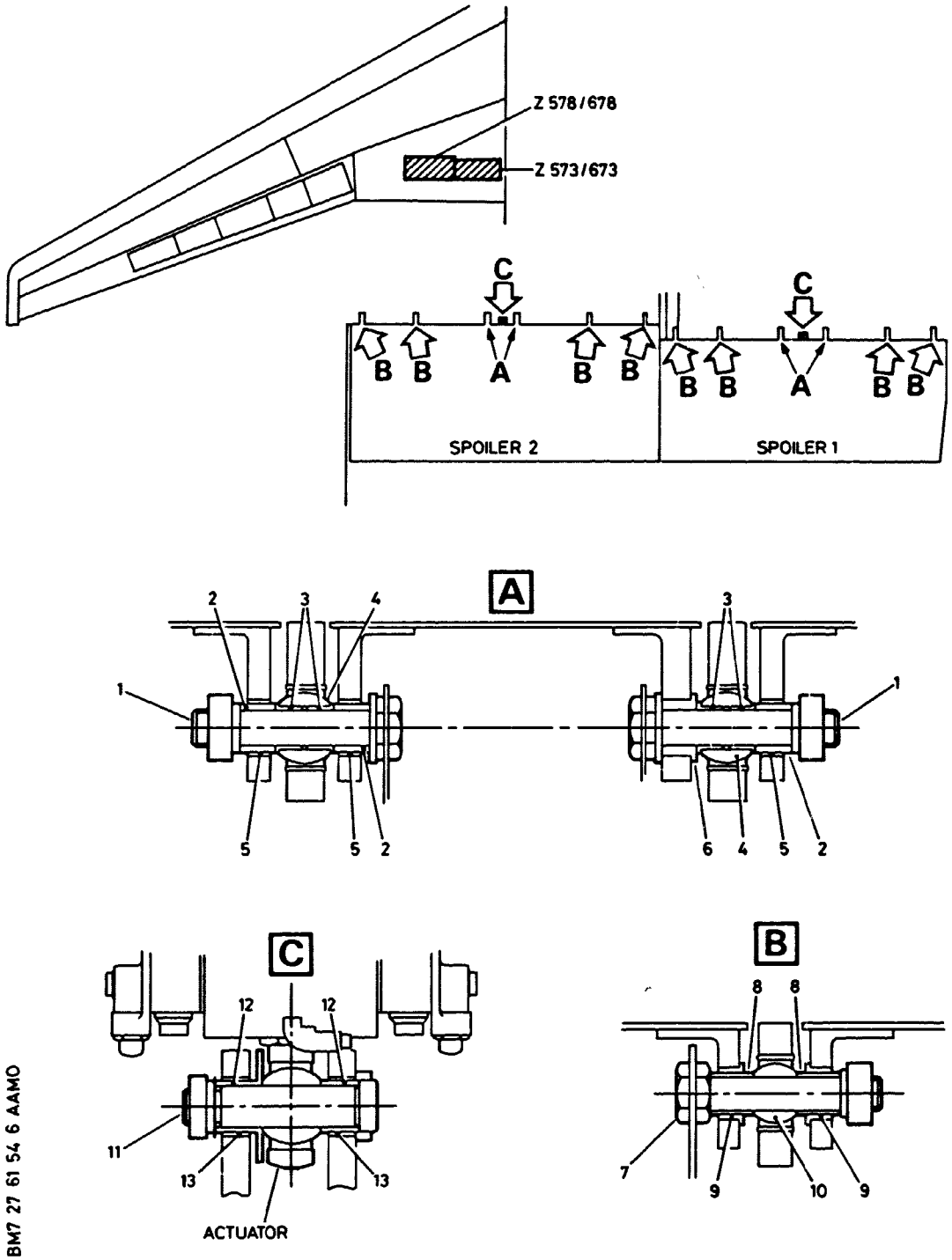
(1)Fully retract flaps (Ref.27-50-00, P. Block 301).
(2)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(3)Remove warning notices.
(4)Close access doors 572(672)BB and 572(672)DB as applicable.
(5)Remove access platform.
(6)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

1. Reason for the Job

A. Check of fits and clearances
With removal - Table of Fits and Clearances
(Ref. Fig. 601)
NOTE : Limits annotated with an asterisk *, only apply while there is a thickness of chrome plating remaining on the bearing surfaces.

Detail and Item No.	Original Mfg Limits: Dimension inches (Millimeters) Min.	Original Mfg Limits: Dimension inches (Millimeters) Max.	Original Mfg Limits: Assy. Clearance Inch.(Milli.) Min.	Original Mfg Limits: Assy. Clearance Inch.(Milli.) Max.	In Service Wear Limits: Dimension Limits Inch.(Milli.) Min.	In Service Wear Limits: Dimension Limits Inch.(Milli.) Max.	In Service Wear Limits: Max. Allow clear in. (mm)
A							
OD1	0.6242 (15.855)	0.6247 (15.867)			0.6235 (15.837)		
			0.0003 (0.008)	0.0020 (0.051)	*		0.0040 (0.102)
ID2	0.6250 (15.875)	0.6262 (15.905)				0.6275 (15.939)	
OD1	0.6242 (15.855)	0.6247 (15.867)			0.6235 (15.837)		
			0.0003 (0.008)	0.0015 (0.038)	*		0.0040 (0.102)
ID3	0.6250 (15.875)	0.6260 (15.893)				0.6275 (15.939)	
OD1	0.6242 (15.855)	0.6247 (15.867)			0.6235 (15.837)		
			0.0003 (0.008)	0.0018 (0.046)	*		0.0040 (0.102)
ID6	0.6250 (15.875)	0.6260 (15.900)				0.6275 (15.939)	
OD2	0.8742 (22.205)	0.8747 (22.217)			0.8735 (22.187)		
			0.0003 (0.008)	0.0020 (0.051)			0.0040 (0.102)
ID5	0.8750 (22.225)	0.8762 (22.255)				0.8775 (22.289)	

Detail and Item No.	Original Mfg Limits: Dimension inches (Millimeters) Min.	Original Mfg Limits: Dimension inches (Millimeters) Max.	Original Mfg Limits: Assy. Clearance Inch.(Milli.) Min.	Original Mfg Limits: Assy. Clearance Inch.(Milli.) Max.	In Service Wear Limits: Dimension Limits Inch.(Milli.) Min.	In Service Wear Limits: Dimension Limits Inch.(Milli.) Max.	In Service Wear Limits: Max. Allow clear in. (mm)
OD3	0.7471 (18.976)	0.7487 (19.017)			0.7460 (18.948)		
			0.0008 (0.020)	0.0029 (0.074)			0.0055 (0.140)
ID4	0.7495 (19.037)	0.7500 (19.050)				0.7515 (19.088)	
B							
OD7	0.4991 (12.677)	0.4995 (12.687)			0.4985 (12.662)		
			0.0005 (0.013)	0.0016 (0.041)	*		0.0035 (0.089)
ID8	0.5000 (12.700)	0.5007 (12.718)				0.5020 (12.751)	
OD7	0.4991 (12.677)	0.4995 (12.687)			0.4985 (12.662)		
			0.0000 (0.000)	0.0009 (0.023)	*		0.0025 (0.064)
ID10	0.4995 (12.687)	0.5000 (12.700)				0.5010 (12.725)	
OD8	0.6243 (15.857)	0.6247 (15.867)			0.6235 (15.837)		
			0.0003 (0.008)	0.0017 (0.043)			0.0035 (0.089)
ID9	0.6250 (15.875)	0.6260 (15.900)				0.6270 (15.926)	
C							
OD11	0.9980 (25.350)	0.9993 (25.381)			0.9970 (25.324)		
			0.0002 (0.007)	0.0020 (0.050)			0.0040 (0.102)
ID12	0.9995 (25.388)	1.0000 (25.400)				1.0010 (25.425)	
OD12	1.2492 (31.730)	1.2496 (31.741)			1.2480 (31.699)		
			0.0004 (0.009)	0.0018 (0.046)			0.0040 (0.102)
ID13	1.2500 (31.750)	1.2510 (31.775)				1.2520 (31.801)	



Spoilers 1 and 2
Figure 601

SPOILERS 1 AND 2 - DEACTIVATION/REACTIVATION

Ref. MMEL Sect. 1-27 Item 1

CAUTION : THIS PROCEDURE IS TO BE USED IN ACCORDANCE WITH THE REQUIREMENTS OF THE MMEL.

WARNING : LANDING GEAR - MAKE SURE THAT THE GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE SURE THAT THE GROUND SAFTIES AND NOTICES ARE IN POSITION.

FLIGHT CONTROLS - MAKE SURE THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

HYDRAULICS - BEFORE YOU PRESSURIZE THE SYSTEM, MAKE SURE THAT THE CONTROL SURFACE POSITIONS AND THE FLIGHT CONTROL POSITIONS ARE THE SAME.

MAKE SURE THAT YOU ISOLATE THE ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS.

1. Deactivation

A. Reason for the Job
(1)Deactivation of the spoiler servo control.

B. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Warning Notices - that prevent the use of Hydraulic, Flap, Slat and Spoiler Systems
C.	Warning Notice - Specified Defective Spoiler(s) are OFF and must stay OFF
D.	Circuit Breaker Safety Clips and Tags
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-64-12, P. Block 401	Speedbrake Valve Groups (Surfaces 1 & 2)
R - 27-65-00, P. Block 1	Control Surface Position Indicating
- 29-10-00, P. Block 301	Main Hydraulic Power

C. Deactivation Of Inoperative Spoiler(s)

CAUTION : TOTAL NUMBER OF INOPERATIVE SPOILER SURFACES AFTER DEACTIVATION MUST NOT EXCEED TWO SURFACES PER WING.

CAUTION : DO NOT DO THIS DEACTIVATION PROCEDURE IF THERE IS EXTERNAL LEAKAGE ON THE UNSERVICEABLE SERVO-CONTROL. AN EXTERNAL LEAKAGE CAUSES AN UNSERVICEABLE HYDRAULIC SYSTEM.

(1)Energize the aircraft electrical network and make sure that the electronic racks are ventilated (Ref. 24-41-00, P. Block 301).
(2)Set, the defective Spoiler, pushbutton on the overhead flight control panel 428VU to OFF.
(3)Install warning notices on the Captain and First Officer's instrument panels to warn pilots that the specified defective spoiler(s) are OFF and must stay OFF.
(4)Check the defective Spoiler position on the SD F/CTL page on the right
R ECAM display unit (Ref. 27-65-00, P. Block 1):
- if the defective spoiler is extended go to Para. (5)
- if the defective spoiler is retracted go to Para. (6).
(5)If necessary retract the defective spoiler as follows:
(a)Make sure that there is no hydraulic leak on the relevant servo controls.
(b)Fully extend flaps (Ref. 27-50-00, P. Block 301), to clear under-wing spoiler access panels.
(c)Make sure that the relevant hydraulic system is depressurized (Ref. 29-10-00, P. Block 301):
- Spoiler 1 (Yellow)
- Spoiler 2 (Blue).
(d)Install warning notice(s) that prevent the use of the hydraulic, flap, slat and spoiler systems.
(e)Put the access platform in position.
(f)Open the relevant access doors:
- Spoiler 1 : 572BB (672BB)
- Spoiler 2 : 572DB (672DB).
(g)Open, safety and tag the circuit breakers that follow:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR 1 & 4	53CP	334/S63
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR 2 &3	5CP	335/R63
133VU	FLT CTL/LAND RECOVERY SUPPLY/SPLR 1 & 4 & 6 & 7	54CP	334/S67
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 2 & 3	8CP	333/T62
133VU	FLT CTL/EFCU/LAND RECOVERY SUPPLY/ SPLR 1 & 4	72CP	333/T67
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/FLAPS/ SYS 1	10CV	335/R67
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61

(h)At the relevant access door in the wings:
- Spoiler 1 : 572BB (672BB)
- Spoiler 2 : 572DB (672DB)

locate the spoiler valve group and use a spanner to turn the maintenance device on the affected valve group to 'M' position,
R (Ref. 27-64-12, P. Block 401).

(j)Manually retract the defective spoiler.

(k)Reset the maintenance device by turning the spanner to 'O' position.

(l)Make sure that the work area is clean and clear of tools and all other items of equipment.

(m)Close the relevant access doors:
- Spoiler 1 : 572BB (672BB)
- Spoiler 2 : 572DB (672DB).

(n)Remove the access platform.

(p)On panel 133VU, remove safety clips and tags and close circuit breakers 53CP(334/S63), 5CP(335/R63), 54CP(334/S67), 8CP(333/T62), 72CP(333/T67), 2CV(334/S62), 6CV(331/V61), 5CV(332/U61), 10CV(335/R67), 1CV(335/R61) and 71CP(331/V62).

(q)Remove warning notice(s) that prevent the use of the hydraulic, flap, slat and spoiler systems.

(r)Fully retract the flaps (Ref. 27-50-00, P. Block 301).

(6)Check that the deactivated spoilers are OFF as follows:

(a)Pressurize the three hydraulic systems (Ref. 29-10-00, P. Block 301). Set ELEC PUMP and PTUs as required.

(b)On the flight controls center pedestal, panel 9VU, slowly set Speedbrake lever to half position.

(c)Check on the SD F/CTL page on the Right ECAM Display Unit, that the inoperative spoiler(s) remain in the retracted position.

(d)On the flight controls center pedestal, panel 9VU, slowly set the Speedbrake lever to RET.

(e)Slowly give roll left then right order whilst checking the SD F/CTL page on the Right ECAM Display Unit that the deactivated spoiler surfaces remain in the retracted position.

(7)Close-Up

R (a)Depressurize the three hydraulic systems (Ref. 29-10-00, P. Block 301).
R Set the ELEC PUMP and PTUs to off.

R (b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R (c)Do not remove the warning notices on the Captain and the First Officer's instrument panels to warn the pilots that the specified defective spoilers are OFF and must stay OFF.

R (d)Make an appropriate entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM		DESIGNATION
R	A.	Warning notices - that prevent the use of Hydraulic, Flap, Slat and Spoiler System
	Referenced Procedures	
	- 24-41-00, P. Block 301	AC External Power Control
	- 27-60-00, P. Block 301	Spoilers and Speedbrakes
	- 27-61-00, P. Block 1	Electrical and Mechanical Control
R	- 27-65-00, P. Block 1	Control Surface Position Indicating
	- 29-10-00, P. Block 301	Main Hydraulic Power
R	- TSM 27-61-00	Fault Isolation

B. Procedure

(1)Job Set-Up

(a)Energize aircraft electrical network and make sure that the electronics racks are ventilated (Ref. 24-41-00, P. Block 301).

(b)Install warning notice(s) that prevent the use of the hydraulic, flap, slat and spoiler systems.

(c)Pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).

R (d)Identify any defective spoiler surfaces:

- by visual identification of warning notices in the flight compartment and check the SD F/CTL page on the Right ECAM Display Unit (Ref. 27-65-00, P. Block 1).

(2)Fault Isolation

(a)Release-out pushbutton(s) on the overhead flight control panel 428VU associated with defective spoiler surface(s) (set to OFF during spoiler deactivation).

(b)Do the trouble-shooting procedure (Ref. TSM 27-61-00).

(3)Test

(a)Reset the appropriate EFCU BITE display (Ref. 27-61-00, P. Block 1).

(b)Make sure that the spoilers are fully retracted (Ref. 27-60-00, P. Block 301).

(c)Fully extend the spoilers and make sure that the spoiler deflection is at least 51 deg.

(d)Fully retract the spoilers (Ref. 27-60-00, P. Block 301).

R (e)De-pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).

R (f)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(4)Close-Up.

(a)Make sure that the work area is clean and clear of tools and all other items of equipment.

R (b)Remove the warning notices from the Captain and First Officer's instrument panels to warn pilots that the specified defective spoiler(s) are OFF and must stay OFF.

R (c)Remove the warning notices that prevent the use of the hydraulic, flap, slat and spoiler systems.

R (d)Make appropriate entries in the aircraft technical log.

HYDRAULIC ACTUATION (SPOILERS AND SPEEDBRAKES)
DESCRIPTION AND OPERATION

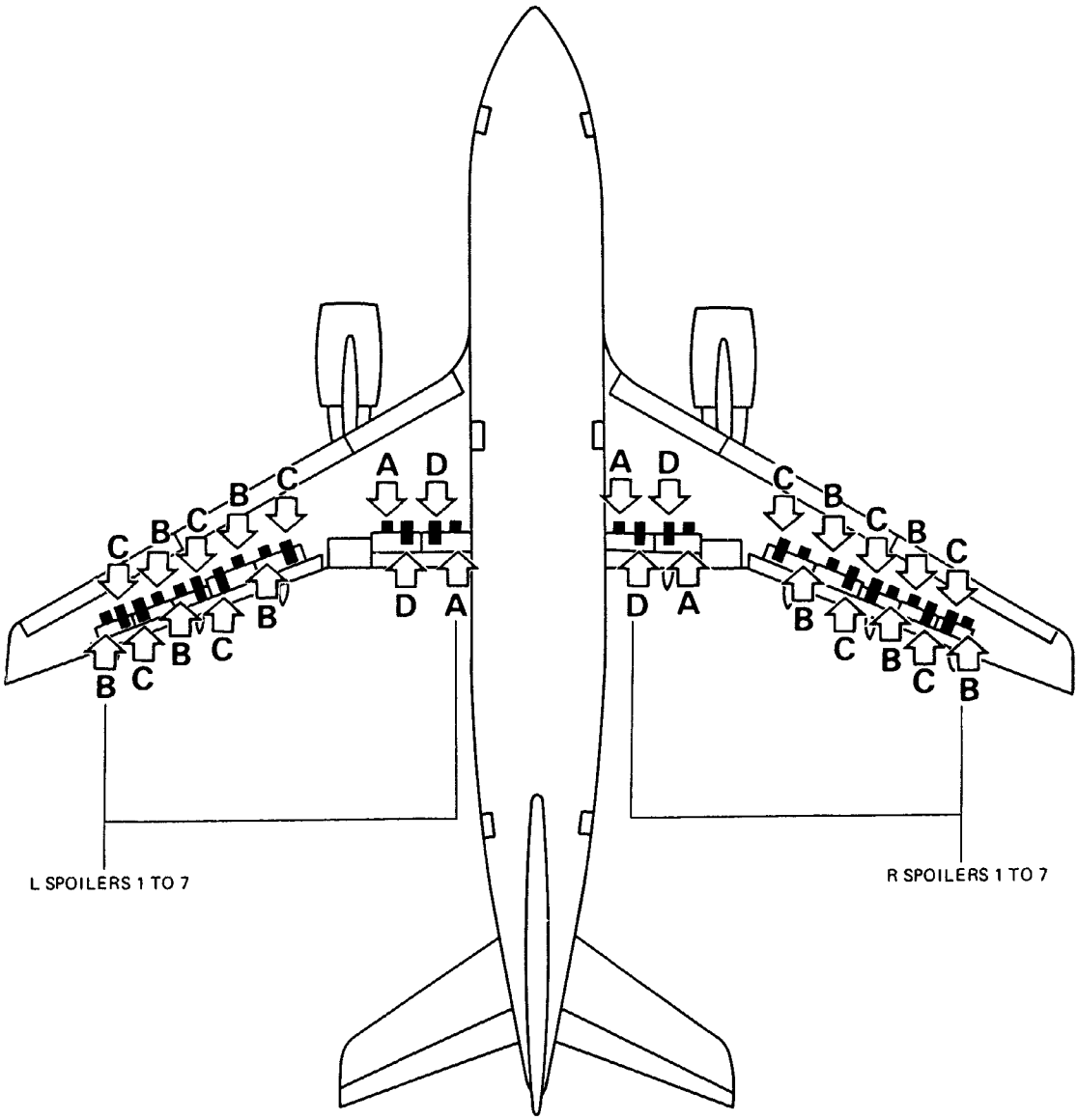
1. General

This section covers hydraulic actuation of spoilers 1 through 7.

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	22CP	ACTUATOR-SPLR3, R		681	681CB	27-64-14
	23CP	ACTUATOR-SPLR3, L		581	581CB	27-64-14
	24CP	ACTUATOR-SPLR6, R		681	681GB	27-64-14
	25CP	ACTUATOR-SPLR6, L		581	581GB	27-64-14
	26CP	ACTUATOR-SPLR7, R		681	681JB	27-64-14
	27CP	ACTUATOR-SPLR7, L		581	581JB	27-64-14
	30CP	VALVE GROUP-SPLR3, R		681	681CB	27-64-13
	31CP	VALVE GROUP-SPLR3, L		581	581CB	27-64-13
	32CP	VALVE GROUP-SPLR6, R		681	681GB	27-64-13
	33CP	VALVE GROUP-SPLR6, L		581	581GB	27-64-13
	34CP	VALVE GROUP-SPLR7, R		681	681JB	27-64-13
	35CP	VALVE GROUP-SPLR7, L		581	581JB	27-64-13
	60CP	ACTUATOR-SPLR4, R		681	681DB	27-64-14
	61CP	ACTUATOR-SPLR4, L		581	581DB	27-64-14
	62CP	ACTUATOR-SPLR5, R		681	681FB	27-64-14
	63CP	ACTUATOR-SPLR5, L		581	581FB	27-64-14
	66CP	VALVE GROUP-SPLR4, R		681	681DB	27-64-13
	67CP	VALVE GROUP-SPLR4, L		581	581DB	27-64-13
	68CP	VALVE GROUP-SPLR5, R		681	681FB	27-64-13
	69CP	VALVE GROUP-SPLR5, L		581	581FB	27-64-13
	10CS	ACTUATOR-SPLR2, R		672	672DB	27-64-11
	11CS	ACTUATOR-SPLR2, L		572	572DB	27-64-11
	12CS	ACTUATOR-SPLR1, R		672	672BB	27-64-11
	13CS	ACTUATOR-SPLR1, L		572	572BB	27-64-11
R	14CS	VALVE GROUP-SPLR1, R		672	672DB	27-64-12
R	15CS	VALVE GROUP-SPLR1, L		572	572DB	27-64-12
R	16CS	VALVE GROUP-SPLR2, R		672	672BB	27-64-12
R	17CS	VALVE GROUP-SPLR2, L		572	572BB	27-64-12



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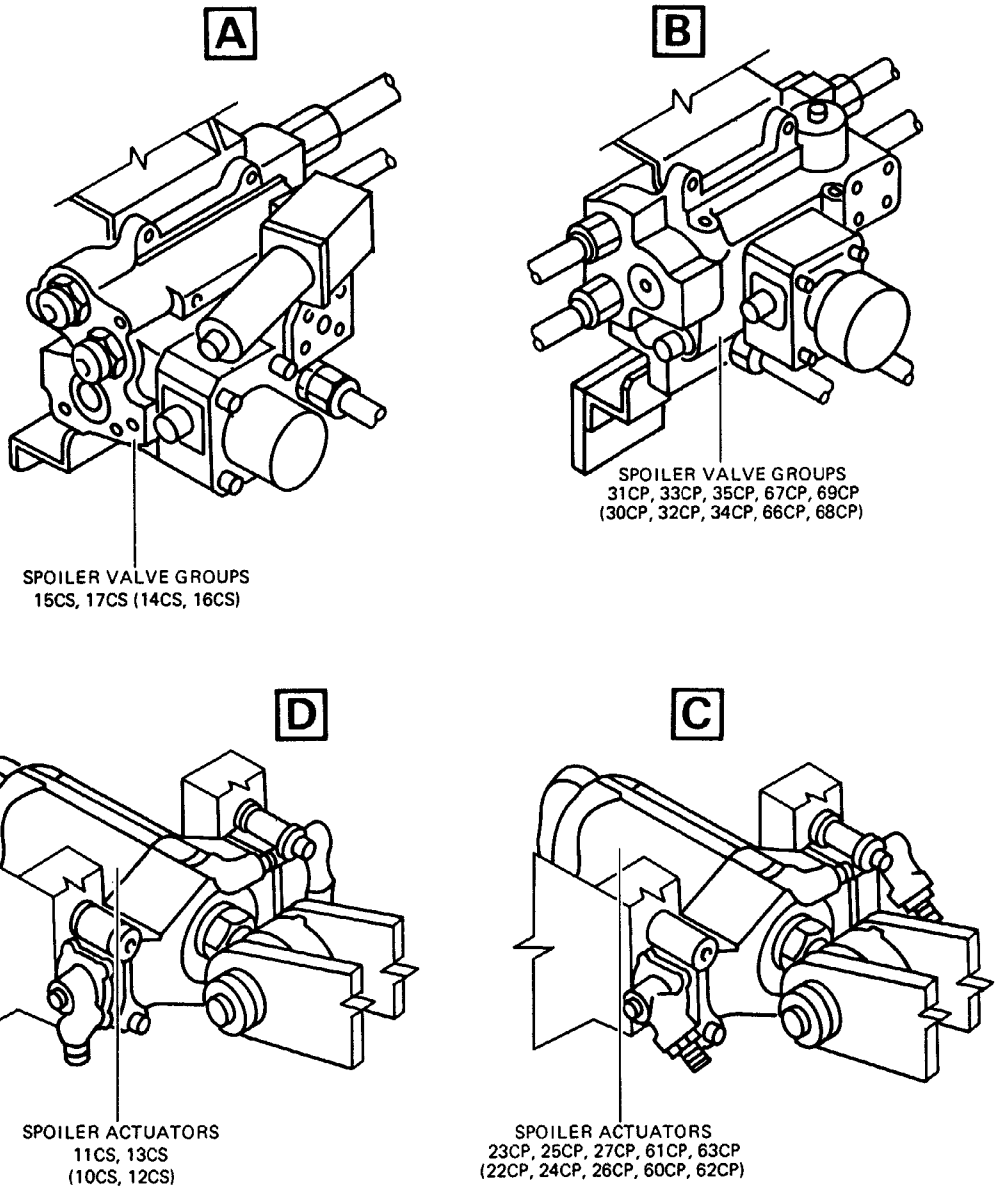
Component Location
Figure 001



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Component Location
Figure 002

3. Component Description

A. Actuator and Valve Group - Spoilers 1 and 2
(Ref. Fig. 003, 004)

(1)General

Spoilers 1 and 2 are each actuated by one actuator which receives control inputs from a separate valve group.

Actuators 1 and 2 are interchangeable and identical to spoiler actuators 3 and 4.

The four speedbrake valve groups are interchangeable but valve groups 1 and 2 are provided with a solenoid valve.

(2)Normal operation, with the actuator and valve group pressurized. In this case, solenoid valve (10) is not energized. High pressure therefore passes through it and is applied to valve (9). High pressure is also applied to bypass valve (2) and plunger (5) which opens closing valve (3), thus allowing servovalve services to be connected to the two chambers.

Operation is then identical to that of spoilers 3 thru 7 actuators and valve groups.

(3)Operation after an electrical failure. In this case, the servovalve input signal is nulled. This biases the servovalve in order to make the piston rod retract.

(4)Operation after a servovalve failure. In this case, solenoid valve (10) is energized and is connected to return. Valve (9) is returned by its spring. High pressure is then applied to chamber (C2) through bypass valve (2), valve (9) and closing valve (3) successively. Chamber (C1) is connected to return through retraction valve (9) and pressure increasing valve (4). The piston rod therefore retracts, even if a servovalve mechanical failure causes control valve to be incorrectly positioned.

This is not the case for spoiler 3 and 4 actuators and valve groups.

(5)Operation after a hydraulic failure or operation with the actuator and valve group depressurized.

Same as for spoiler 3 through 7 actuators and valve groups.

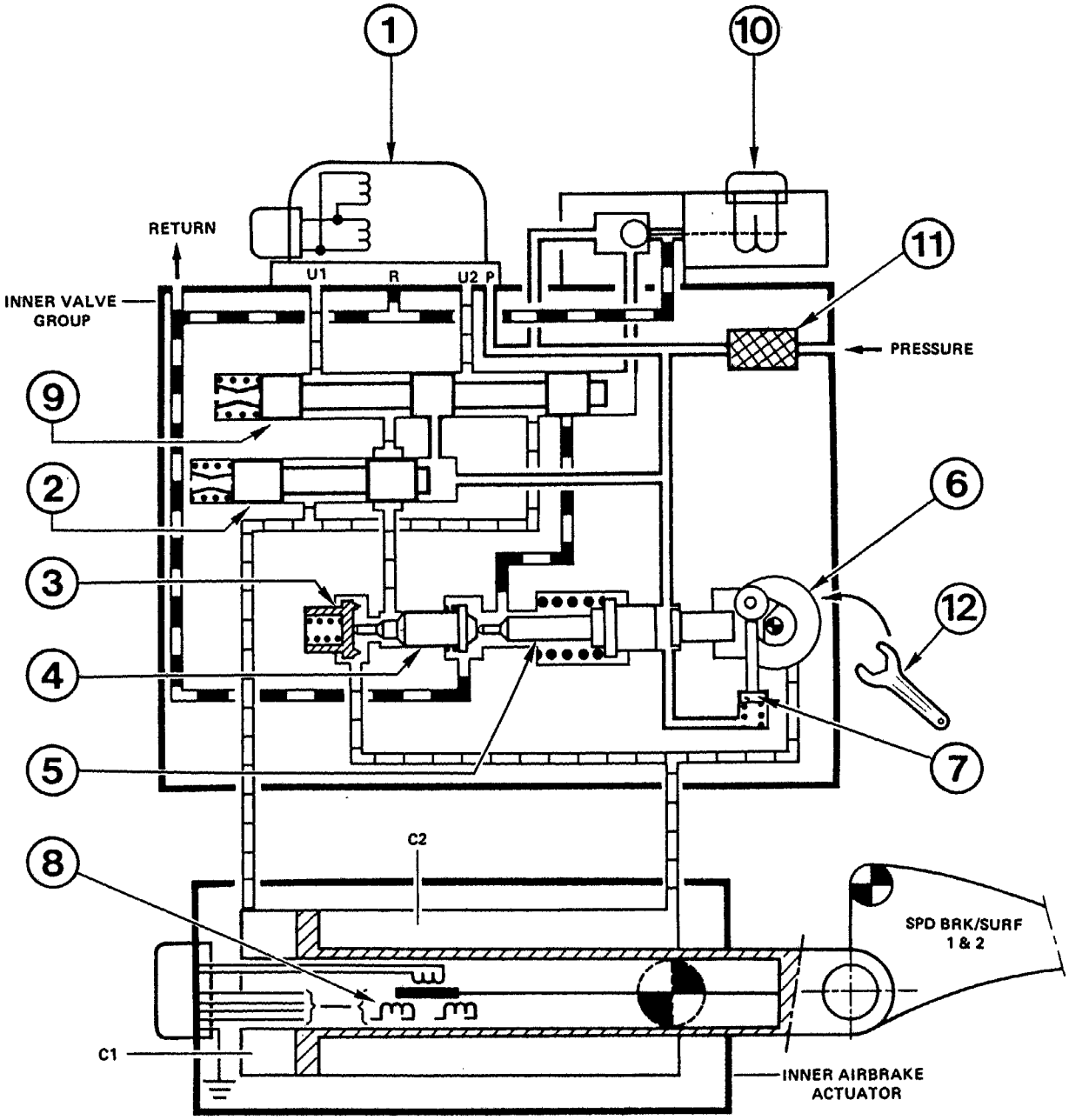
(6)Operation on the ground, with the actuator and valve group depressurized

- In the event of thermal overpressure in the small chamber, this chamber is unlocked via plunger (5) which causes valve (3) to open.
- In order to enable ground maintenance operations to be performed, the small chamber can also be unlocked manually by means of crank lever (6) and maintenance wrench (12).

CAUTION : UNLOCKING IS AUTOMATICALLY CANCELLED BY PISTON (7) WHEN THE ACTUATOR AND VALVE GROUP ARE PRESSURIZED.

(7)Maintenance & rigging facilities

Same as for spoiler 3 thru 7 actuators and valve groups except that there is an additional Line Replaceable Unit, the solenoid valve.



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1 – SERVO VALVE
2 – BYPASS VALVE
3 – CLOSING VALVE
4 – PRESSURE INCREASING VALVE
5 – PLUNGER
6 – MAINTENANCE UNLOCKING CRANK LEVER
7 – PRESSURE CONTROLLED PISTON
8 – FEEDBACK TRANSDUCER (LVDT)
9 – ACTUATOR RETRACTION VALVE
10 – SOLENOID VALVE
11 – FILTER
12 – MAINTENANCE WRENCH

Actuator & Valve Group - Spoilers 1 and 2
Figure 003

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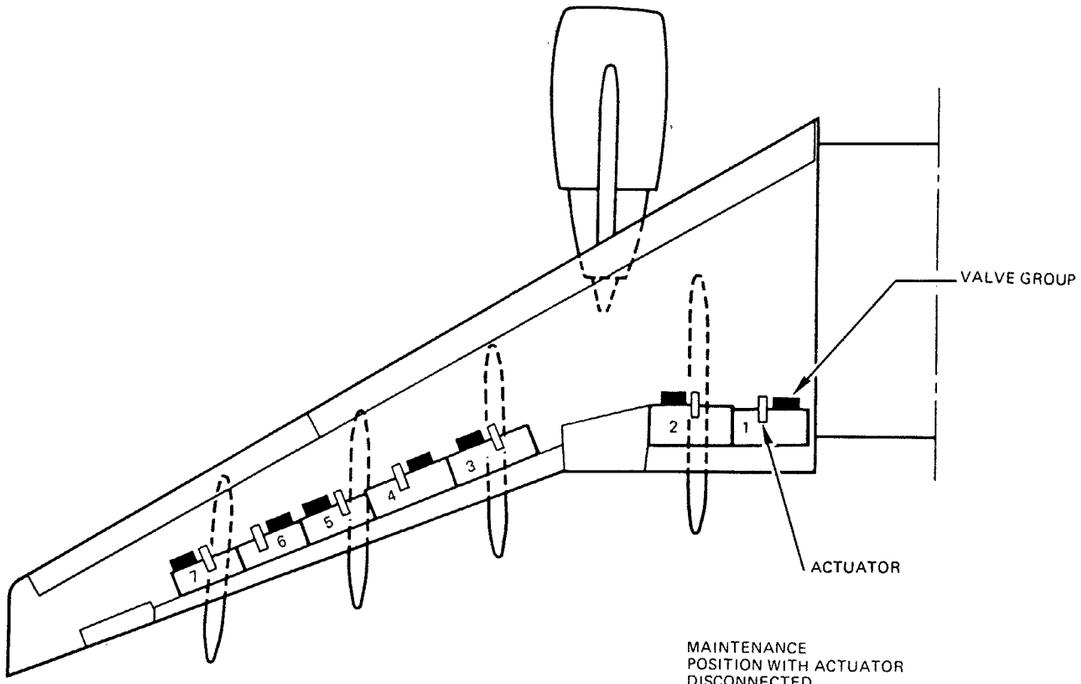
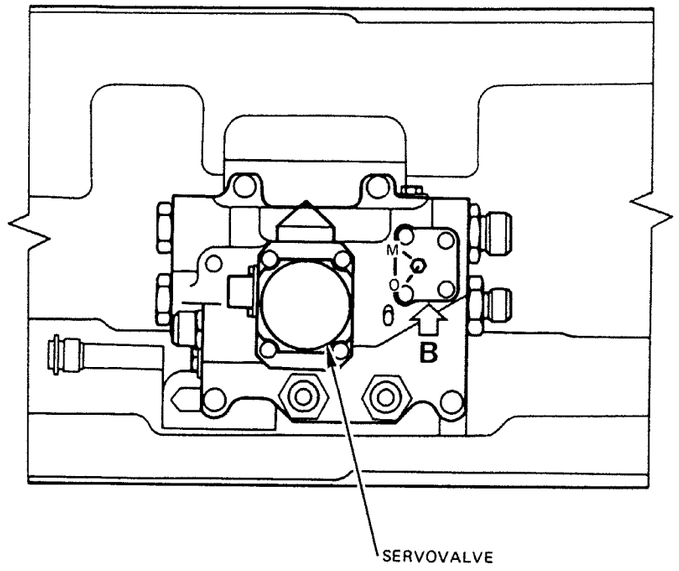
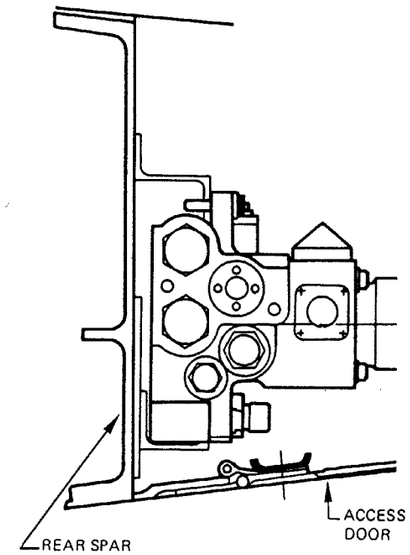
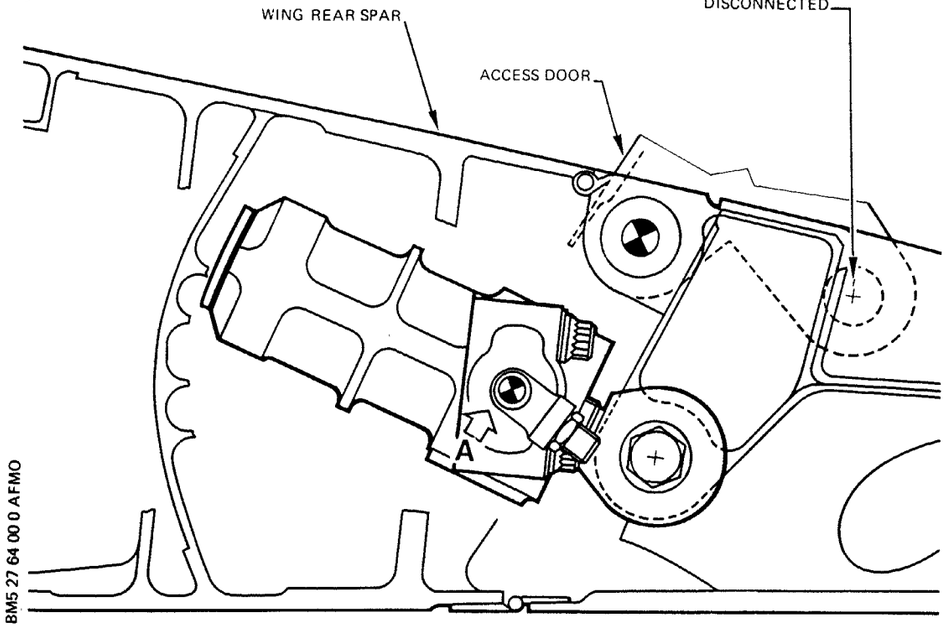
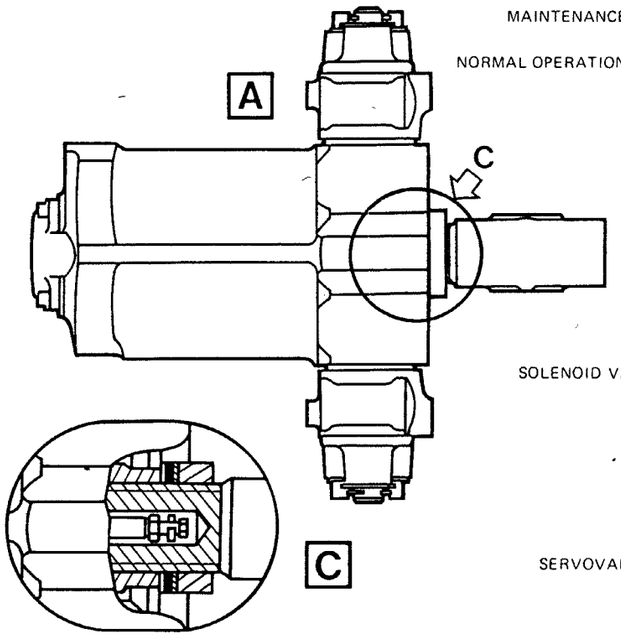


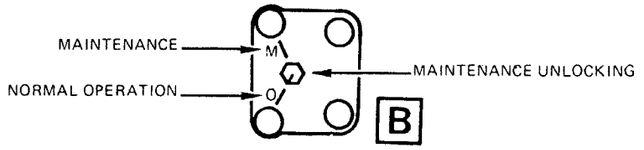




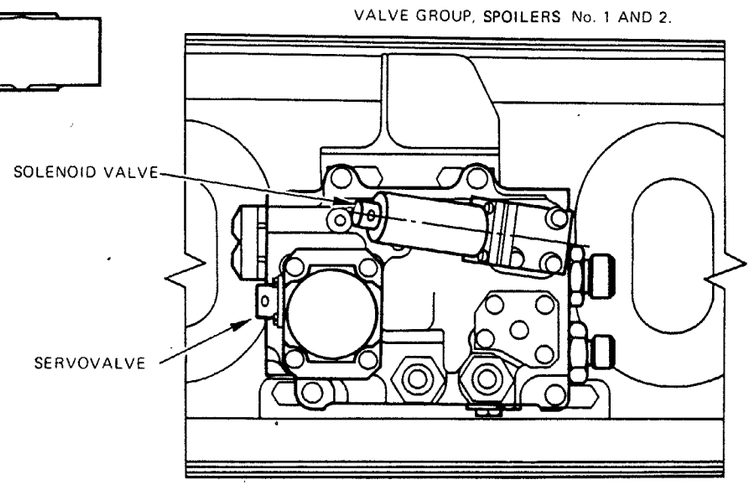
VALVE GROUP, SPOILERS No. 3 THROUGH 7







VALVE GROUP, SPOILERS No. 1 AND 2.



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Spoiler Actuator and Valve Group - Location
Figure 004

(8)Leading particulars
(a)Mechanical
Piston area
. Large----------51.5 cm² (7.98 in.²)
. Small----------39.2 cm² (6.07 in.²)
Stall load (for HP : 200 bars/2900 psi and
LP : 5 bars/73 psi, and no friction)
. Extension----------10,104 daN (22,756 lbf.)
. Retraction----------7583 daN (17,078 lbf.)
Operating stroke----------
corresponding to a spoiler extension of 50° :
. Spoiler 1----------54.9 mm
. Spoiler 2----------69.8 mm
Stop-to-stop stroke----------74 mm (2.91 in.)
Weight (filled with fluid)
. Valve group----------3.1 kg (6.83 lb.)
. Actuator----------8.5 kg (18.74 lb.)
(b)Hydraulic
Maximum speed without external load, in
degrees/s of surface deflection----------50°/s
corresponding to a maximum flow of :------
R for HP : 17 l/min (spoiler 1) 21.6 l/min (spoiler 2)
R LP : 12.9 l/min (spoiler 1) 16.5 l/min (spoiler 2)
Maximum internal leakage
R . When new----------0.5 l/min
R . After 10 000 flight hours----------1 l/min
Maximum external leakage
. When new----------0 drop
R . After 10 000 flight hours----------Nil
(c)Electrical
L V D T supply----------26V-400 Hz
Solenoid valve supply----------28VDC
Servovalve characteristics----------(Ref. 27-61)

B. Actuator and Valve Group - Spoilers 3 Through 7
(Ref. Fig. 005, 004)

(1) General

Each spoiler is actuated by one actuator, which receives control inputs from one valve group.

Each valve group is installed separate from its actuator, the hydraulic connection being made by two rigid pipes.

The valve groups are identical for all spoilers 3 through 7 but there are two sizes of actuators :

- A smaller one for spoilers 5, 6, 7
- A larger one for spoilers 3 and 4.

(2) Normal operation with the actuator and valve group pressurized

The piston rod is controlled by servovalve (1), feedback being achieved via linear variable differential transducer (LVDT) (8).

The servovalve has a biased zero : when the input signal is equal to electrical zero, its spool valve is open at 50% of its max stroke and connects the small chamber supply line to the high pressure.

When the spoilers are at neutral, they are held against their stops by nulling the current of the servovalve, which then feeds high pressure into the small chamber and applies the piston rod to its internal retraction stop.

(3) Operation after an electrical failure

In this case, the servovalve input signal is nulled. This biases the servovalve in order to make the piston rod retract.

(4) Operation after an hydraulic failure

When pressure drops :

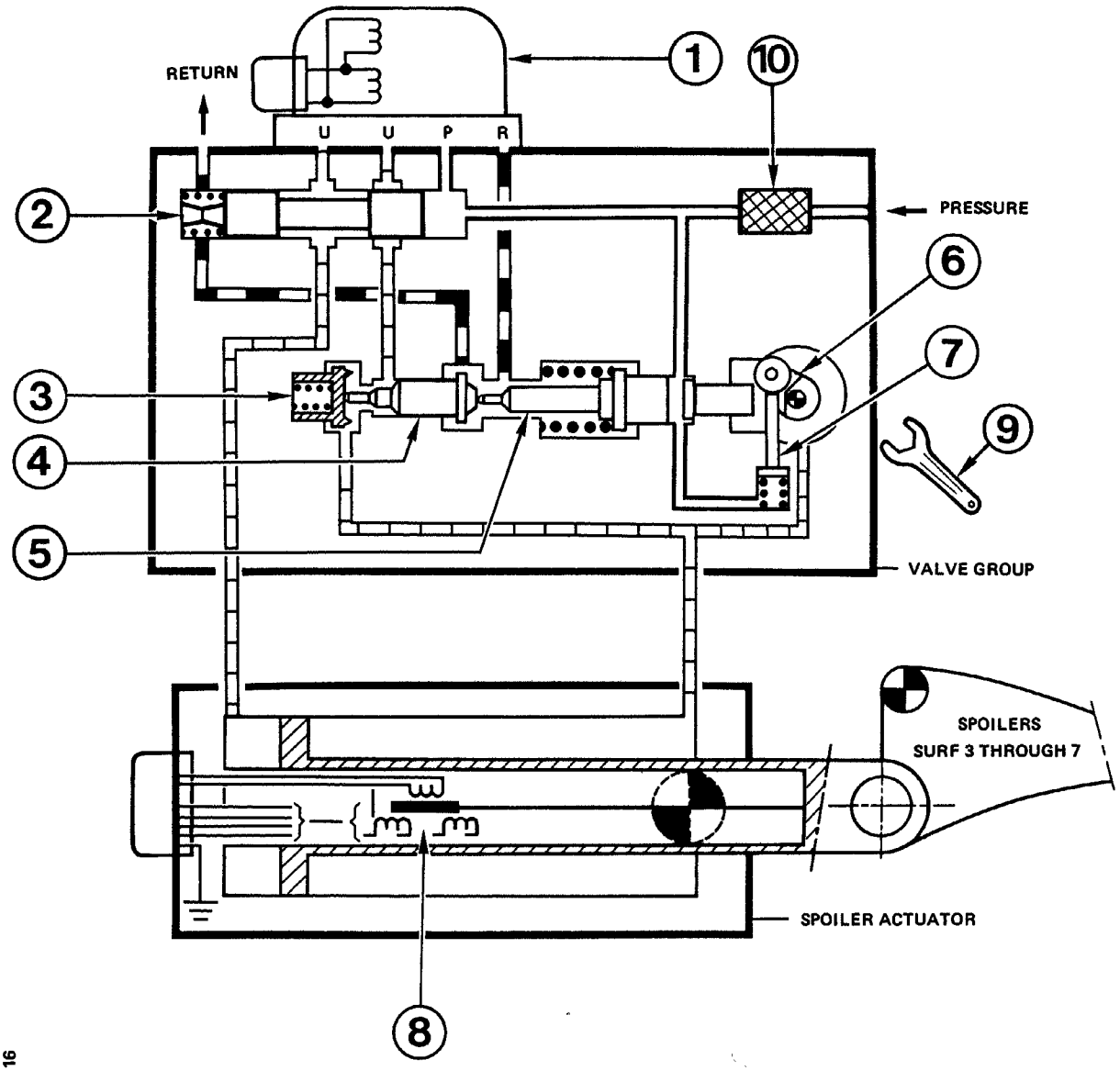
- Plunger (5) frees valve (3) which closes thus preventing extension of the piston rod.
- Bypass valve (2) is displaced rearwards by its spring. This isolates the servovalve from high pressure, thus biasing its spool valve and allowing the two chambers of the actuator to be interconnected in retraction direction via valve (3). The large chamber is connected to return by the biased servovalve.

  The actuator can then be retracted by external forces, valve (4) preventing any depression in the small chamber by increasing the return line pressure.

(5) Operation on the ground, with the actuator and valve group depressurized

- In the event of thermal overpressure in the small chamber, this chamber is unlocked via plunger (5) which causes valve (3) to open.
- In order to enable ground maintenance operations to be performed, the small chamber can also be unlocked manually by means of crank lever (6) and maintenance wrench (9).

CAUTION : UNLOCKING IS AUTOMATICALLY CANCELLED BY PISTON (7) WHEN THE ACTUATOR AND VALVE GROUP ARE PRESSURIZED.



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1 – SERVOVALVE
2 – BYPASS VALVE
3 – CLOSING VALVE
4 – PRESSURE INCREASING VALVE
5 – PLUNGER
6 – MAINTENANCE UNLOCKING CRANK LEVER
7 – PRESSURE CONTROLLED PISTON
8 – FEED BACK TRANSDUCER (LVDT)
9 – MAINTENANCE WRENCH
10 – FILTER

Actuator and Valve Group - Spoilers 3 Through 7
Figure 005

(6)Maintenance & rigging facilities
Maintenance is "ON CONDITION"
The following items are Line Replaceable Units :
- filter
- servovalve.
The length of the actuator piston rod is adjustable in order to allow the spoiler neutral position to be achieved when the actuator piston rod is fully retracted.

(7)Leading particulars
(a)Spoilers 5 through 7
1 Mechanical
Piston area :
. Large.....29.8 cm² (4.62 in.²)
. Small (annular).....21.9 cm² (3.39 in.²)
Stall load for HP = 200 bars (2900 psi)
LP = 5 bars (73 psi) and no friction
. Extension.....5851 daN (13,177 lbf.)
. Retraction.....4231 daN (9259 lbf.)
Operating stroke :
corresponding to a spoiler extension of 50° :
. Spoiler 5.....71.1 mm (2.80 in.)
. Spoiler 6.....71.7 mm (2.82 in.)
. Spoiler 7.....70.4 mm (2.77 in.)
Stop-to-stop stroke :.....74 mm (2.91 in.)
Weight (filled with fluid) :
. Actuator
. Valve group

2 Hydraulic
Maximum speed without external load, in degrees/s of surface deflection.....50°/s
Corresponding to a maximum flow of.....l/mn (US gal/mn)
R for HP = Spoiler 5 = 12.7 l/min and LP = Spoiler 5 = 9.34 l/min
R Spoiler 6 = 12.82 l/min Spoiler 6 = 9.42 l/min
R Spoiler 7 = 12.59 l/min Spoiler 7 = 9.25 l/min
Maximum internal leakage
. When new.....0.5 l/mn (0.13 US gal/mn)
. After 10,000 flight hours.....1 l/mn (0.26 US gal/mn)
Maximum external leakage when new.....Nil

3 Electrical
LVDT supply.....26V, 400 Hz
Servovalve characteristics (Ref. 27-61)

(b)Spoilers 3 and 4
1 Mechanical
Piston area
. Large.....51.5 cm² (7.98 in.²)
. Small (annular).....39.2 cm² (6.07 in.²)
Stall load for HP = 200 bars (2900 psi)
LP = 5 bars (73 psi) and no friction
. Extension.....10,104 daN (22,756 lbf.)
. Retraction.....7583 daN (17,078 lbf.)
Operating stroke
Corresponding to a spoiler extension of 50° :
. Spoiler 3.....70.6 mm (2.78 in.)
. Spoiler 4.....71.2 mm (2.80 in.)
Stop-to-stop stroke.....74 mm (2.91 in.)
Weight (filled with fluid)
. Valve group
. Actuator
2 Hydraulic
Maximum speed without external load,
in degrees/s of surface deflection.....50°/s
corresponding to a maximum flow of
for HP = Spoiler 3 = 21.82 l/min and LP = Spoiler 3 = 16.65 l/min
Spoiler 4 = 22.00 l/min Spoiler 4 = 16.75 l/min
Maximum internal leakage
. When new.....0.5 l/mn (0.1305 US gal/mn)
. After 10 000 flight hours.....1 l/mn (0.26 US gal/mn)
Maximum external leakage when new.....Nil
3 Electrical
LVDT supply.....26V, 400 Hz
Servovalve characteristics (Ref. 27-61)

SPEEDBRAKE VALVE GROUP (SURFACES 1 AND 2) - ADJUSTMENT/TEST

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Functional Test

A. Reason for the Job
Check correct operation of spoiler 1 and 2 solenoid valve.
NOTE : To do the functional test described below, you need the control box 98A27608011000.
If you do not have this tool available, as an alternative procedure, you can do the ground spoiler test then the speedbrake test in the speedbrake functional test (Ref. 27-61-00, P. Block 501).

B. Equipment and Materials

ITEM	DESIGNATION
(1)35M5M01270000	Solenoid Valve Test Tool
R or	
R G5M5M0-127-0000	
(2)	Access Platform
(3)	Safety Barriers
(4)98A27608011000	Control Box - Spoiler Valve Group
Referenced Procedures	
- 24-41-00, P. Block 301	A/C External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-60-00, P. Block 301	Spoilers and Speedbrakes
- 27-61-00, P. Block 501	Control Box - Spoiler Valve Group
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
(1)Job Set-Up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301)
Make certain that electronics racks ventilation is correct.
(b)Pressurize hydraulic systems cither :

- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301)
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301) Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).

WARNING : BEFORE OPERATIONG FLAPS AND SPEEDBRAKES, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE SURFACES ARE CLEAR.

(c)Extend Flaps (Ref. 27-50-00, P. Block 301) Display warning notice.

(d)Position access platform

(e)On control box 98A27608011000, make certain that ON/OFF switch is in OFF position and selector switch RETRACT position.
Make certain that circuit breakers are open (Ref.Table 1)

(f)Make certain that hydraulic power supply is shut down and display warning notice.

NOTE : Only Test for left Wing surface 1 is described, for the other surface the same results are expected.

(2)Test

ACTION	RESULT
1. Disconnect electrical connector from valve group (Ref. Table 2)	
2. Connect solenoid valve test tool to solenoid valve connector 15CS-BLH.	
3. Connect control box to spoiler valve group connector 15CS-ALH.	
4. Pressurize corresponding hydraulic system.	
5. On control box, place ON/OFF switch in ON position.	ON/OFF light comes ON.
6. Place control box selector switch in EXTEND position.	Speedbrake fully extends.
7. Place control box selector switch in RETRACT position.	Speedbrake retracts.
8. Place control box selector switch in EXTEND position.	Speedbrake fully extends.
9. Press ON/OFF pushbutton switch of solenoid valve test tool to select ON position. (Solenoid energized).	Speedbrake retracts.
10.Place control box selector switch in RETRACT position.	Speedbrake stays in retracted position.
11.Place control box selector switch in EXTEND position.	Speedbrake stays in retracted position.

ACTION	RESULT
12.Place control box selector switch in RETRACT position.	No change.

13.Press then release ON/OFF pushbutton switch of solenoid valve test tool to select OFF.

14.On control box, place ON/OFF switch in OFF position.

15.Shut down hydraulic pressure.

16.Disconnect solenoid test tool and control box from speed brake 1LH and repeat the test for the 3 other concerned surfaces.

17.When all solenoids are tested restore the A/C wiring.

18.Close circuit breakers.

19.Perform speedbrake functional test (Ref. 27-61-00, P. Block 501).

NOTE : Repeat the same test procedure for the 3 other surfaces.
Table 1 :

For surface 1

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/1&4	53CP	334/S63
133VU	LAND/RECOVERY/SUPPLY/SPLR/1&4 & 6&7	54CP	334/S67
133VU	FLT CTL/EFCU/NORM/SUPPLY/SPLR 1&4	71CP	331/V62
133VU	EFCU/LAND RECOVERY/SUPPLY/SPLR/1&4	72CP	333/T67

For surface 2

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU TRANSDUCERS/NORM SUPPLY/SPLR/2&3	5CP	335/R63
133VU	EFCU/NORM/SUPPLY/SPLR/2&3	8CP	333/T62

Table 2 :
For left wing
surface 1 connector numbers 15CS - A, 15CS - B
surface 2 connector numbers 17CS - A, 17CS - B

For right wing
surface 1 connector numbers 14CS - A, 14CS - B
surface 2 connector numbers 16CS - A, 16CS - B

(3)Close-up.
(a)Move slat and flap control lever to first notch.
(b)Shut down hydraulic power supply. Depressurize systems. Where applicable, disconnect hydraulic ground power cart.
(c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

SPEEDBRAKE ACTUATORS (SURFACES 1 AND 2) (10CS THRU 13CS) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.8 m (12 ft.)
B. SL90-374-8750	Wrench - Notched, Tightening of Nuts NSA5454
C. SL90-314-8750	Tool - Extraction, Tab Washers STA-LOK NSA5454
D. SL90-313-8750	Tool - Installation, Tab Washers STA-LOK NSA5454 **NOTE** : The tools listed in items B. thru D. were previously part of tool kit PN 98A27608008000.
E. 98A27608010000	Guide Bullets
F. 98A27608011000	Control Box - Spoiler, Valve Group
G. 98A27608014000	Safety Collar Set - Airbrake Actuator Piston
H. 98A27608015000	Setting Gage Set - Actuator Adjustment
J. 98A27608017000	Spanner Set - Spoiler/Speedbrake Actuator Piston Adjustment
K.	Torque Wrench, 11 to 12 m.daN (81 to 88.5 lbf.ft.)
L.	Torque Wrench, 17 to 21 m.daN (125 to 155 lbf.ft.)
M.	Torque Wrench, 0.38 to 0.48 m.daN (33.6 to 44 lbf.in.)
N.	Clinometer
P.	Feeler Gages
Q.	Depth Gage
R.	Circuit Breaker Safety Clips and Tags
S.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.) and 0.6 mm (0.024 in.)
T. Material No. 04-004	Common Greases (Ref. 20-31-00)
U. Material No. 05-002	Special Materials (Ref. 20-31-00)

ITEM	DESIGNATION
V. Material No. 06-002	Lubricants (Ref. 20-31-00)
W. Material No. 09-003	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-61-00, P. Block 501	Electrical and Mechanical Control (Spoilers and Speedbrakes)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

2. Procedure

A. Job Set-Up
(1)Position safety barriers.
(2)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).
(3)Open, safety and tag the following circuit breakers:
(a)For surfaces 1 and 2

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/FLAPS/SYS 1	10CV	335/R67

(b)For surface 1

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	FLT CTL/EFCU/LAND RECOVERY/SUPPLY/ SPLR 1 & 4	72CP	333/T67
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR 1 & 4	53CP	334/S63
133VU	FLT CTL/LAND RECOVERY/SUPPLY/ SPLR 1 & 4 & 6 & 7	54CP	334/S67

(c)For surface 2

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 2 & 3	8CP	333/T62
133VU	FLT CTL/EFCU/TRANSDUCERS/NORM SUPPLY/ SPLR 2 & 3	5CP	335/R63

(4)Position access platform.
(5)Depressurize hydraulic system supplying actuator to be removed (Ref. 29-10-00, P. Block 301).
(6)Depressurize hydraulic reservoir supplying actuator to be removed (Ref. 29-14-00, P. Block 301).

B. Removal
(Ref. Fig. 401)
(1)Set maintenance device on valve group controlling surface being worked on in position 'M' and manually extend surface.
(2)Install actuator safety collar.
(3)Disconnect electrical connector surface 1 left 1793VC, surface 2 left 1785VC, (surface 1 right 1792VC, surface 2 right 1784VC) and fit protective cap.
(4)Disconnect hydraulic hoses and fit blanking plugs.
(5)Remove nut (3), bolt (4) and anti-rotation plate (5).
(6)Using STA-LOK extraction tool PN SL90-314-8750 remove tab washer (9).

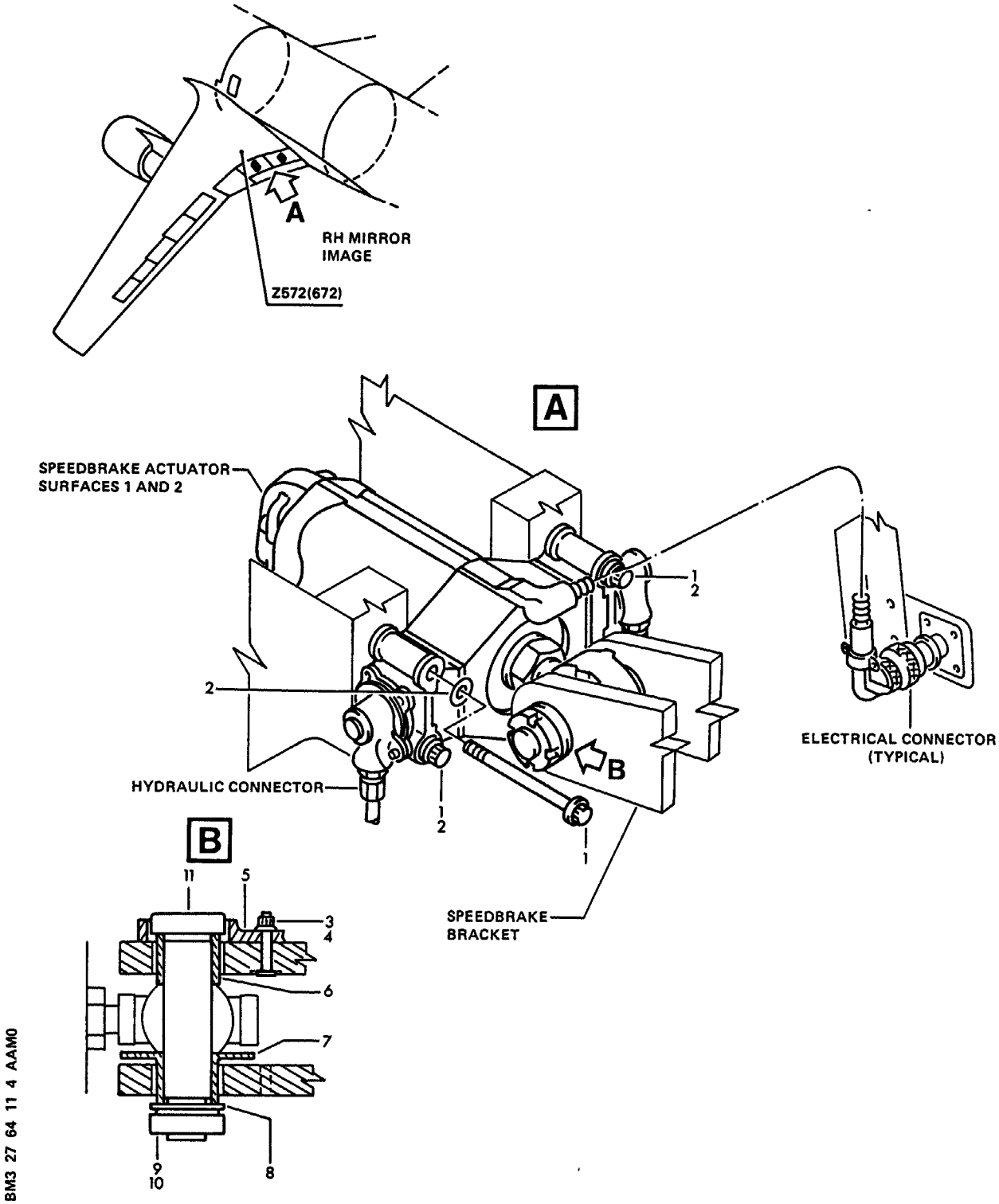
(7)Using STA-LOK notched wrench PN SL90-374-8750 remove nut (10).

(8)Remove washer (8) and bolt (11).
(9)Remove flanged bush (7) and plain bush (6) from surface bracket.

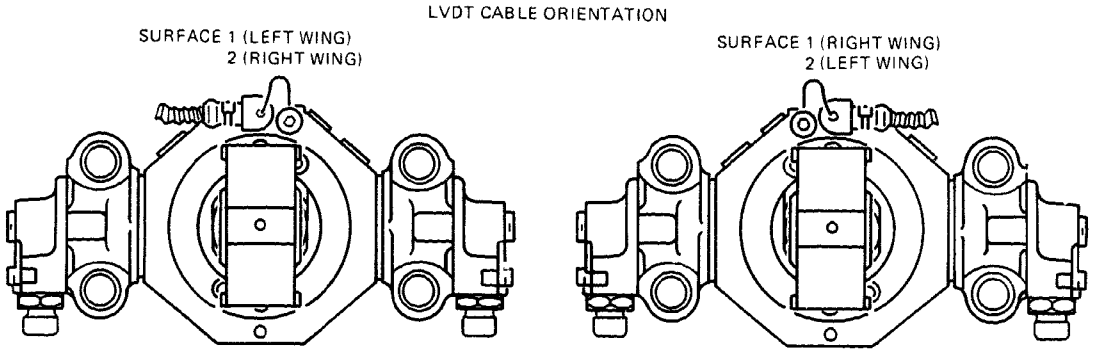
CAUTION : DURING REMOVAL, SUPPORT ACTUATOR BODY TO PREVENT DAMAGE TO HYDRAULIC PIPES BELOW.

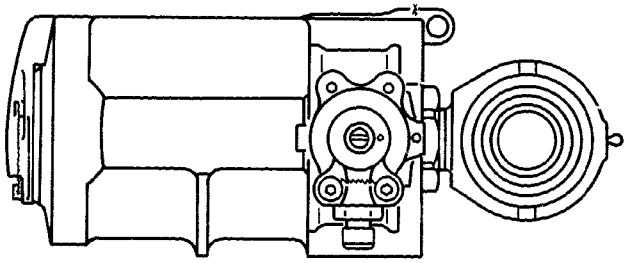
(10)Cut and remove lockwire and remove four bolts (1) and washers (2) securing trunnions.
(11)Remove actuator from aircraft.

C. Preparation for Installation
(Ref. Fig. 402)
(1)Check that the LVDT cable is correctly orientated for actuator installed location, if not proceed as detailed below:
(a)Remove screw (13) and washer (14).
(b)Without withdrawing cable connector from actuator body, rotate connector to desired position.
(c)Position bonding lead and install washer (14) and screw (13) in lower hole in cable connector.
(2)TORQUE screw (13) to between 0.389 and 0.486 m.daN (34.4 and 43 lbf.in.) and safety with lockwire.
(3)Check that hydraulic connections are correctly orientated for actuator installed location, if not proceed as detailed below:
(a)Remove screws (15) and washers (16).
(b)Rotate hydraulic connection to desired position.
(c)Install washers (16) and screws (15).
(4)TORQUE screws (15) to between 0.389 and 0.486 m.daN (34.4 and 43 lbf.in.) and safety with lockwire.

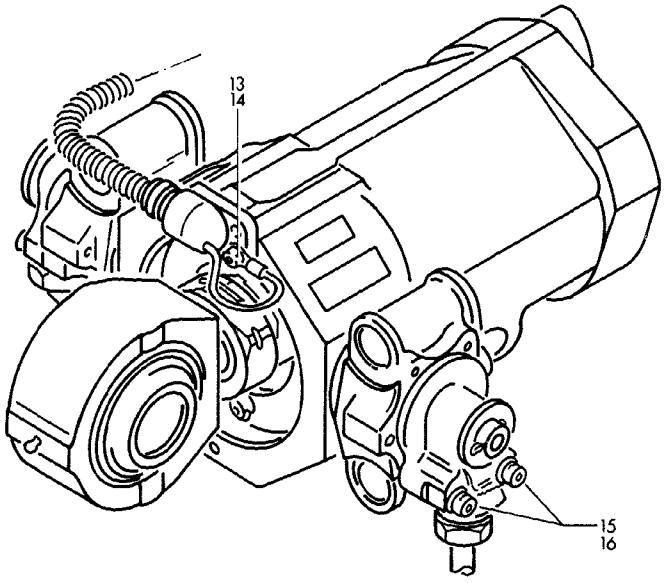


Speedbrake Actuators, Surfaces 1 and 2
Figure 401





HYDRAULIC CONNECTOR ORIENTATION
(SURFACES 1, 2, LEFT AND RIGHT WINGS)



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Hydraulic and LVDT Cable Orientation
Figure 402

(5)Using depth gage, check that no movement of trunnion bolt hole thread inserts has occurred.

NOTE : Dimension measured from face of wing mating surface of trunnion
R to outer end of thread insert (Ref. Fig. 403).

D. Installation (Ref. Fig. 401)
(Ref. Fig. 404)

(1)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of actuator trunnion and bolt (1).

CAUTION : MAKE CERTAIN THAT THE POSITION OF THE LVDT IS ON TOP OF THE ACTUATOR.

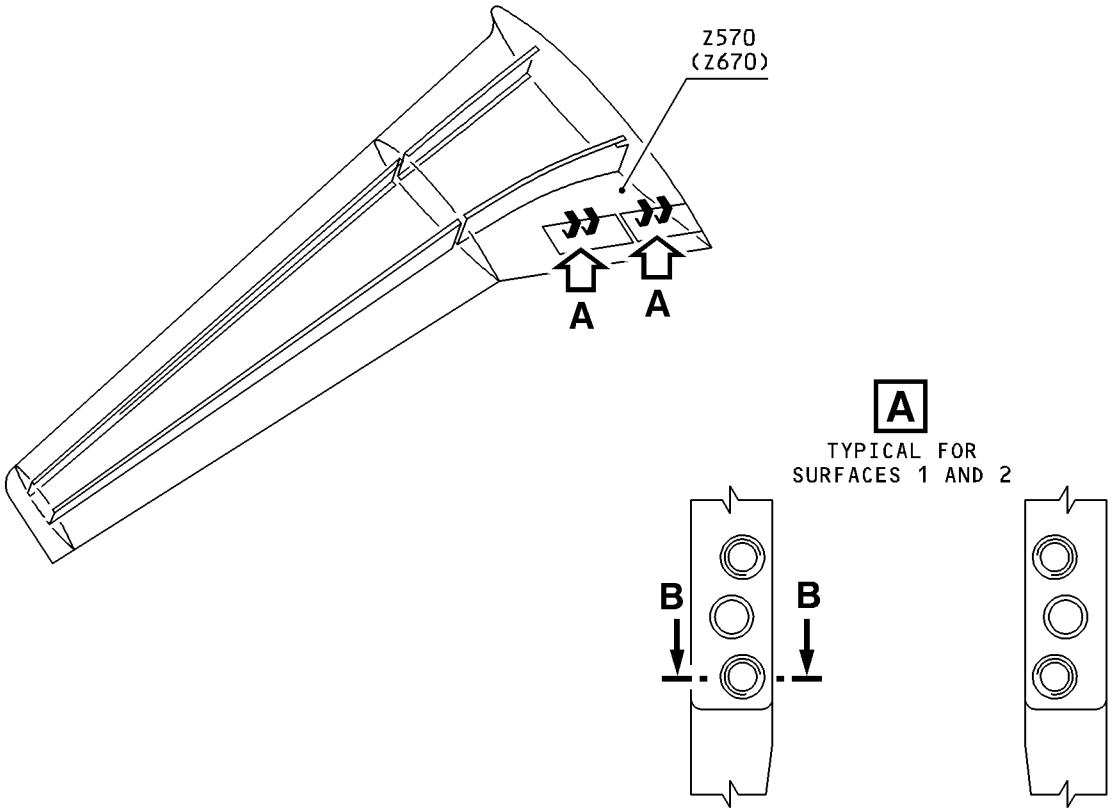
(2)Position actuator and secure trunnions with washers (2) and bolts (1).

NOTE : Make certain that washers are installed correctly with chamfered faces against bolt heads.

(3)TORQUE bolts (1) to 18 m.daN (132.8 lbf.ft.) and safety with lockwire.
(4)Extend actuator rod and position eye end between speedbrake surface brackets.
(5)Measure gaps between side of eye end bearing and inside of speedbrake surface brackets.
(6)Lubricate outer diameters of bushes (6 and 7) with grease (Material No. 04-004) and install bushes in surface brackets.

NOTE : Flanged bush (7) to be installed in side of bracket with greatest clearance from eye end bearing.

(7)Remove blanking plugs and connect hydraulic hoses.
(8)Remove protective cover and connect electrical plug, surface 1 left 1793VC, surface 2 left 1785VC, (surface 1 right 1792VC, surface 2 right 1784VC).
(9)Check fluid level in hydraulic reservoir supplying actuator being worked on, replenish as required (Ref. 12-12-29, P. Block 1).
(10)At valve group associated with actuator being worked on, disconnect electrical connector detailed below and connect control box PN 98A27608011000.
(a)On left wing -
surface 1 - 15 CS-A surface 2 - 17 CS-A
(b)On right wing -
surface 1 - 14 CS-A surface 2 - 16 CS-A
(11)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(12)Make certain that electronics racks ventilation is correct.
(13)Pressurize hydraulic system supplying actuator being worked on (Ref. 29-10-00, P. Block 301).
(14)Make certain that the maintenance device on valve group has returned to position '0'.
(15)Using control box PN 98A27608011000, operate actuator over full travel ten times to remove air and to make certain that there is no leakage of hydraulic fluid.

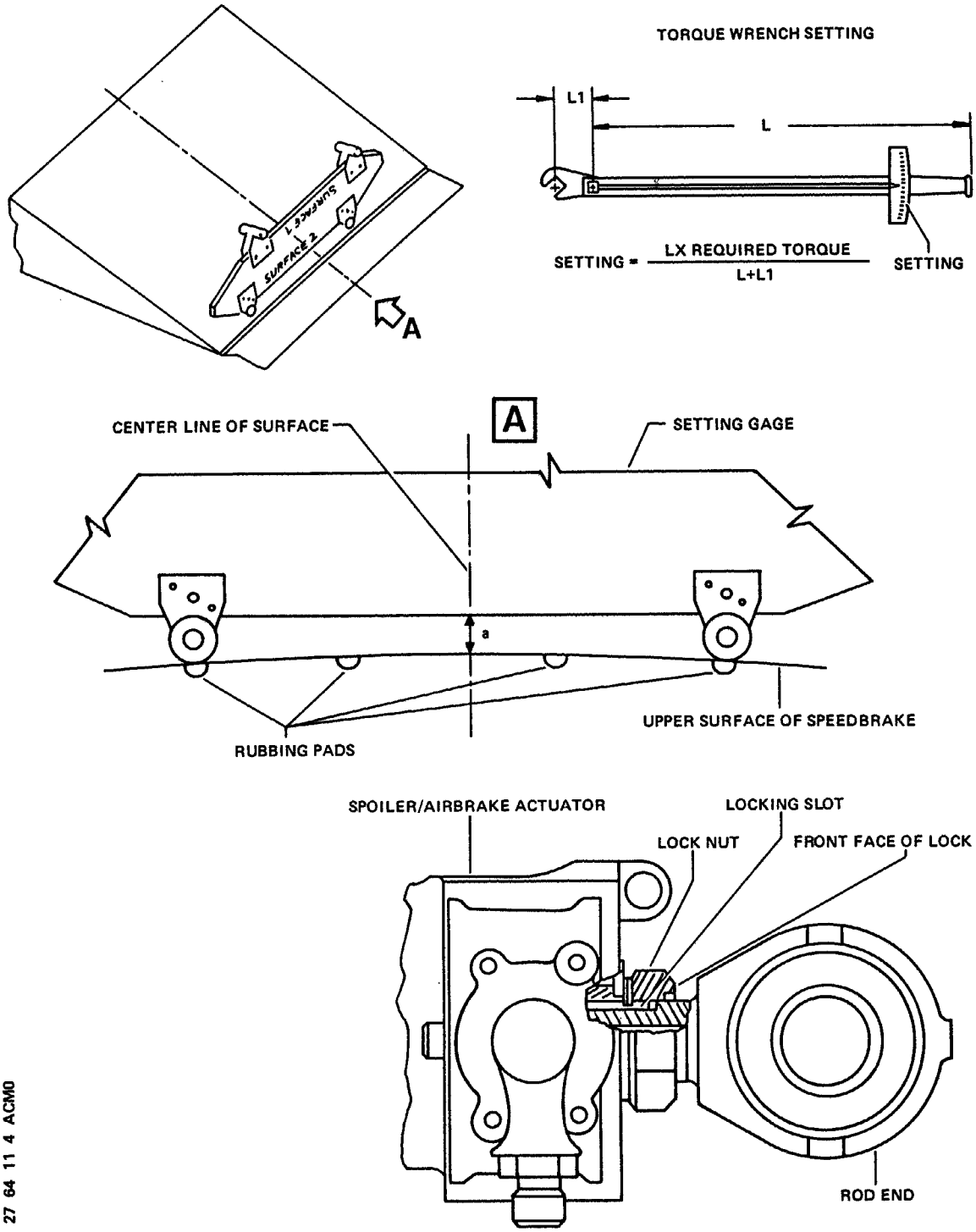


SURFACE	MEASUREMENT "A" NOT LESS THAN
1	7.0mm (0.28in.)
2	7.0mm (0.28in.)

BM6 27 64 11 4 AGMO 00

R

Measurement of Threaded Insert Position
Figure 403



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Speedbrake Actuator Adjustment
Figure 404

(16)Fully retract speedbrake actuator.
(17)With speedbrake surface in retracted position, adjust length of piston rod until bolt (11) can be installed thru eye end and surface bracket, using guide bullet PN 98A27608010000.
(18)Remove guide bullet.
(19)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(20)Check fluid level in hydraulic reservoir supplying actuator being worked on, replenish as required (Ref. 12-12-29, P. Block 1).
(21)Apply lubricant (Material No. 06-002) to bolt threads and mounting face of nut (10).
(22)Install washer (8) and using STA-LOK notched wrench PN SL90-374-8750 install nut (10). TORQUE to between 11 and 12 m.daN (81 and 88.5 lbf.ft.).

(23)Using STA-LOK installation tool PN SL90-313-8750 install tab washer (9).

(24)Apply sealant (Material No. 09-003) to mating surfaces and install anti-rotation plate (5) and secure with nut (3) and bolt (4).
(25)Pressurize hydraulic system supplying actuator being worked on (Ref. 29-10-00, P. Block 301).
(26)Place setting gage PN 98A27608015000 on speedbrake surface (Ref. Fig. 404) and measure surface bow (dimension 'a').
(27)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(28)Set the maintenance device on the valve group in position 'M' and manually extend speedbrake.

CAUTION : THE ADJUSTMENT OF SPEEDBRAKE BOW MUST BE CARRIED OUT WITH UTMOST CARE. UNDER NO CIRCUMSTANCE IS THE SPEEDBRAKE TO BE SUBJECTED TO EXCESSIVE DEFORMATION.

(29)Using spanner set PN 98A27508017000, adjust length of actuator rod by rotating piston rod to obtain correct surface bow dimension 'a' as follows:
surface 1: 'a' = 23.0 ± 0.2 mm (0.906 ± 0.0079 in.)
surface 2: 'a' = 4 ± 0.2 mm (0.157 ± 0.0079 in.).

Piston rod rotated	Surface bow alters by Surface 1	Surface 2
90°	3.4 mm (0.134 in.)	3.5 mm (0.138 in.)
180°	6.9 mm (0.272 in.)	7.0 mm (0.276 in.)
270°	10.4 mm (0.409 in.)	10.5 mm (0.413 in.)
360°	13.8 mm (0.543 in.)	14.0 mm (0.551 in.)

(30)Tighten piston rod lock-nut.
(31)Manually retract speedbrake surface.
(32)Pressurize hydraulic system supplying actuator being worked on (Ref. 29-10-00, P. Block 301).
(33)Make certain that maintenance device on valve group has returned to position 'O'.
(34)Place setting gage on surface and check bow (dimension 'a') (Ref. Fig. 404).
(35)If correct value for dimension 'a' is still not obtained, repeat steps D.(27) thru D.(33).
(36)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(37)Set maintenance device on valve group in position 'M'.
(38)Extend speedbrake manually.
(39)Using spanner set PN 98A27608017000, TORQUE piston rod lock nut to between 18 and 20 m.daN (133 and 147 lbf.ft.).
NOTE : To calculate torque wrench setting for piston rod lock nut:

$$\text{setting} = \frac{L \times \text{required torque}}{L + L1}$$

where L = torque wrench length from end of handle to center of square drive.
L1 = 65 mm (2.559 in.) for tool No. 98A27608017001
= 80 mm (3.150 in.) for tool No. 98A27608017002
= 80 mm (3.150 in.) for tool No. 98A27608017003

CAUTION : INSUFFICIENT TIGHTENING OF PISTON ROD LOCK NUT CAN LEAD TO SERIOUS DAMAGE OF THE ACTUATOR EYE-END.

(40)Make certain that after adjustment locking slot in threaded end of piston rod does not extend beyond front face of lock-nut

(Ref. Fig. 404).
(41)Safety lock-nut with lockwire.
(42)Manually retract speedbrake.
(43)Pressurize hydraulic system supplying actuator being worked on (Ref. 29-10-00, P. Block 301).
(44)Make certain that maintenance device on valve group has returned to position '0'.
(45)Using control box PN 98A27608011000, fully extend speedbrake and using clinometer, check that deflection obtained is at least 51°.
(46)Retract speedbrake surface.
(47)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(48)Disconnect control box from valve group.
(49)Reconnect electrical plug disconnected in step D.(10).
(50)Remove tags and safety clips and close the following circuit breakers:
(a)For surface No. 1: 54CP, 53CP, 72CP and 71CP
(b)For surface No. 2: 5CP, 8CP.

E. Test
(1)Carry out functional test of speedbrakes (Ref. 27-61-00, P. Block 501).

F. Close-Up
(1)Remove tags and safety clips and close circuit breakers 10CV, 5CV and 6CV.
(2)Retract flaps (Ref. 27-50-00, P. Block 301).
(3)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(4)Shut-down and disconnect hydraulic ground power supply.
(5)Remove access platform and safety barriers.

SPEEDBRAKE VALVE GROUPS (SURFACES 1 AND 2) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27608011000	Control Box - Spoiler, Valve Group
C.	Torque Wrench, 0.23 to 1.6 m.daN (20 to 142 lbf.in.)
D.	Safety Barriers
E.	Circuit Breaker Safety Clips and Tags
F.	O-Rings
G.	Lockwire, Corrosion-Resistant Steel, Dia. 0.6 mm (0.024 in.)
H. Material No. 09-015	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-61-00, P. Block 501	Electrical and Mechanical Control (Spoilers and Speedbrakes
- 27-64-00, P. Block 501	Hydraulic Actuation (Spoilers and Speedbrakes)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

2. Procedure

A. Job Set-Up

(1)Position safety barriers.

(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Make certain that electronics racks ventilation is correct.

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGES OF THE SURFACES ARE CLEAR.

(4)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).

(5)Depressurize hydraulic system supplying valve group to be removed (Ref. 29-10-00, P. Block 301).
(6)Depressurize hydraulic reservoir of system supplying valve group to be removed (Ref. 29-14-00, P. Block 301).
(7)Position access platform.
(8)Open access door (572BB No.1 surface left wing, 572DB No.2 surface left wing) (672BB No.1 surface right wing, 672DB No.2 surface right wing).
(9)Set maintenance device on valve group to be removed to position 'M'.

(10)Open, safety and tag the following circuit breakers:
(a)For surfaces 1 and 2

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

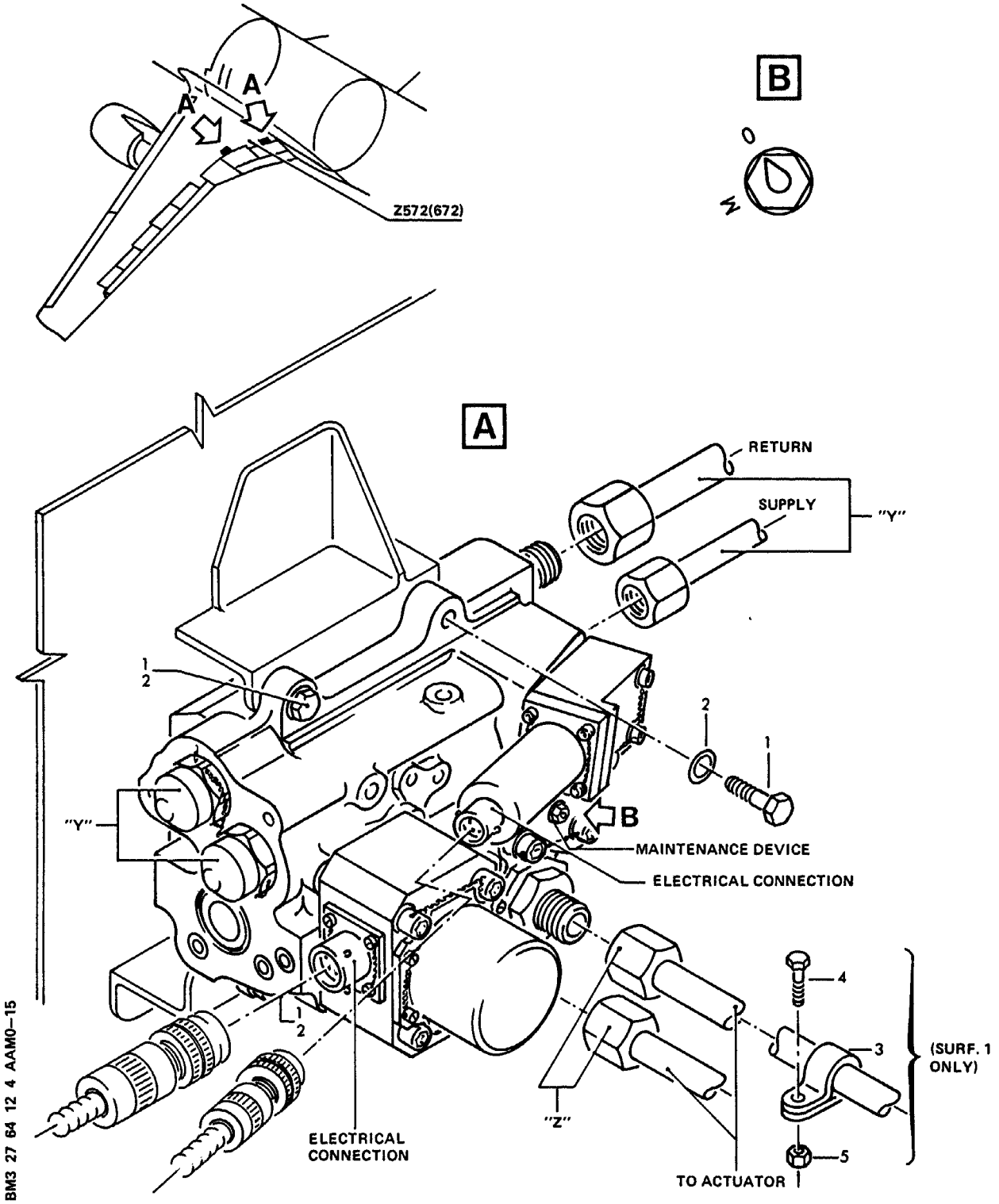
(b)For surface 1

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	FLT CTL/EFCU/LAND RECOVERY/SUPPLY/ SPLR 1 & 4	72CP	333/T67
133VU	FLT CTL/EFCU/TRANSDUCERS/NORM SUPPLY/ SPLR 1 & 4	53CP	334/S63
133VU	FLT CTL/LAND RECOVERY/SUPPLY/ SPLR 1 & 4 & 6 & 7	54CP	334/S67

(c)For surface 2

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 2 & 3	8CP	333/T62
133VU	FLT CTL/EFCU/TRANSDUCERS/NORM SUPPLY/ SPLR 2 & 3	5CP	335/R63

B. Replacement of Valve Group Complete
(Ref. Fig. 401)
(1)Removal
(a)Disconnect electrical connectors as follows:
1 For left wing
surface 1 connector numbers 15CS-A 15CS-B
surface 2 connector numbers 17CS-A 17CS-B
2 For right wing
surface 1 connector numbers 14CS-A 14CS-B
surface 2 connector numbers 16CS-A 16CS-B
(b)Fit protective caps to connectors.
(c)For surface 1 proceed as follows:



Speedbrake Valve Groups, Surfaces 1 and 2
Figure 401

1 Remove nut (5), bolt (4) and 'P' clip (3) from one connecting pipe.
2 Disconnect and remove two hydraulic pipes connecting valve group and actuator and fit storage blanks.

(d)For surface 2 proceed as follows:
1 Disconnect and remove two hydraulic pipes connecting valve group and actuator and fit storage blanks.

(e)Disconnect hydraulic supply and return pipes and fit storage blanks.
(f)Remove four bolts (1) and washers (2) and remove valve group.

(2)Preparation for Installation
(a)Remove storage plugs from replacement valve group.
(b)Cut and discard lockwire and remove blanking plugs and hydraulic connectors from removed valve group.
(c)Discard O-rings from blanking plugs and hydraulic connectors.
(d)Fit new O-rings and install blanking plugs and hydraulic connectors on replacement valve group.
(e)TORQUE hydraulic connectors and blanking plugs, those in positions "y" to between 1.4 and 1.6 m.daN (124 and 142 lbf.in.), those in positions "z" to between 1.2 and 1.6 m.daN (106 and 142 lbf.in.).
(f)Safety blanking plugs with lockwire.
(g)Install storage plugs in removed valve group.
(h)Remove sealant material from structure and valve group body.
(i)Apply sealant (Material No. 09-015) to valve group mounting on structure.

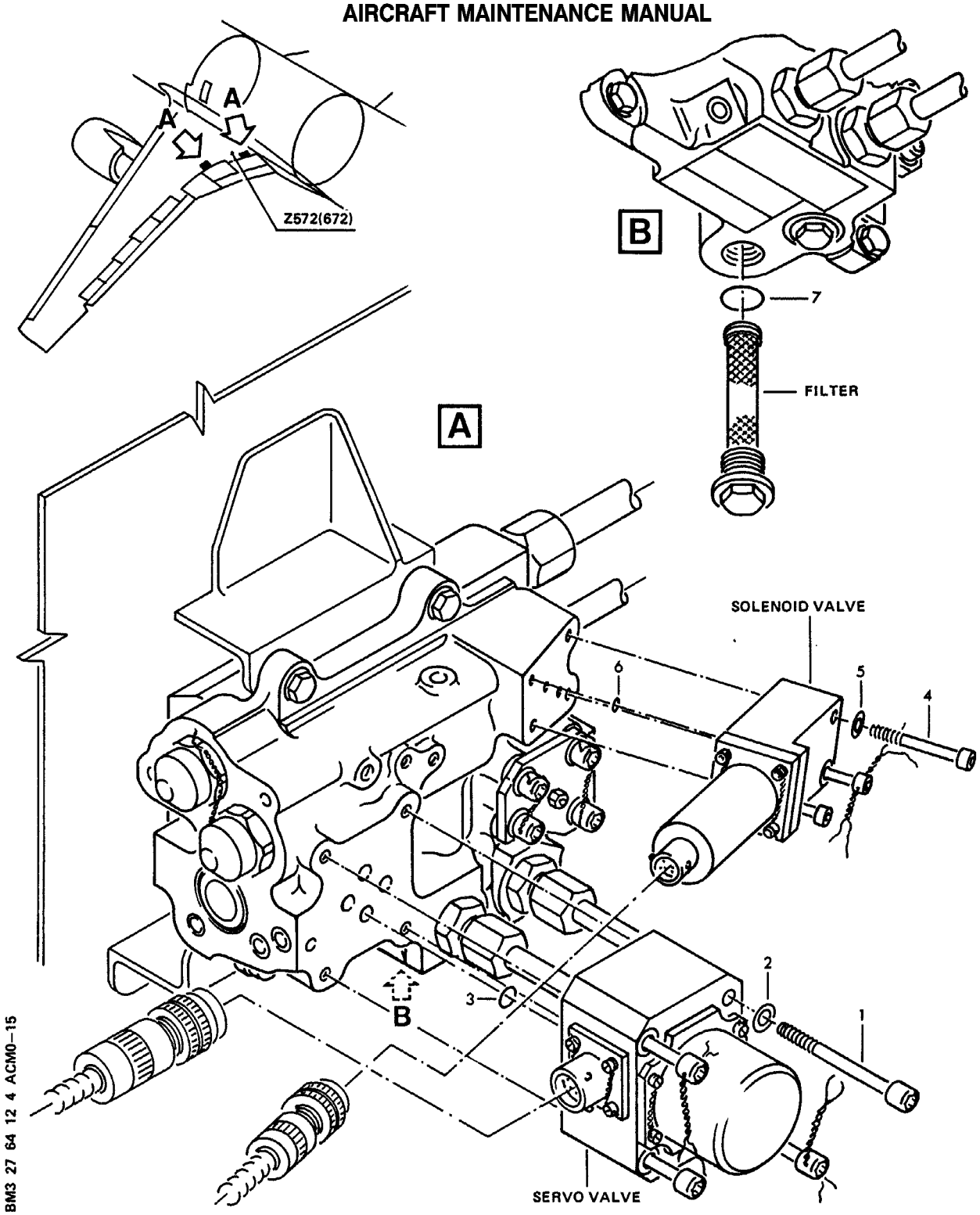
(3)Installation
(a)Install valve group and fit washers (2), bolts (1). Do not tighten bolts.
(b)Remove storage blanks and connect hydraulic supply and return pipes.
(c)Remove storage blanks and install two hydraulic pipes connecting valve group and actuator.
(d)For surface 1 only, install 'P' clip (3) and secure with bolt (4) and nut (5).
(e)Tighten valve group securing bolts (1).
(f)Remove protective cap from servo valve electrical connector on valve group and connect control box PN 98A27608011000 to valve group.
(g)Pressurize hydraulic reservoir of system supplying valve group being worked on (Ref. 29-14-00, P. Block 301).
(h)Pressurize hydraulic system supplying valve group being worked on (Ref. 29-10-00, P. Block 301).

WARNING : BEFORE OPERATING SPEEDBRAKE, MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACE IS CLEAR.

(i)Using control box PN 98A27608011000 operate speedbrake ten times to remove air from valve group.
(j)Make certain there are no leaks from any disturbed hydraulic connections or valve group body.
(k)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(l)Set maintenance device on valve group to position 'M' and make certain that speedbrake surface can be extended and retracted manually.
(m)Pressurize hydraulic system supplying valve group being worked on (Ref. 29-10-00, P. Block 301).

(n)Check that maintenance device on valve group has reset itself to position '0'.
(o)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(p)Disconnect control box from valve group.
(q)Remove remaining protective cap and connect electrical connectors
1 For left wing
surface 1 connector numbers 15CS-A, 15CS-B
surface 2 connector numbers 17CS-A, 17CS-B
2 For right wing
surface 1 connector numbers 14CS-A, 14CS-B
surface 2 connector numbers 16CS-A, 16CS-B
(r)Remove tags and safety clips and close the following circuit breakers:
1 For surface 1 - 53CP, 54CP, 71CP, 72CP.
2 For surface 2 - 5CP, 8CP.

C. Replacement of Servo Valve only
(Ref. Fig. 402)
(1)Removal
(a)Disconnect electrical connector from servo valve and fit protective caps to connections.
(b)Cut and discard lockwire; remove four screws (1) and washers (2) securing servo valve assembly.
(c)Lift servo valve assembly from valve group.
(d)Remove and discard four O-rings (3).
(e)If replacement servo valve is not to be installed immediately, cover exposed ports to prevent ingress of dirt.
(2)Installation
(a)Remove any covers or blanks which may have been installed on valve group body.
(b)Install four O-rings (3) in servo valve seatings.
(c)Position servo valve assembly on valve group body, secure with four washers (2) and screws (1).
(d)TORQUE screws (1) to between 0.39 and 0.48 m.daN (34 and 43 lbf.in.).
(e)Safety screws (1) with lockwire.
(f)Remove protective cap from servo valve electrical connector on valve group and connect control box PN 98A27608011000 to valve group.
(g)Pressurize hydraulic reservoir of system supplying valve group being worked on (Ref. 29-14-00, P. Block 301).
(h)Pressurize hydraulic system supplying valve group being worked on (Ref. 29-10-00, P. Block 301).
WARNING : BEFORE OPERATING SPEEDBRAKE, MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACE IS CLEAR.
(i)Using control box PN 98A27608011000 operate speedbrake ten times to remove air from valve group.
(j)Make certain there are no leaks from valve group.
(k)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(l)Disconnect control box from valve group.
(m)Remove remaining protective cap and connect electrical connector to servo valve.
(n)Remove tags and safety clips and close the following circuit breakers:
1 For surface 1 - 53CP, 54CP, 71CP, 72CP



Servo Valve, Solenoid Valve and Filter of
Speedbrake Valve Groups
Figure 402

2 For surface 2 - 5CP, 8CP.

D. Replacement of Solenoid Valve only (Ref. Fig. 402)
(1)Removal
(a)Disconnect electrical connector from solenoid valve and servo valve and fit protective caps to connections.
(b)Cut and discard lockwire, remove three screws (4) and washers (5).
(c)Lift solenoid valve from valve group.
(d)Remove and discard three O-rings (6).
(e)If replacement solenoid valve is not to be installed immediately, cover exposed ports to prevent ingress of dirt.
(2)Installation
(a)Remove any blanks or covers which may have been installed on valve group.
(b)Install three O-rings (6) on solenoid valve seatings.
(c)Position solenoid valve on valve group, secure with three washers (5) and screws (4).
(d)TORQUE screws (4) to between 0.23 and 0.29 m.daN (20 and 26 lbf.in.).
(e)Safety screws (4) with lockwire.
(f)Remove protective cap from servo valve electrical connector on valve group and connect control box PN 98A27608011000 to valve group.
(g)Pressurize hydraulic reservoir of system supplying valve group being worked on (Ref. 29-14-00, P. Block 301).
(h)Pressurize hydraulic system supplying valve group being worked on (Ref. 29-10-00, P. Block 301).
WARNING : BEFORE OPERATING SPEEDBRAKE, MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACE IS CLEAR.
(i)Using control box PN 98A27608011000 operate speedbrake ten times to remove air from valve group.
(j)Make certain there are no leaks from valve group.
(k)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(l)Disconnect control box from valve group.
(m)Remove remaining protective caps and connect electrical connector to solenoid valve and servo valve.
(n)Remove tags and safety clips and close the following circuit breakers:
1 For surface 1 - 53CP, 54CP, 71CP, 72CP
2 For surface 2 - 5CP, 8CP.

E. Replacement of Filter only (Ref. Fig. 402)
(1)Removal
(a)Cut and discard lockwire.
(b)Slacken filter and withdraw from valve group body.
(c)Discard O-ring (7).
(d)If replacement filter is not to be installed immediately, install a blank in valve group filter port.
(2)Installation
(a)Install O-ring (7) on filter.
(b)Remove blank (if installed) from valve group filter port.
(c)Insert filter in valve group and tighten.
(d)TORQUE filter to between 1.3 and 1.5 m.daN (115 and 132 lbf.in.).
(e)Safety filter with lockwire.

(f)Pressurize hydraulic reservoir of system supplying valve group being worked on (Ref. 29-14-00, P. Block 301).
(g)Pressurize hydraulic system supplying valve group being worked on (Ref. 29-10-00, P. Block 301).
(h)Make certain there are no leaks at the filter connection.
(i)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(j)Remove tags and safety clips and close the following circuit breakers:
1 For surface 1 - 53CP, 54CP, 71CP, 72CP
2 For surface 2 - 5CP, 8CP.

F. Test
(1)Check correct operation of speed brake solenoid valve (Ref. 27-64-00, P. Block 501) if solenoid valve or complete valve group has been replaced.
(2)Carry out functional test of speed brakes (Ref. 27-61-00, P. Block 501).

G. Close-Up
(1)Remove tags and safety clips and close circuit breakers 10CV, 5CV and 6CV.
(2)Close access door (572BB No.1 surface left wing, 572DB No. 2 surface left wing) (672BB No. 1 surface right wing, 672DB No. 2 surface right wing).
WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGES OF SURFACES IS CLEAR.
(3)Retract flaps (Ref. 27-50-00, P. Block 301).
(4)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(5)Remove access platform.
(6)Remove safety barriers.

SPOILER/SPEEDBRAKE VALVE GROUPS (SURFACES 3 THRU 7) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11 ft.)
B. 98A27608011000	Control Box - Spoiler, Valve Group
C.	Torque Wrench, 0.39 to 1.6 m.daN (34 to 142 lbf.in.)
D.	Safety Barriers
E.	Circuit Breaker Safety Clips and Tags
F.	O-Rings
G.	Lockwire, Corrosion-Resistant Steel, Dia. 0.6 mm (0.024 in.)
H. Material No. 09-015	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

2. Procedure

A. Job Set-Up

(1)Position safety barriers.

(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Make certain that electronics racks ventilation is correct.

WARNING : BEFORE OPERATING FLAPS MAKE CERTAIN THAT TRAVEL RANGES OF THE SURFACES ARE CLEAR.

(4)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).

(5)Depressurize hydraulic system supplying valve group to be removed (Ref. 29-10-00, P. Block 301).

(6)Depressurize hydraulic reservoir of system supplying valve group to be removed (Ref. 29-14-00, P. Block 301).
(7)Position access platform.
(8)Open access doors as follows:
(a)For left wing

surface 3	door number	581CB
surface 4	door number	581DB
surface 5	door number	581FB
surface 6	door number	581GB
surface 7	door number	581JB

(b)For right wing

surface 3	door number	681CB
surface 4	door number	681DB
surface 5	door number	681FB
surface 6	door number	681GB
surface 7	door number	681JB

(9)Set maintenance device on valve group to be removed to position 'M'.

(10)Open, safety and tag the following circuit breakers:
(a)For surfaces 3 thru 7

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/FLAPS/SYS 1	10CV	335/R67

(b)For surface 3

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 2 & 3	8CP	333/T62
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR 2 & 3	5CP	335/R63

(c)For surface 4

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	FLT CTL/EFCU/LAND RECOVERY/SUPPLY/ SPLR 1 & 4	72CP	333/T67
133VU	FLT CTL/EFCU/TRANSDUCERS/NORM SUPPLY/ SPLR 1 & 4	53CP	334/S63
133VU	FLT CTL/LAND RECOVERY/SUPPLY/ SPLR 1 & 4 & 6 & 7	54CP	334/S67

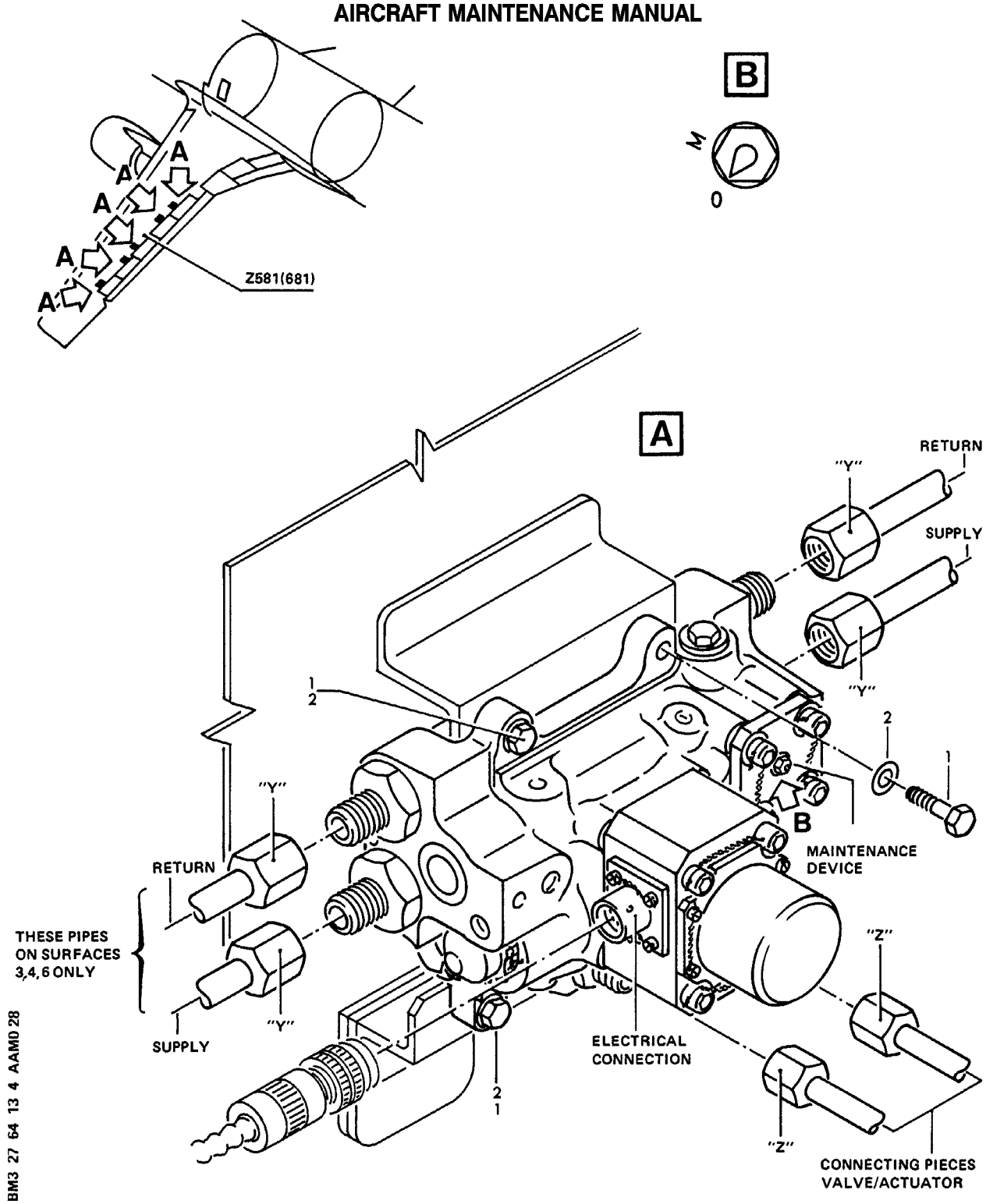
(d)For surface 5

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 5	70CP	333/T65
133VU	FLT CTL/EFCU/TRANSDUCERS/NORM SUPPLY/ SPLR 5	55CP	334/S64

(e)For surfaces 6 & 7

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 6 & 7	10CP	332/U62
133VU	FLT CTL/EFCU/LAND RECOVERS/SUPPLY/ SPLR & & 7	9CP	333/T66
133VU	FLT CTL/LAND RECOVERY/SUPPLY/ SPLR 1 & 4 & 6 & 7	54CP	334/S67
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR 6 & 7	7CP	335/R62

B. Replacement of Valve Group Complete
(Ref. Fig. 401)
(1)Removal
(a)Disconnect electrical connectors as follows:
1 For left wing
surface 3 connector number 31CP-A
surface 4 connector number 67CP-A
surface 5 connector number 69CP-A
surface 6 connector number 33CP-A
surface 7 connector number 35CP-A
2 For right wing
surface 3 connector number 30CP-A
surface 4 connector number 66CP-A
surface 5 connector number 68CP-A
surface 6 connector number 32CP-A
surface 7 connector number 34CP-A
(b)Fit protective caps to connectors.
(c)Disconnect and remove two pipes connecting valve group and actuator and fit storage blanks.
(d)Disconnect hydraulic supply and return pipes from valve group and fit storage blanks.
NOTE : Valve groups at surfaces 5 & 7 have one supply and one return pipe, valve groups at surfaces 3, 4, 6 have two supply and two return pipes.
(e)Remove four bolts (1) and washers (2) and remove valve group.
(2)Preparation for Installation
(a)Remove storage plugs from replacement valve group.
(b)Cut and discard lockwire and remove blanking plugs and hydraulic connectors from removed valve group.
(c)Discard O-rings from blanking plugs and hydraulic connectors.
(d)Fit new O-rings and install blanking plugs and hydraulic connectors on replacement valve group.



Spoiler Valve Groups, Surfaces 3 thru 7
Figure 401

(e)TORQUE hydraulic connectors and blanking plugs, those in positions "y" to between 1.4 and 1.6 m.daN (124 and 142 lbf.in.), those in positions "z" to between 1.2 and 1.6 m.daN (106 and 142 lbf.in.).
(f)Safety blanking plugs with lockwire.
(g)Install storage plugs in removed valve group.
(h)Remove sealant material from structure and valve group body.
(i)Apply sealant (Material No. 09-015) to valve group mounting on structure.

(3)Installation
(a)Install valve group, fit washers (2), bolts (1). Do not tighten bolts.
(b)Remove storage blanks and connect hydraulic supply and return pipes.
NOTE : Valve groups at surfaces 5 & 7 have one supply and one return pipe, valve groups at surfaces 3, 4, 6 have two supply and two return pipes.
(c)Remove storage blanks and install two hydraulic pipes connecting valve group and actuator.
(d)Tighten bolts (1).
(e)Remove protective cap from servo valve electrical connector on valve group and connect control box PN 98A27608011000 to valve group.
(f)Pressurize hydraulic reservoir of system supplying valve group being worked on (Ref. 29-14-00, P. Block 301).
(g)Pressurize hydraulic system supplying valve group being worked on (Ref. 29-10-00, P. Block 301).
WARNING : BEFORE OPERATING SPOILER, MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACE IS CLEAR.
(h)Using control box PN 98A27608011000 operate spoiler ten times to remove air from valve group.
(i)Make certain that there are no leaks from any disturbed hydraulic connections or valve group body.
(j)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(k)Set maintenance device on valve group to position 'M' and make certain that spoiler surface can be extended and retracted manually.
(l)Pressurize hydraulic system supplying valve group being worked on (Ref. 29-10-00, P. Block 301).
(m)Check that maintenance device on valve group has reset itself to position 'O'.
(n)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(o)Disconnect control box from valve group.
(p)Connect electrical connector detailed below to valve group.
1 for left wing -

surface 3 31CP-A	surface 4 67CP-A
surface 5 69CP-A	surface 6 33CP-A
surface 7 35CP-A	

2 for right wing -

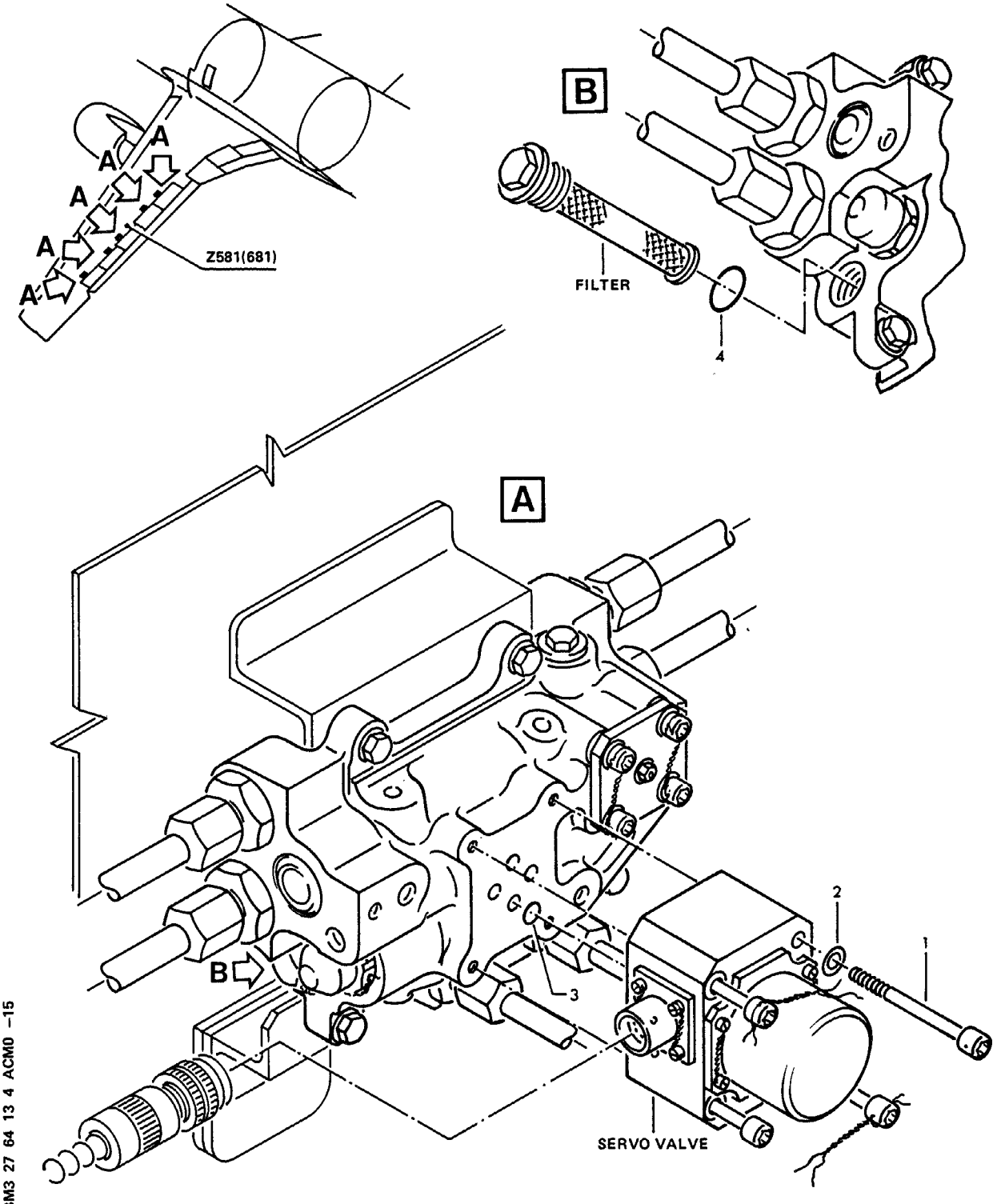
surface 3 30CP-A	surface 4 66CP-A
surface 5 68CP-A	surface 5 32CP-A
surface 7 34CP-A	

(q)Remove tags and safety clips and close the following circuit breakers:
1 for surface 3 - 5CP, 8CP
2 for surface 4 - 53CP, 54CP, 71CP, 72CP
3 for surface 5 - 55CP, 70CP

4 for surfaces 6 & 7 - 7CP, 9CP, 10CP, 54CP

C. Replacement of Servo Valve only
(Ref. Fig. 402)
(1)Removal
(a)Disconnect electrical connector from servo valve and fit protective caps to connections.
(b)Cut and discard lockwire, remove four screws (1) and washers (2) securing servo valve assembly.
(c)Lift servo valve assembly from valve group.
(d)Remove and discard four O-rings (3).
(e)If replacement servo valve is not to be installed immediately, cover exposed ports to prevent ingress of dirt.
(2)Installation
(a)Remove any covers or blanks which may have been temporarily installed on valve group body.
(b)Install four O-rings (3) in servo valve seatings.
(c)Position servo valve assembly on valve group body, secure with four washers (2) and screws (1).
(d)TORQUE screws (1) to between 0.39 and 0.48 m.daN (34 and 43 lbf.in.).
(e)Safety screws (1) with lockwire.
(f)Remove protective cap from servo valve electrical connector on valve group and connect control box PN 98A27608011000 to valve group.
(g)Pressurize hydraulic reservoir of system supplying valve group being worked on (Ref. 29-14-00, P. Block 301).
(h)Pressurize hydraulic system supplying valve group being worked on (Ref. 29-10-00, P. Block 301).
WARNING : BEFORE OPERATING SPOILER, MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACE IS CLEAR.
(i)Using control box PN 98A27608011000 operate spoiler ten times to remove air from valve group.
(j)Make certain that there are no leaks from valve group.
(k)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(l)Disconnect control box from valve group.
(m)Remove remaining protective cap and connect electrical connector to servo valve.
(n)Remove tags and safety clips and close the following circuit breakers:
1 for surface 3 - 5CP, 8CP
2 for surface 4 - 53CP, 54CP, 71CP, 72CP
3 for surface 5 - 55CP, 70CP
4 for surfaces 6 & 7 - 7CP, 9CP, 10CP, 54CP

D. Replacement of Filter only (Ref. Fig. 402)
(1)Removal
(a)Cut and discard lockwire.
(b)Slacken filter and withdraw from valve group body.
(c)Discard O-ring (4).
(d)If replacement filter is not to be installed immediately, install a blank in valve group filter port.
(2)Installation
(a)Install O-ring (4) on filter.



Servo Valve and Filter of Spoiler/Speedbrake Valve Groups
Figure 402

(b)Remove blank (if installed) from filter port on valve group body.
(c)Insert filter in valve group and tighten.
(d)TORQUE filter to between 1.3 and 1.5 m.daN (115 and 132 lbf.in.).
(e)Safety filter with lockwire.
(f)Pressurize hydraulic reservoir of system supplying valve group being worked on (Ref. 29-14-00, P. Block 301).
(g)Pressurize hydraulic system supplying valve group being worked on (Ref. 29-10-00, P. Block 301).
(h)Make certain that there are no leaks from valve group.
(i)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(j)Remove tags and safety clips and close the following circuit breakers:
1 for surface 3 - 5CP, 8CP
2 for surface 4 - 53CP, 54CP, 71CP, 72CP
3 for surface 5 - 55CP, 70CP
4 for surfaces 6 & 7 - 7CP, 9CP, 10CP, 54CP

E. Test
(1)Carry out functional test (roll test) (Ref. 27-11-00, P. Block 501).

F. Close-Up
(1)Remove tags and safety clips and close circuit breakers 10CV, 5CV and 6CV.
(2)Close access doors as follows:
(a)For left wing

surface 3	door number	581CB
surface 4	door number	581DB
surface 5	door number	581FB
surface 6	door number	581GB
surface 7	door number	581JB

(b)For right wing

surface 3	door number	681CB
surface 4	door number	681DB
surface 5	door number	681FB
surface 6	door number	681GB
surface 7	door number	681JB

WARNING : BEFORE OPERATING FLAPS, MAKE CERTAIN THAT TRAVEL RANGES OF THE SURFACES ARE CLEAR.
(3)Retract flaps (Ref. 27-50-00, P. Block 301).
(4)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(5)Remove access platform.
(6)Remove safety barriers.

SPOILER/SPEEDBRAKE ACTUATORS (SURFACES 3 THRU 7) (22CP THRU 27CP, 60CP THRU 63CP) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SURFACES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.8 m (12 ft.)
B. SL90-374-8750	Wrench - Notched, Tightening of Nuts NSA5454
C. SL90-314-8750	Tool - Extraction, Tab Washers STA-LOK NSA5454
D. SL90-313-8750	Tool - Installation, Tab Washers STA-LOK NSA5454 NOTE : The tools listed in items B. thru D. were previously part of tool kit PN 98A27608008000
E. 98A27608010000	Guide Bullets
F. 98A27608011000	Control Box - Spoiler, Valve Group
G. 98A27608013000	Safety Collar Set - Spoiler Actuator Piston
H. 98A27608014000	Safety Collar Set - Airbrake Actuator Piston
J. 98A27608015000	Setting Gage Set - Actuator Adjustment
K. 98A27608017000	Spanner Set - Spoiler/Speedbrake Actuator Piston
L.	Torque Wrench, 0.38 to 0.5 m.daN (33.6 to 44 lbf.in.)
M.	Torque Wrench, 8.0 to 10.0 m.daN (59 to 73.7 lbf.ft.) surfaces 5,6 and 7
N.	Torque Wrench, 11 to 12 m.daN (81 to 88.5 lbf.ft.)
P.	Torque Wrench, 15 to 23 m.daN (110 to 170 lbf.ft.) surfaces 3 and 4
Q.	Feeler Gages
Q.	Depth Gage
S.	Clinometer
T.	Circuit Breaker Safety Clips and Tags
U.	Safety Barriers

ITEM	DESIGNATION
V.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.) and 0.6 mm (0.024 in.)
W. Material No. 04-004	Common Greases (Ref. 20-31-00)
X. Material No. 05-002	Special Materials (Ref. 20-31-00).
Y. Material No. 06-002	Lubricants (Ref. 20-31-00)
Z. Material No. 09-003	Sealants (Ref. 20-31-00)

Referenced Procedures

- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-11-00, P. Block 501	Mechanical and Electrical Control (Aileron)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System

3. Procedure

A. Job Set-Up
(1)Position safety barriers.
(2)Extend flaps to 40° position (Ref. 27-50-00, P. Block 301).

(3)Open, safety and tag the following circuit breakers:
(a)For surfaces 3 thru 7

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(b)For surface 3

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU NORM SUPPLY/SPLR 2 ! 3	8CP	333/T62
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR 2 ! 3	5CP	335/R63

(c)For surface 4

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 1 ! 4	71CP	331/V62
133VU	FLT CTL/EFCU/LAND RECOVERY/SUPPLY/ SPLR 1 ! 4	72CP	333/T67
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR 1 ! 4	53CP	334/S63

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/LAND RECOVERY/SUPPLY/ SPLR 1 ! 4 ! 6 ! 7	54CP	334/S67

(d)For surface 5

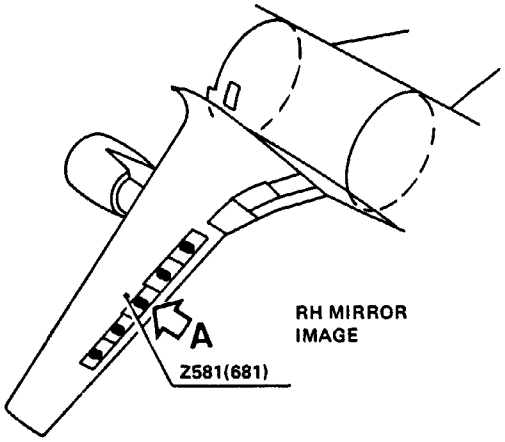
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/NORM SUPPLY/SPLR 5	70CP	333/T65
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR 5	55CP	334/S64

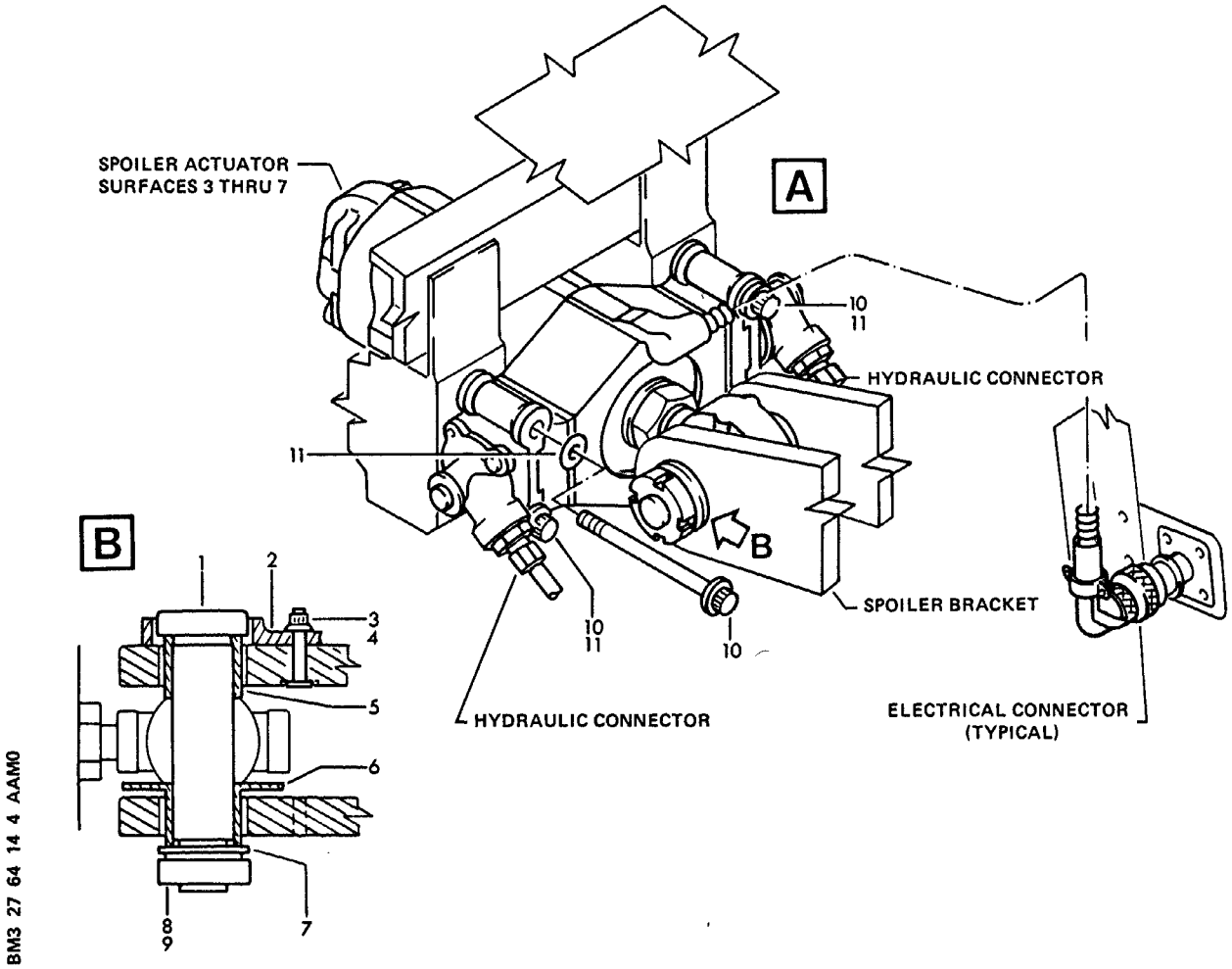
(e)For surfaces 6 and 7

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/EFCU/NORM SUPPLY/SPLR 6 ! 7	10CP	332/U62
133VU	FLT CTL/EFCU/LAND RECOVERY/SUPPLY/ SPLR 6 ! 7	9CP	333/T66
133VU	FLT CTL/LAND RECOVERY/SUPPLY/ SPLR 1 ! 4 ! 6 ! 7	54CP	334/S67
133VU	FLT CTL/EFCU TRANSDUCERS/NORM SUPPLY/ SPLR 6 ! 7	7CP	335/R62

(4)Position access platform.
(5)Depressurize hydraulic system supplying actuator to be removed (Ref. 29-10-00, P. Block 301).
(6)Depressurize hydraulic reservoir supplying actuator to be removed (Ref. 29-14-00, P. Block 301).

B. Removal
(Ref. Fig. 401)
(1)Set maintenance device on valve group controlling spoiler to be worked on in position 'M' and extend spoiler surface manually.
(2)Fit actuator safety collar.
(3)Disconnect electrical connectors as follows:
(a)For left wing
surface 3 connector number 1787VC
surface 4 connector number 1795VC
surface 5 connector number 1797VC
surface 6 connector number 1789VC
surface 7 connector number 1791VC
(b)For right wing
surface 3 connector number 1786VC
surface 4 connector number 1794VC
surface 5 connector number 1796VC
surface 6 connector number 1788VC
surface 7 connector number 1790VC
(4)Fit protective caps.





Spoiler Actuators, Surfaces 3 thru 7
Figure 401

(5)Disconnect hydraulic hoses and fit blanking plugs.
(6)Remove nut (4), bolt (3) and anti-rotation plate.
(7)Using STA-LOK extraction tool PN SL90-314-8750 remove tab washer (9).

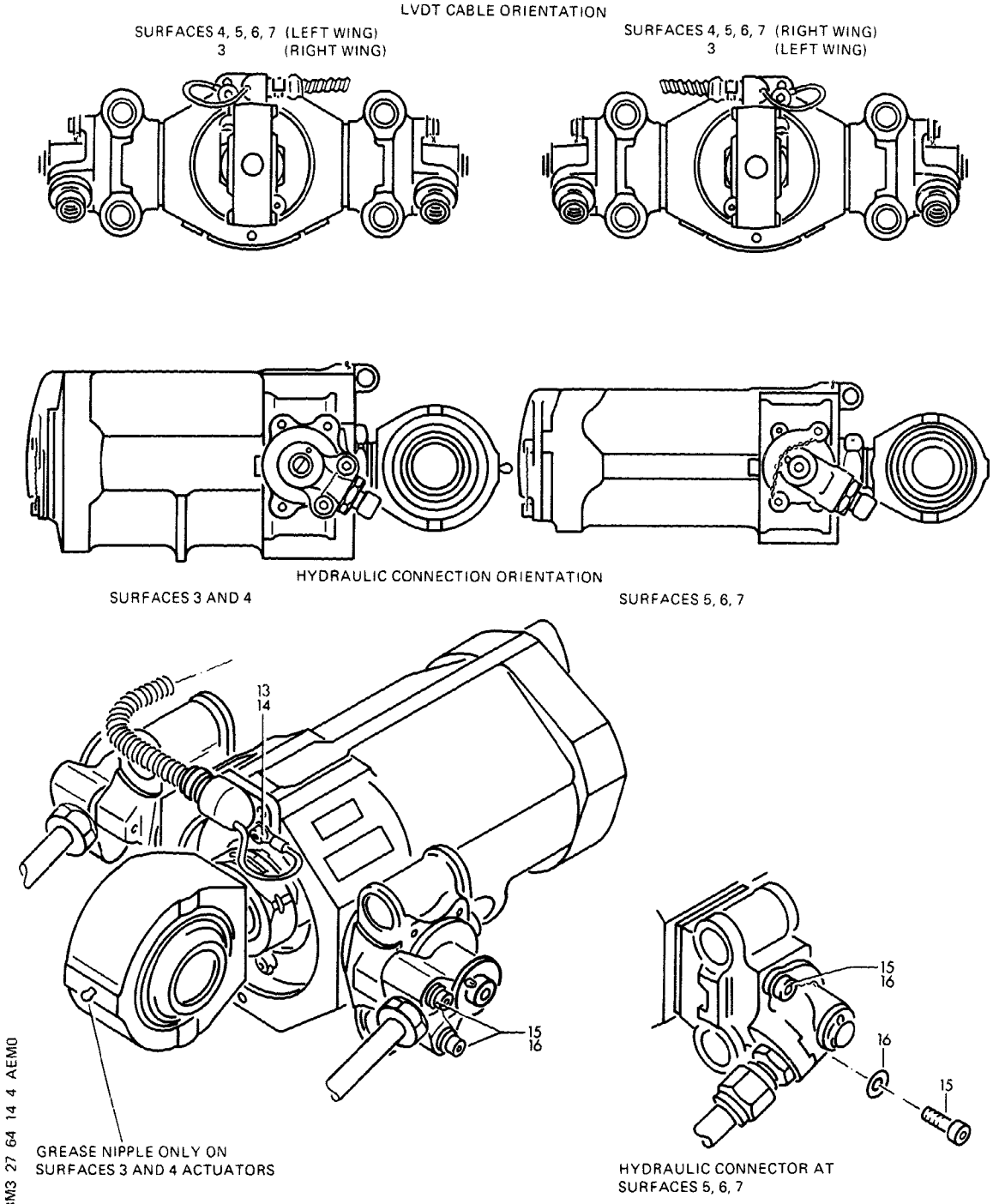
(8)Using STA-LOK notched wrench PN SL90-374-8750 remove nut (8).

(9)Remove washer (7) and bolt (1).
(10)Remove flanged bush (6) and plain bush (5) from spoiler surface bracket.

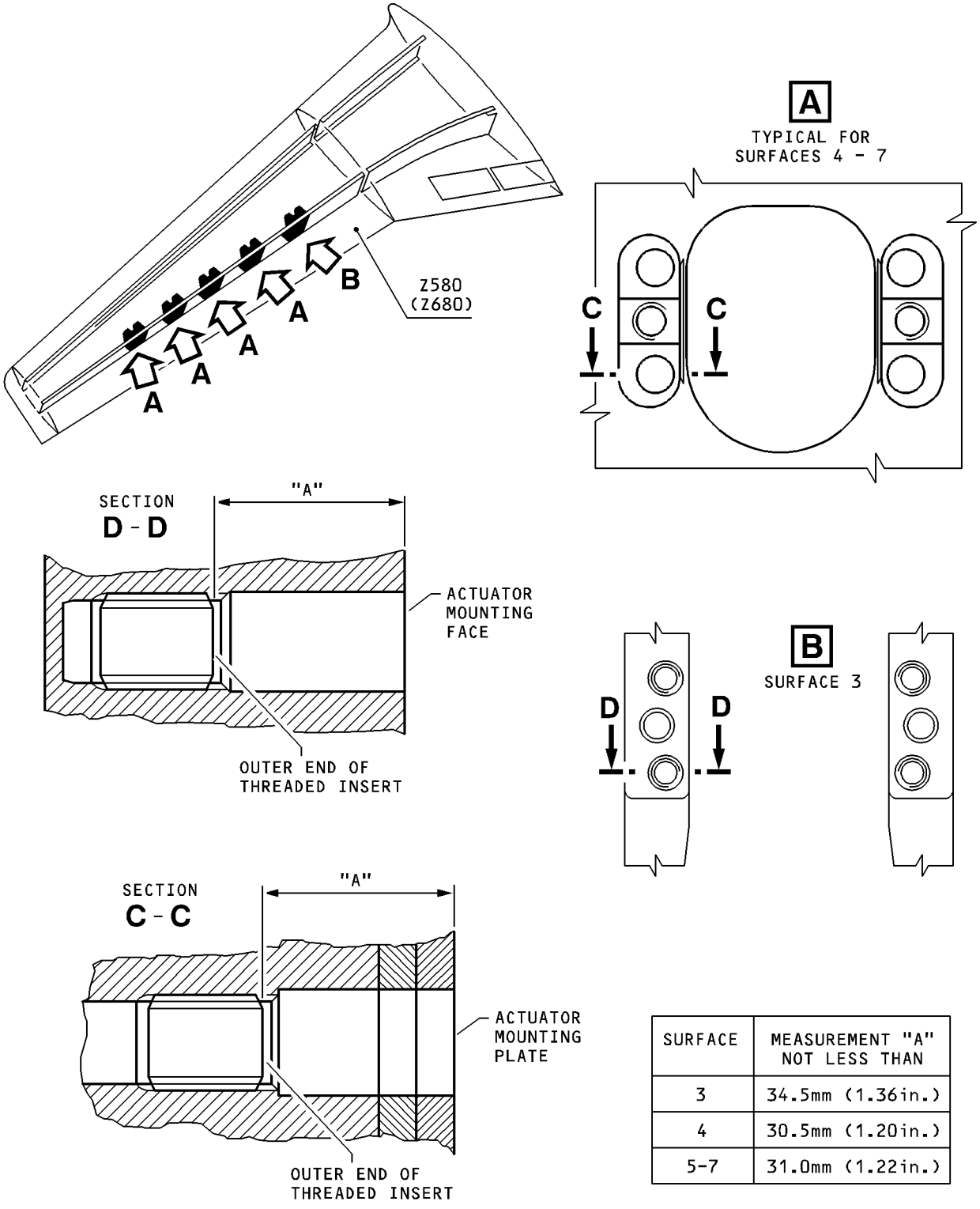
CAUTION : DURING REMOVAL, SUPPORT ACTUATOR BODY TO PREVENT DAMAGE TO HYDRAULIC PIPES BELOW.

(11)Cut and remove lockwire and remove four bolts (10) and washers (11) securing trunnions.
(12)Remove actuator from aircraft.

C. Preparation for Installation
(Ref. Fig. 402)
(1)Check that the LVDT cable is correctly orientated for actuator installed location, if not proceed as detailed below:
(a)Remove screw (13) and washer (14).
(b)Without withdrawing cable connector from actuator body, rotate connector to desired position.
(c)Position bonding lead and install washer (14) and screw (13) in lower hole in cable connector.
(2)TORQUE screw (13) to between 0.389 and 0.486 m.daN (34.4 and 43 lbf.in.) and safety with lockwire.
(3)Check that hydraulic connections are correctly orientated for actuator installed location, if not proceed as detailed below:
(a)Remove screws (15) and washers (16).
(b)Rotate hydraulic connection to desired position.
(c)Install washers (16) and screws (15).
(4)TORQUE screws (15) to between 0.389 and 0.486 m.daN (34.4 and 43 lbf.in.) and safety with lockwire.
(5)Using depth gage, check that no movement of trunnion bolt hole thread inserts has occurred.
NOTE : Dimension measured from face of wing mating surface of trunnion
R to outer end of threaded insert (Ref. Fig. 403).



Hydraulic and LVDT Cable Orientation
Figure 402



SURFACE	MEASUREMENT "A" NOT LESS THAN
3	34.5mm (1.36in.)
4	30.5mm (1.20in.)
5-7	31.0mm (1.22in.)

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Measurement of the Threaded Insert Position
Figure 403

R

D. Installation
(Ref. Fig. 404)

(1)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of actuator trunnion and bolts (10).

CAUTION : MAKE CERTAIN THAT THE POSITION OF THE LVDT IS ON TOP OF THE ACTUATOR.

(2)Position actuator and secure trunnions with washers (11) and bolts (10).

NOTE : Make certain that washers are installed correctly with chamfered faces against bolt heads.

(3)TORQUE bolts (10) to 18 m.daN (132.8 lbf.ft.) surfaces 3 and 4, 8.3 m.daN (61.2 lbf.ft.) surfaces 5, 6 and 7 and safety with lockwire.
(4)Extend actuator rod end and position eye end between spoiler surface brackets.
(5)Measure gaps between side of eye end bearing and inside of spoiler surface brackets.
(6)Lubricate outer diameter of bushes (5 and 6) with grease (Material No. 04-004) and install bushes in spoiler brackets.

NOTE : Flanged bush (6) to be installed in side of bracket with greatest clearance from eye end bearing.

(7)Remove blanking plugs and connect hydraulic hoses.
(8)Remove protective cover and connect electrical connectors as detailed below:
(a)For left wing

surface 3	connector number 1787VC
surface 4	connector number 1795VC
surface 5	connector number 1797VC
surface 6	connector number 1789VC
surface 7	connector number 1791VC

(b)For right wing

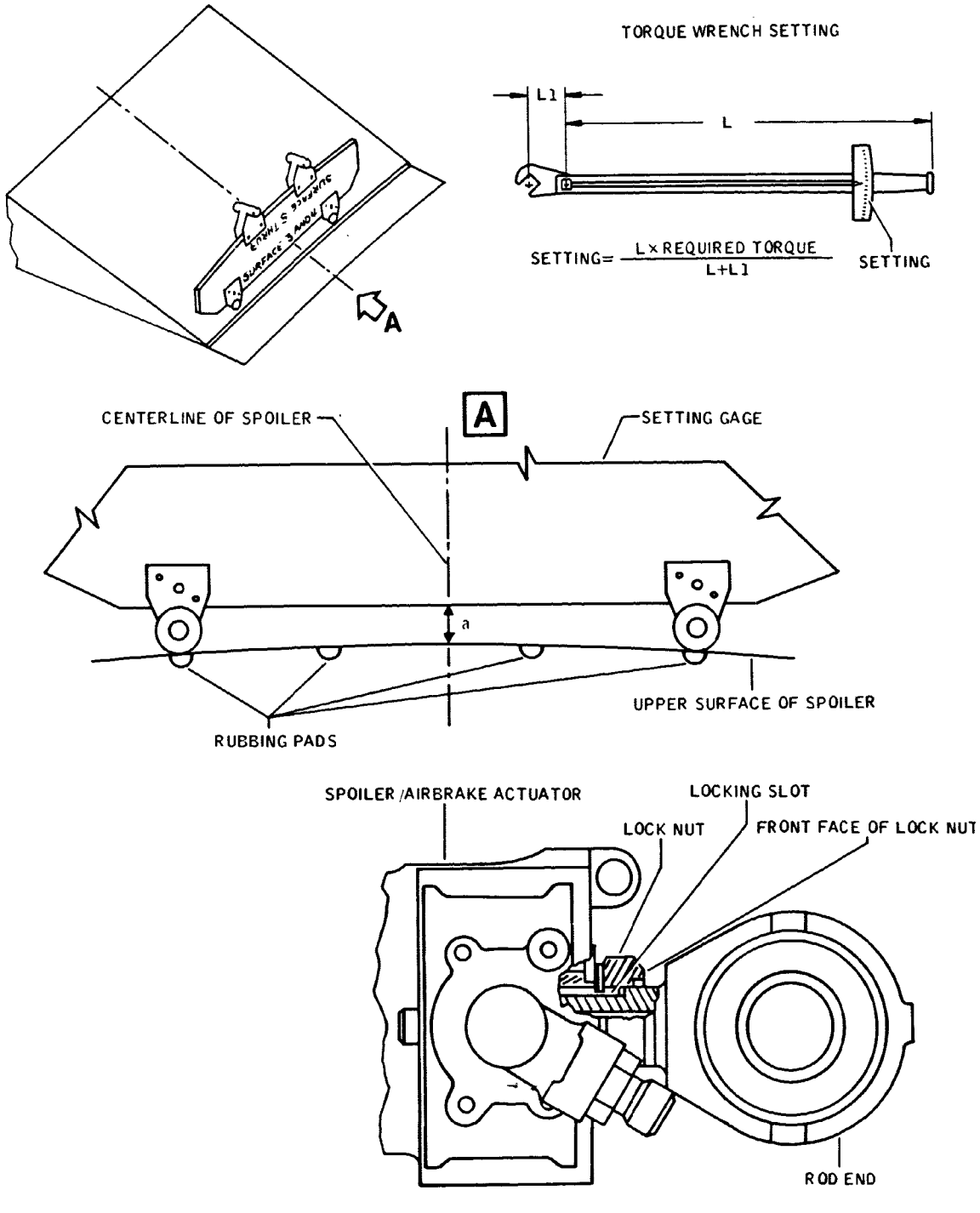
surface 3	connector number 1786VC
surface 4	connector number 1794VC
surface 5	connector number 1796VC
surface 6	connector number 1788VC
surface 7	connector number 1790VC

(9)Check fluid level in hydraulic reservoir supplying actuator being worked on, replenish as required (Ref. 12-12-29, P. Block 1).
(10)At valve group associated with actuator being worked on, disconnect electrical connector detailed below and connect control box PN 98A27608011000.
(a)On left wing -

surface 3 - 31CP-A	surface 4 - 67CP-A
surface 5 - 69CP-A	surface 6 - 33CP-A
surface 7 - 35CP-A	

(b)On right wing -

surface 3 - 30CP-A	surface 4 - 66CP-A



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Spoiler Actuator Adjustment
Figure 404

surface 5 - 68CP-A surface 6 - 32CP-A
surface 7 - 34CP-A.

(11)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(12)Make certain that electronics racks ventilation is correct.
(13)Pressurize hydraulic system supplying actuator being worked on (Ref. 29-10-00, P. Block 301).
(14)Make certain that maintenance device on valve group has returned to 'O' position.
(15)Using control box PN 98A27608011000, operate actuator ten times to remove air and to make certain that there is no leakage of hydraulic fluid.
(16)Retract actuator.
(17)With surface in retracted position adjust length of piston rod until bolt (1) can be installed using guide bullet PN 98A27608010000.
(18)Remove guide bullet.
(19)Apply lubricant (Material No. 06-002) to bolt threads and mounting face of nut (8).
(20)Install washer (7) and using STA-LOK notched wrench PN SL90-374-8750 install nut (8). TORQUE to between 11 and 12 m.daN (81 and 88.5 lbf.ft.).

(21)Using STA-LOK installation tool PN SL90-313-8750 install tab washer (9).

(22)Apply sealant (Material No. 09-003) to mating surfaces, install anti-rotation plate (2) and secure with bolt (3) and nut (4).
(23)Place setting gage PN 98A27608015000 on spoiler surface (Ref. Fig. 404) and measure surface bow (dimension 'a').
(24)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(25)Check fluid level in hydraulic reservoir supplying actuator being worked on, replenish as required (Ref. 12-12-29, P. Block 1).
(26)Set the maintenance device on the valve group in position 'M' and manually extend spoiler surface.

CAUTION : THE ADJUSTMENT OF SPOILER SURFACE BOW MUST BE CARRIED OUT WITH UTMOST CARE. UNDER NO CIRCUMSTANCE IS THE SURFACE TO BE SUBJECTED TO EXCESSIVE DEFORMATION.

(27)Using special tools PN 98A27608017000, adjust length of actuator rod by rotating piston rod to obtain correct value for dimension 'a' as detailed below.
(a)Dimension 'a' to be obtained when adjusting spoiler surface bow.

SURFACE No.	3	4	5	6	7
DIMENSION 'a'	3.45 mm (0.136 in.)	4.0 mm (0.157 in.)	3.40 mm (0.134 in.)	3.30 mm (0.130 in.)	2.90 mm (0.114 in.)

NOTE : All above dimensions are ±0.2 mm (0.0079 in.).

(b)Amount of alteration of deflection obtained per 360° rotation of piston rod.

SURFACE No.	3	4	5	6	7
	10.9 mm (0.429 in.)	10.9 mm (0.429 in.)	9.6 mm (0.378 in.)	8.6 mm (0.339 in.)	7.0 mm (0.276 in.)

(28)Tighten piston rod lock-nut.
(29)Manually retract spoiler surface.
(30)Pressurize hydraulic system supplying actuator being worked on (Ref. 29-10-00, P. Block 301).
(31)Make certain that maintenance device on valve group has returned to position 'O'.
(32)Place setting gage on surface and check bow (dimension 'a') (Ref. Fig. 404).
(33)If correct value for dimension 'a' is still not obtained, repeat steps D.(24) thru D.(31).
(34)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(35)Set maintenance device on valve group in position'M' and extend spoiler manually.
(36)Using special tools PN 98A27608017000, TORQUE piston rod lock nut to between 18 and 20 m.daN (133 and 147 lbf.ft.) surfaces 3 and 4, 8 and 9 m.daN (59 and 66 lbf.ft.) surfaces 5, 6 and 7.

NOTE : To calculate torque wrench setting for piston rod lock nut, proceed as follows:

$$\text{setting} = \frac{L \times \text{required torque}}{L + L1}$$

where: L = torque wrench length from end of handle to center of square drive
L1 = 65 mm (2.559 in.) for tool No. 98A27608017001
= 80 mm (3.150 in.) for tool No. 98A27608017002
= 80 mm (3.150 in.) for tool No. 98A27608017003

CAUTION : INSUFFICIENT TIGHTENING OF PISTON ROD LOCK NUT CAN LEAD TO SERIOUS DAMAGE OF THE ACTUATOR EYE-END.

(37)Make certain that after adjustment, locking slot in threaded end of rod does not extend beyond front face of lock-nut (Ref. Fig. 404).
(38)Safety lock-nut with lockwire.
(39)Manually retract spoiler.
(40)Pressurize hydraulic system supplying actuator being worked on (Ref. 29-10-00, P. Block 301).
(41)Make certain that maintenance device on valve group has returned to position 'O'.
(42)Using control box PN 98A27608011000, fully extend surface, and using clinometer, check that deflection obtained is at least 51° for surfaces 3, 5 and 7, and at least 50.5° for surfaces 4 and 6.
(43)Retract spoiler surface.
(44)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(45)Disconnect control box from valve group.
(46)Reconnect electrical plug disconnected in step D.(10).
(47)Remove safety clips and tags and close the following circuit breakers:
(a)For surface 3: 8CP, 5CP.
(b)For surface 4: 53CP, 54CP, 71CP, 72CP.

(c)For surface 5: 55CP, 70CP.
(d)For surfaces 6 and 7: 7CP, 9CP, 10CP, 54CP.

E. Test

R (1)Carry out operational test (roll test) (Ref. 27-11-00, P. Block 501).

F. Close-Up

(1)Remove safety clips and tags and close circuit breakers 10CV, 5CV and 6CV.
(2)Retract flaps (Ref. 27-50-00, P. Block 301).
(3)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(4)Shut down and disconnect hydraulic ground power supply.
(5)Remove access platform and safety barriers.

CONTROL SURFACE POSITION INDICATING (SPOILERS AND SPEEDBRAKES)
DESCRIPTION AND OPERATION

1. General

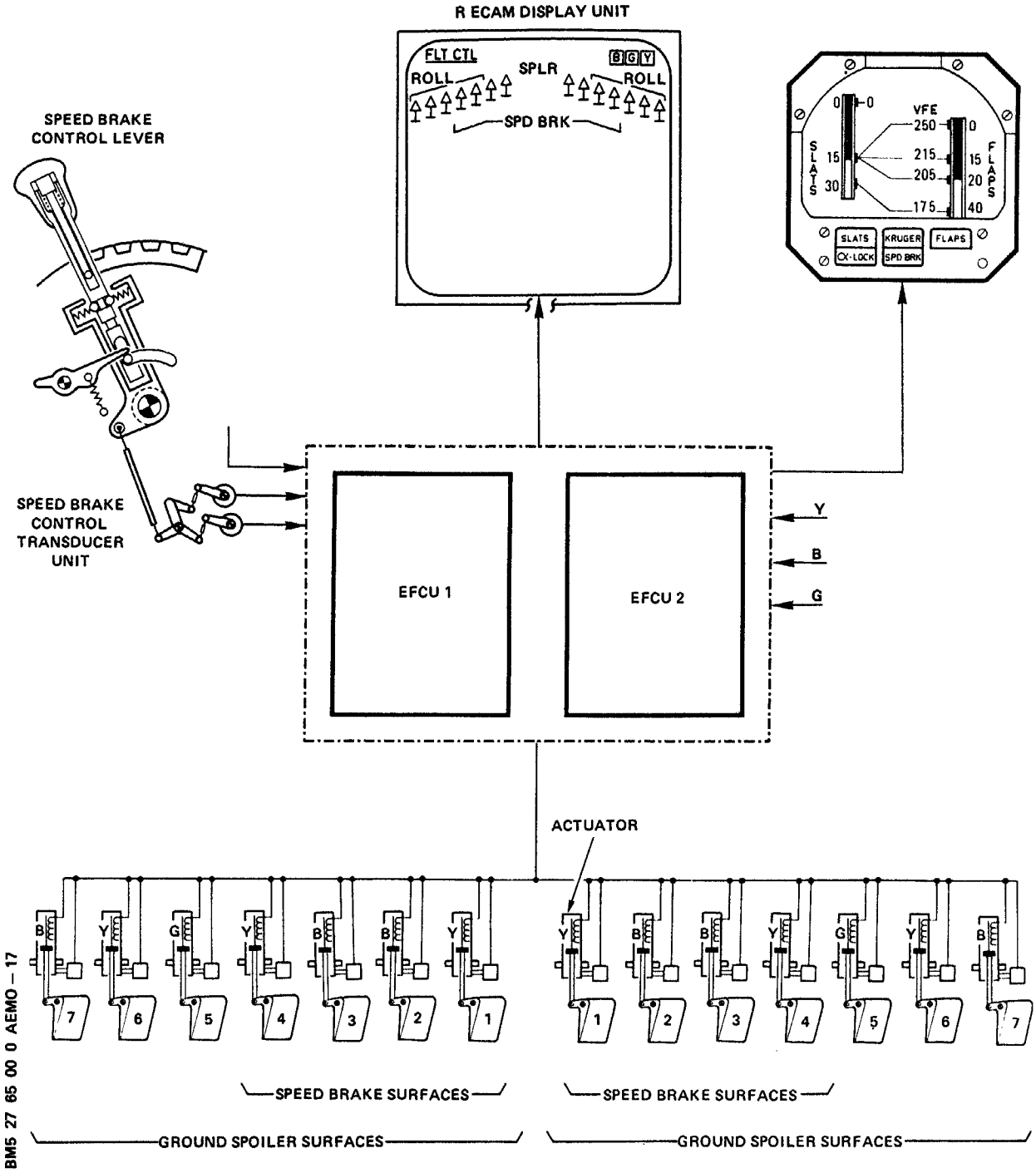
(Ref. Fig. 001)

Position of spoilers 1 through 7 is indicated on the right **ECAM** display unit together with the hydraulic systems available for the actuators (Ref. 27-00-00).

Position of spoilers 3 through 7 (Roll spoilers) is also indicated on right **ECAM** display unit depending on the number of roll spoilers extended (Ref. 27-15-00 and 27-60-00).

Extension of spoilers 1 through 4 (speedbrake mode) is also indicated on slat flap position indicator (**SFPI**).

This information is confirmed by the **SPEED BRAKE** control lever position on center pedestal.



Speedbrake and Ground Spoiler - Block Diagram
Figure 001

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Operational/Functional Test

A. Reason for the Job
Check correct operation of speedbrake position indicating on R ECAM display unit, FLT CTL page, SPD BRK scale.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC Electrical Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)

C. Procedure
(1)Job set up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(b)Pressurize hydraulic systems either :
- using hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
- or using Green auxiliary power (Ref. 29-21-00, P. Block 301), Blue auxiliary power (Ref. 29-22-00, P. Block 301) and Yellow auxiliary power (Ref. 29-23-00, P. Block 301).
(c)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/2 & 3	5CP	335/R63
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/6 & 7	7CP	335/R62
133VU	EFCU/NORM/SUPPLY/SPLR 2 & 3	8CP	335/T62

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU/LAND RECOVERY/NORM SUPPLY/SPLR/6 & 7	9CP	333/T66
133VU	EFCU/NORM/SUPPLY/SPLR 6 & 7	10CP	332/U62
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/1 & 4	53CP	334/S63
133VU	LAND/RECOVERY/SUPPLY/SPLR/1 & 4 & 6 & 7	54CP	334/S67
133VU	EFCU/TRANSDUCERS/NORM SUPPLY/SPLR/5	55CP	334/S64
133VU	EFCU/NORM/SUPPLY/SPLR 5	70CP	333/T65
133VU	FLT CTL/EFCU/NORM/SUPPLY/SPLR 1 & 4	71CP	331/V62
133VU	EFCU/LAND RECOVERY/SUPPLY/SPLR/1 & 4	72CP	333/T67

(d)On ECAM control panel 11VU
- press F/CTL pushbutton switch to call FLT CTL page on the R ECAM display unit

(e)Make certain that flap and slat control lever is in first notch position.

(f)Make certain that SPEED BRAKE control lever is in RET notch position, ground spoiler function not preselected.

(g)On SPLR and SPD BRK section of panel 428VU
- make certain that SPLR & SPD BRK (FAULT/OFF/R) pushbutton switches 3 & 2, 4 & 1 are pressed (in) and legends off.

(2)Test

ACTION	RESULT
1. Move SPEED BRAKE control lever notch by notch from RET position to FULL position	On R ECAM display unit, FLT CTL page, SPD BRK scale : - arrows representing surfaces 1 to 4 on both wings appear as soon as lever is placed in 3rd notch On slat/flap indicator SPD BRK indicator light comes on
2. Move SPEED BRAKE control lever to RET position	On R ECAM display unit, FLT CTL page, SPD BRK scale : - arrows disappear, only horizontal dashes persist. On slat/flap indicator SPD BRK indicator light goes off.

(3)Close-up

(a)Shut down hydraulic power supply. Depressurize systems. Where applicable, disconnect hydraulic ground power cart.

(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

LIFT AUGMENTING (SLATS AND KRUEGER FLAPS) DESCRIPTION AND OPERATION

1. General

The wing leading edge slat and Krueger flap control surfaces are electrically controlled and hydraulically actuated. They provide lift augmentation for take-off, approach and landing.
Lift augmentation is achieved on each wing by:
- inner, center and outer leading edge slats
- a Krueger flap located between the inner slat and the fuselage,

working in conjunction with:
- one inner double-element trailing edge flap
- one outer single-element trailing edge flap
- the all-speed aileron which droops when the Krueger flaps are extended.

The three slats occupy the full span of the wing leading edge. Each slat is attached to curved tracks. The inner slat has 3 tracks; the center and outer slats have 4 tracks each. The tracks are supported by rollers attached within the fixed leading edge, which provide support and guidance for the slat during extension and retraction.
A folding door on the inner slat allows the slat to extend over the engine pylon.
The Krueger flaps operate in conjunction with the leading edge slats. When the slat/flap control lever is moved from SLATS 0 to SLATS 15 or SLATS 30, the Krueger flaps extend to the fully-out position. When SLATS 0 is reselected, the Krueger flaps return to the fully-in position when the slats are below 15 degrees.
When the aircraft angle of attack (alpha) exceeds 9°, retraction of the slats beyond their 15° position is inhibited by the alpha-lock function of the SFCC's.
The alpha-lock function automatically resets should alpha reduce below 8°.
The air data computers (ADC) automatically set the corrected alpha value to 0° when airspeed is below 60 knots, inhibiting the alpha-lock function when the aircraft is on the ground. The alpha-lock function is also inhibited should alpha increase to 9° or more once the slats have started moving from 15° to 0°.

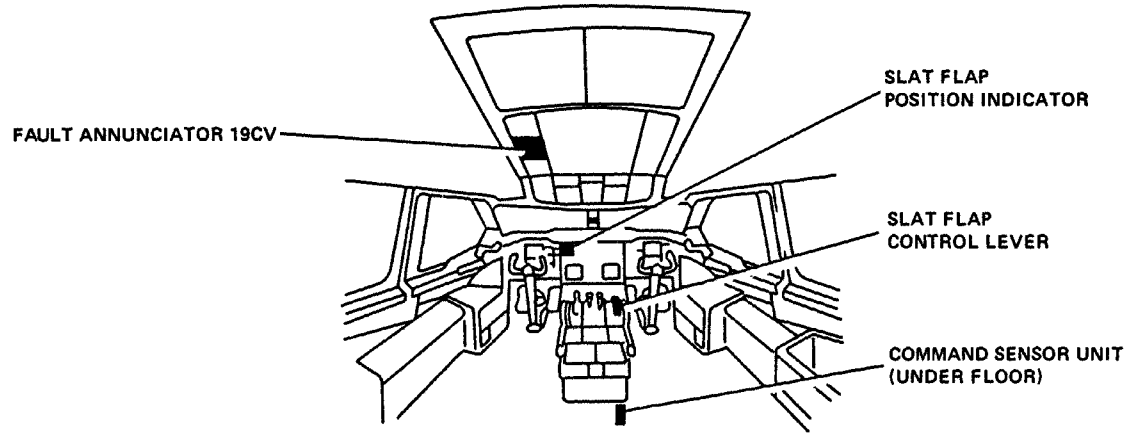
2. Description

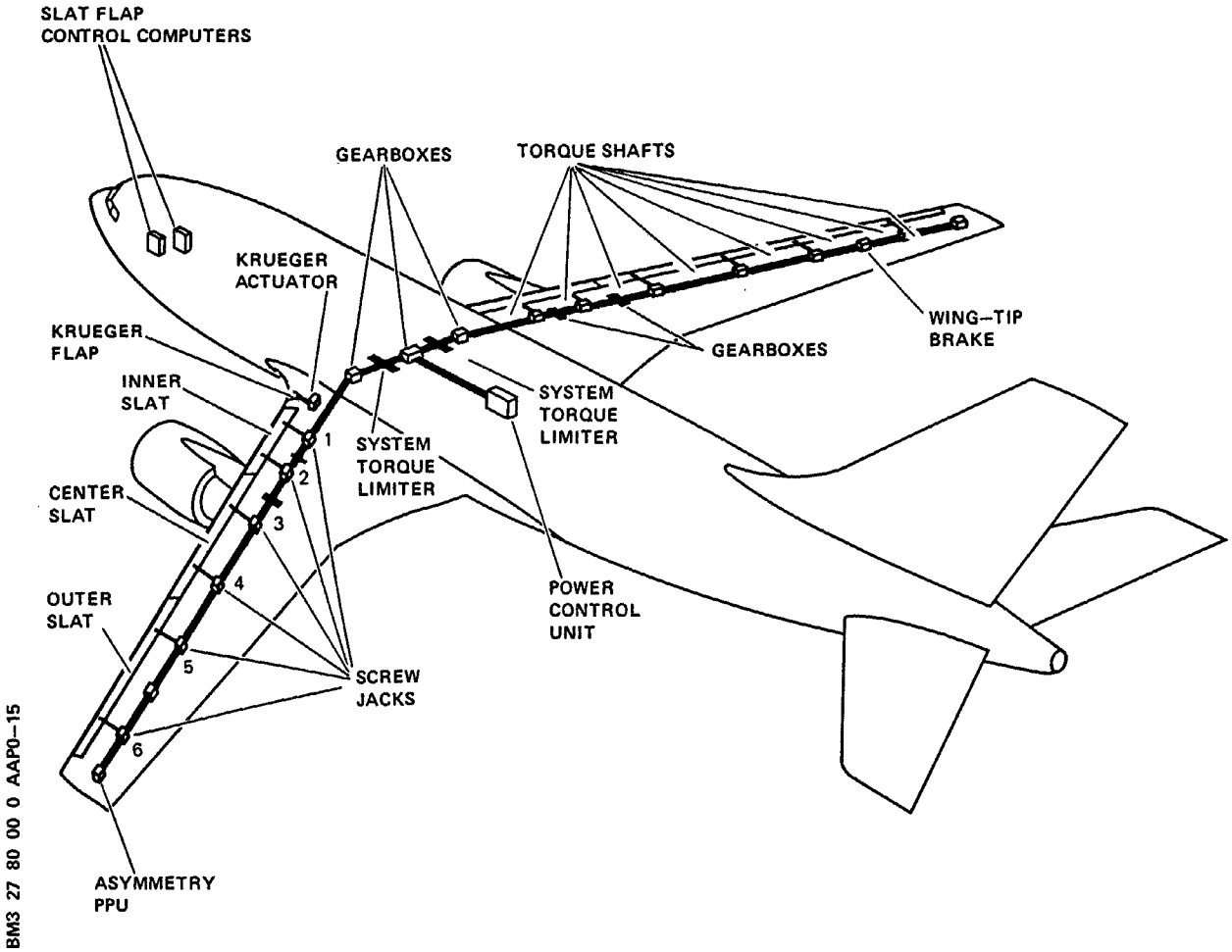
(Ref. Fig. 001)

A. Mechanical and Electrical Control (Slats) (Ref. 27-81-00)

(1) The slat mechanical and electrical control system comprises:
- a slat/flap control lever located on the center pedestal
- a command sensor unit (CSU) located in the electronics bay.

(2) The slat electrical control system comprises:
- two slat flap control computers (SFCC 1 and SFCC 2) located in the electronics bay
- a feedback position pick-off unit (feedback PPU) located on the power control unit (PCU) (Ref. Para. B)
- two valve blocks located on the PCU
- SLATS SYS 1 FAULT and SLATS SYS 2 FAULT annunciators (19CV) located





Slat System Components - Location
Figure 001

on the overhead panel.

B. Hydraulic Actuation and Power Transmission (Slats) (Ref. 27-84-00)
Hydraulic actuation and power transmission comprises a PCU, located in the hydraulic compartment, which is mechanically linked to the slats by:
- torque shafts, torque limiters, gearboxes and joints
- six screw jacks which provide the final drive to the slat control surfaces.

C. Position Indicating (Slats) (Ref. 27-85-00)
Position indicating is provided by:
- an instrumentation PPU, located on the PCU
- a slat/flap position indicator located on the center main instrument panel.

D. Asymmetry and Power Transmission Monitoring (Slats) (Ref. 27-86-00)
Asymmetry and power transmission monitoring is achieved by:
- an asymmetry PPU, attached to the outboard end of screw jack 6 in each wing
- a wing tip brake, located between screw jacks 5 and 6 in each wing.

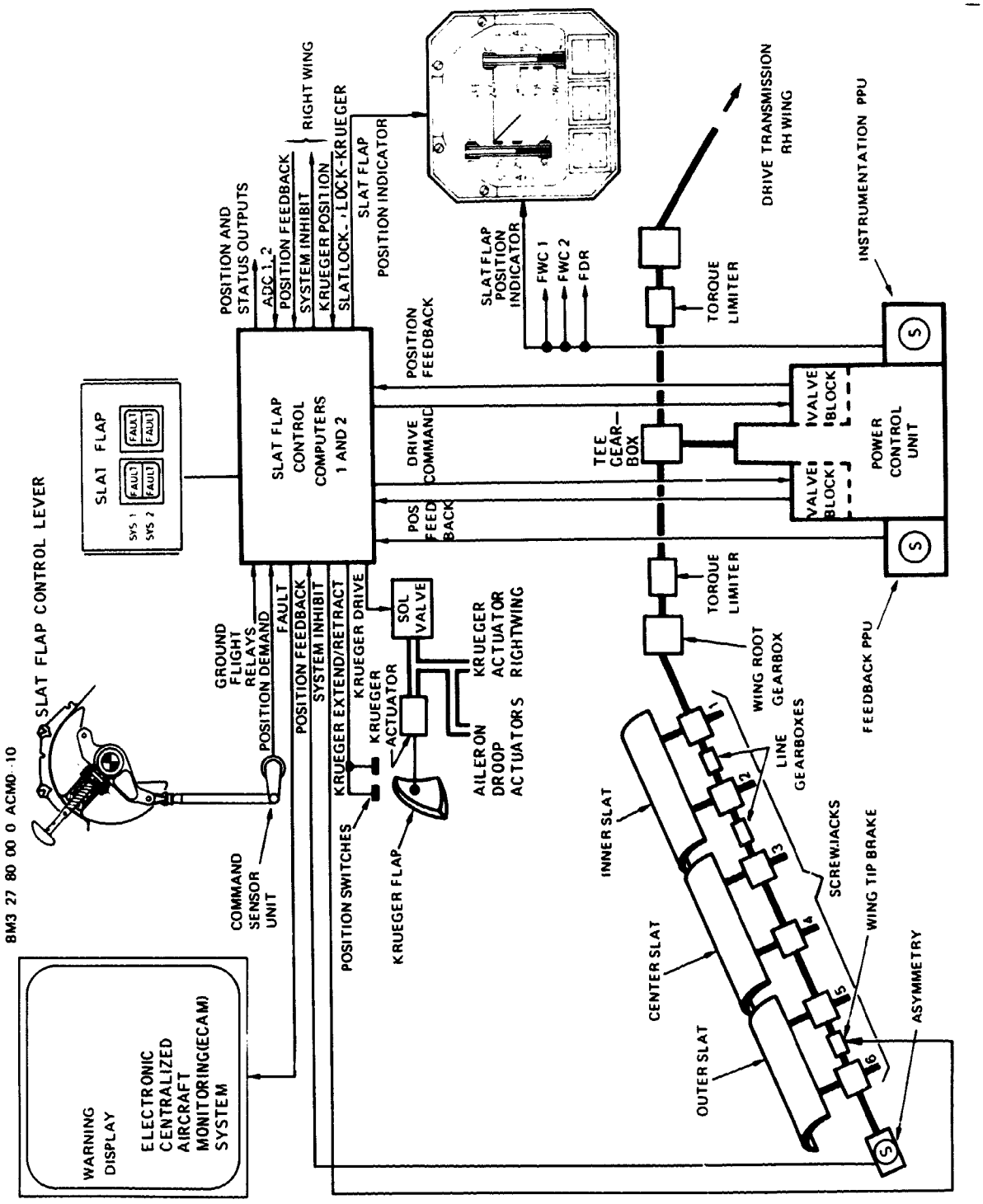
E. Krueger Flap Control (Ref. 27-87-00)
Krueger flap control is provided by:
- the slat/flap control lever
- the CSU
- SFCC 1 and SFCC 2
- a Krueger selector solenoid valve (selector valve) located in the hydraulic compartment.

F. Krueger Flap Hydraulic Actuation (Ref. 27-88-00)
Krueger flap hydraulic actuation is effected by:
- the selector valve
- a non-return valve and a safety valve, located in the hydraulic compartment
- two hydraulic actuators, one located in each wing.

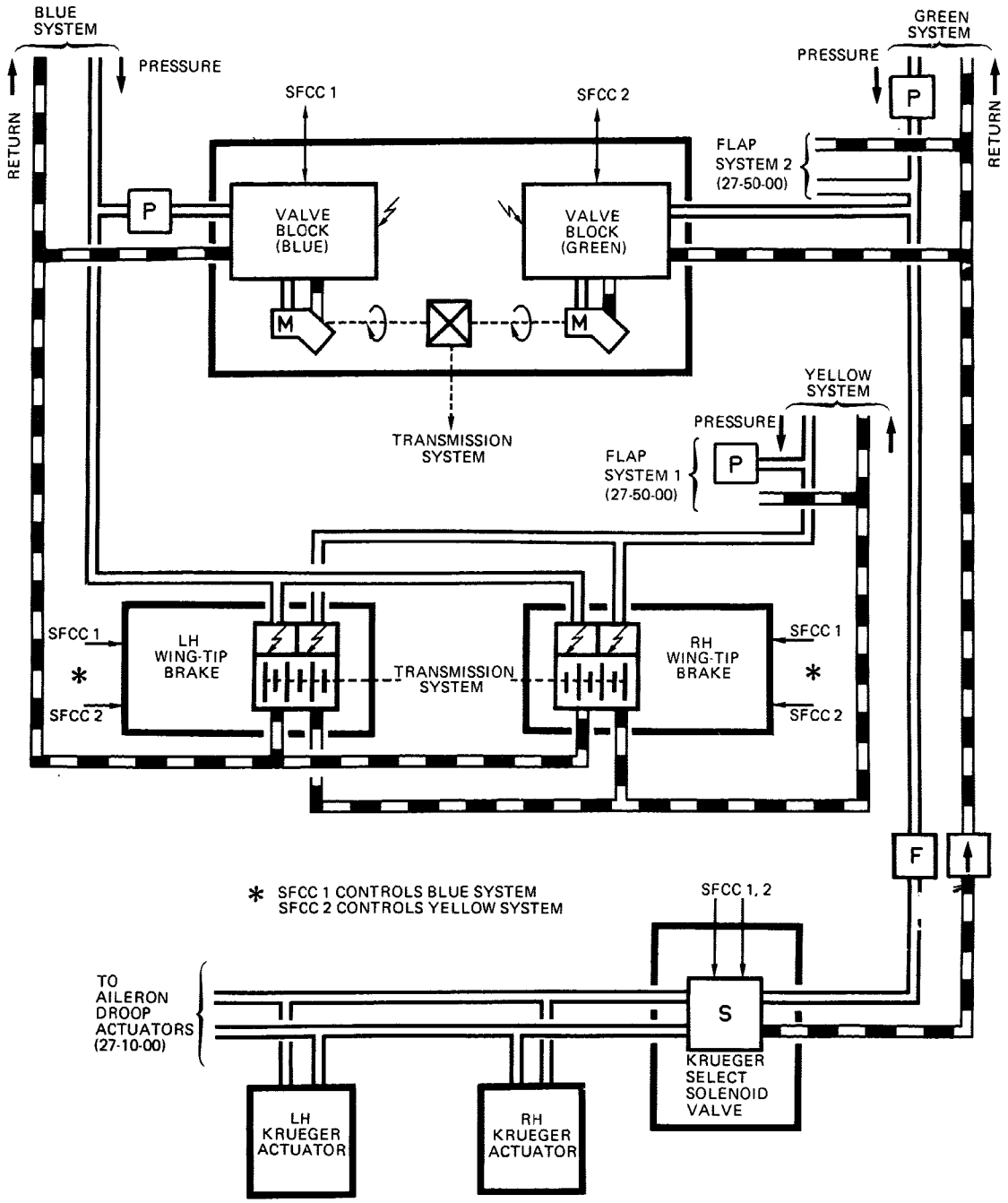
G. Krueger Flap Position Indicating (Ref. 27-89-00)
There is no Krueger flap position display. Position indication is provided for SFCC 1 and SFCC 2 by four microswitches, one extend and one retract on each flap.
If a Krueger flap is not in the commanded position, a KRUGER fault annunciator on the slat/flap position indicator comes on.

3. Operation
(Ref. Fig. 002)
(Ref. Fig. 003)

A. Mechanical and Electrical Control (Slats)
(1)Mechanical control of the slats is achieved by operation of the slat/flap control lever. Movement of the control lever is transmitted to the CSU which converts the lever position into electrical position demand signals.



Slat and Krueger Flap Drive - Schematic Diagram
Figure 002



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Hydraulic System - Schematic Diagram
Figure 003

(2)The electrical position demand signals are passed to SFCC 1 and SFCC 2 for comparison with feedback signals supplied by the feedback PPU, the PCU valve blocks, and air data information supplied by ADC 1 and ADC 2.
(3)The SFCCs generate appropriate drive command signals which are transmitted to the PCU valve blocks. The valve blocks initiate hydraulic actuation.
(4)Electrical control includes continuous and interruptive test facilities using the SFCC BITE circuits. The interruptive test routine is initiated using the rotary selector on maintenance panel 471VU, section FLIGHT CONTROLS. System status is indicated by the following:
- electronic centralized aircraft monitoring (ECAM) system (Warning CRT)
- SLATS SYS FAULT 1 and SLATS SYS 2 FAULT annunciator (19CV) on the overhead panel (428VU)
- slat/flap position indicator
- SFCC front panel BITE display.
- KRUGER annunciator on the slat/flap position indicator.

(5)An SFCC removed warning relay 90CV, system 1, (92CV system 2) receives DC power when the system is on and is energized through an internal link within the SFCC. If the SFCC is removed, the relay is de-energized and the appropriate system FAULT annunciator comes on.

B. Hydraulic Actuation and Power Transmission (Slats)
(1)Hydraulic actuation is achieved by the two hydraulic motors installed in the PCU. Each hydraulic motor is powered by a particular hydraulic system (BLUE or GREEN). The valve blocks control the speed and direction of the hydraulic motors by regulating the supply of hydraulic fluid.
(2)The two hydraulic motors drive the transmission system via a differential gearbox, causing the slat control surfaces to move to the selected position.
(3)In the event of a single hydraulic failure, or failure of one SFCC, the transmission system will operate at approximately half the normal speed.

C. Position Indicating (Slats)
(1)Slat position is indicated to the flight crew by the SLATS vertical bar display on the slat/flap position indicator. The display is driven by inputs from the instrumentation PPU which also provides independent slat position information for other systems.
(2)Slat position discretes and digital data are provided by the SFCCs.

D. Asymmetry and Power Transmission Monitoring (Slats)
(1)The asymmetry PPUs enable the SFCCs to monitor the transmission for asymmetry, runaway and overspeed conditions.
(2)If an asymmetry, runaway or overspeed condition is detected, the wing tip brakes are applied and PCU operation is inhibited, preventing further movement of the transmission system.

E. Krueger Flap Control
(1)Krueger flap control is effected by the slat drive circuits in SFCC 1 and SFCC 2.

(2)Movement of the slat/flap control lever causes both SFCCs to computer a "retract" or "extend" command for the selector valve.

F. Krueger Flap Hydraulic Actuation
(1)The selector valve controls two hydraulic actuators which operate the Krueger flap surfaces through a reverse link.
(2)On receipt of a "retract" or "extend" input from the SFCCs, the selector valve supplies GREEN system hydraulic fluid to the hydraulic actuators, causing the Krueger flaps to extend or retract as required.
(3)When the surfaces have reached the fully extended or fully retracted position, the command from the SFCCs will remain until the alternative position is selected.

G. Krueger Flap Position Indicating
(1)Krueger flap drive status is indicated to the flight crew by the KRUGER warning light on the slat/flap position indicator.
(2)The "extended" or "retracted" position switches are monitored by SFCC 1 and SFCC 2 which produce status discretes for the KRUGER warning light and for the flight warning computer 2 (FWC 2).

4. Interfaces
(Ref. Fig. 004)
The lift augmenting system interfaces with the following systems:

A. Maintenance Indicator Resetting
The read and reset functions interface with the slat/flap maintenance indicators.

B. Air Data System
Digital air data computers 1 and 2 transmit air data information to both SFCCs.

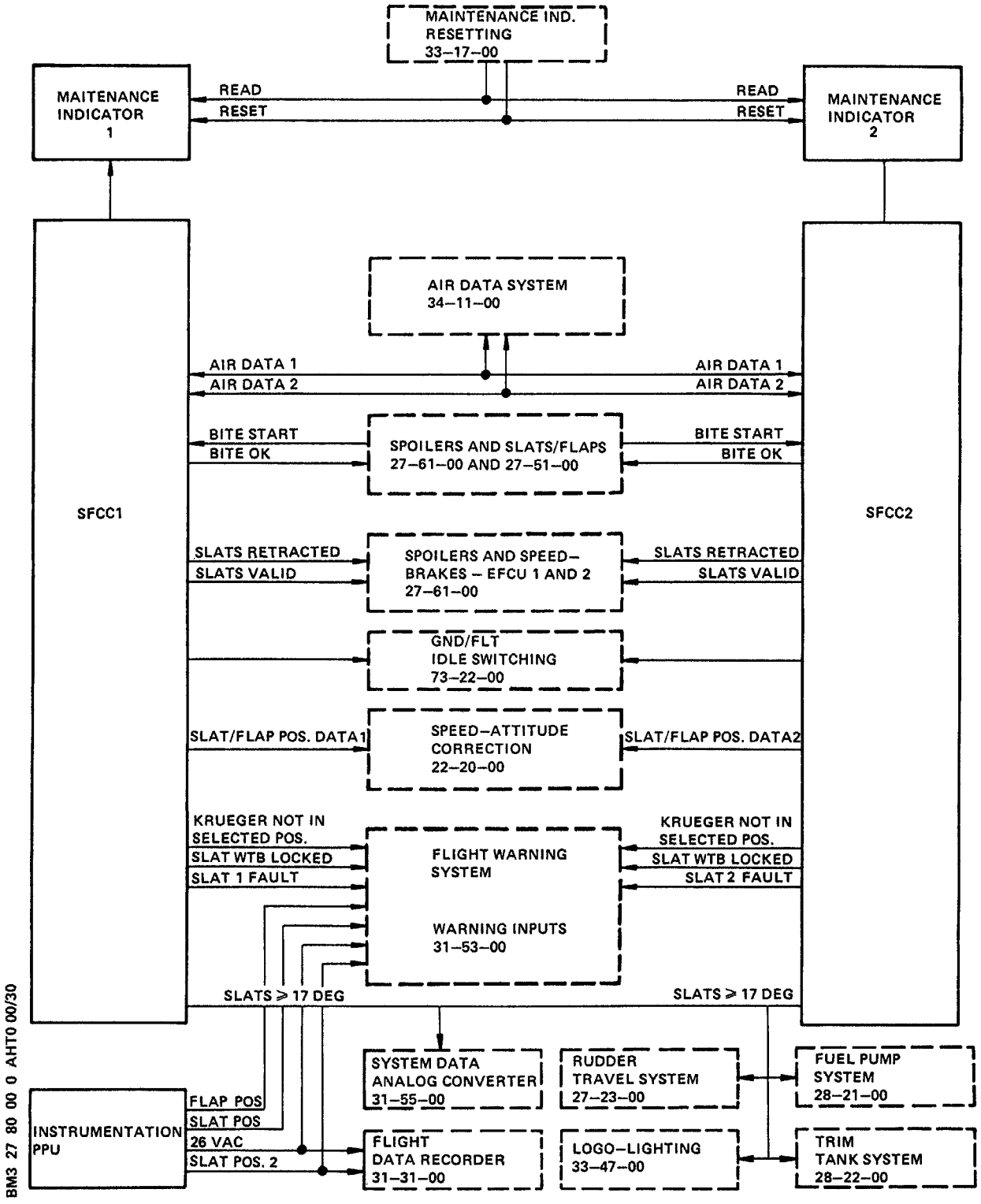
C. Spoiler and Speedbrakes
Slat BITE controls and indicators are shared with the spoiler test circuits.

D. Roll Control
Electronic flight control units 1 and 2 receive slats retracted and slats valid signals from the SFCCS.

E. Speed Attitude Correction
Flight augmentation computers 1 and 2 receive slat and flap position data from SFCC 1 and SFCC 2.

F. Electronic Centralized Aircraft Monitoring (ECAM)
The flight warning computers 1 and 2 receive status and position information from the SFCCs, control switches and instrumentation PPU.

G. Rudder Travel System
The Rudder Travel System receives a slat >17° signal from SFCC1 and SFCC2.



Interfaces - Block Diagram
Figure 004

H. Fuel Pump System
The Fuel Pump System receives a slat >17° signal from SFCC1 and SFCC2.

I. Logo Lighting
The logo-light circuit receives slat ≥17 deg. signal from SFCC 1 and SFCC 2.

J. Trim Tank System
The trim tank system receives a slat >17° signal from SFCC1 and SFCC2.

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WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Extension and Retraction of Slats with Aircraft System

A. Reason for the Job

(1)Operation of slats and Krueger flaps to extended or retracted position to gain access to components for maintenance.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Safety Barriers
(2)	Circuit Breaker Safety Clips and Tags

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power

C. Procedure

(1)Job Set-Up

(a)Position safety barriers.

(b)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(c)Make certain that electronics racks ventilation is correct.

(d)Pressurize GREEN hydraulic system (Ref. 29-21-00 or 29-10-00, P. Block 301).

NOTE : The slat system can be operated by the GREEN and/or BLUE hydraulic system. If required use alternative hydraulic system, although if BLUE system alone is utilized, Krueger and Aileron Droop are inoperative.

(e)To avoid flap operation, open, safety and tag the following circuit

breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC/LAND RECOVERY/ SUPPLY/FLAPS/SYS 1	10CV	335/R67

(f)Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SLATS/WTB 2	14CV	336/Q64
133VU	FLT CTL/SLATS/WTB 1	13CV	336/Q65

WARNING : BEFORE OPERATING SLATS AND KRUEGER FLAPS, MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.

(2)Positioning of Slats and Krueger Flaps to Gain Access for Maintenance

NOTE : If operation of Krueger flap and aileron droop is not desired, open, safety and tag circuit breaker 45CV.

(a)Extension of slats and Krueger flaps

1 On center pedestal, set slat/flap control lever to required position (15°, 20° or 30°). Check that slat surfaces move to selected position and Krueger flaps fully extend.

NOTE : The ailerons will droop 6.6° from neutral position, if aileron servocontrol systems are pressurized.

(b)Retraction of slats and Krueger flaps

1 On center pedestal, set slat/flap control lever to SLATS 0/FLAPS 0. Check that slat and Krueger flap move to fully retracted position.

NOTE : The ailerons will move to neutral if aileron servocontrol systems are pressurized.

(3)Close-Up

(a)Depressurize GREEN hydraulic system (Ref. 29-21-00 or 29-10-00, P. Block 301).

(b)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(c)Remove safety clips and tags and close circuit breakers 10CV, 5CV, 6CV and 45CV if it has been opened.
(d)Remove safety barriers.

2. Retraction of Slats to Zero Position using Wing-Tip Brake Test Tool

Refer to 27-50-00, P. Block 301.

3. Manual Operation of Slat Transmission System

A. Reason for the Job

(1)To operate the slat transmission system manually.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3 m (10 ft.)
(2) 98A27808003000	Drive Tool - 24 Teeth
(3) 98A27808007000	Locking Device - Slat Drive Shaft
(4)	Safety Barriers
(5)	Warning Notice Prohibiting Pressurization of Hydraulic Systems
(6)	Pneumatic Motor
(7)	Circuit Breaker Safety Clips and Tags

Referenced Procedures

- 27-56-00, P. Block 501	Asymmetry and Power Transmission Monitoring (Flaps)
- 27-80-00, P. Block 501	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-21, P. Block 401	Transmission Shafts
- 27-86-11, P. Block 401	Asymmetry Positon Pick-Off Unit
- 29-10-00, P. Block 301	Main Hydraulic Power-Pressurization/ Depressurization

C. Procedure

(1)Job Set-Up
(a)Position safety barriers.
(b)Make certain that slats are in fully retracted position.

NOTE : If possible, the manual operation of slats should always be started from slats fully retracted position. This avoids adjustment of the Position Pick-Off Units.

(c)Depressurize the GREEN, Blue and Yellow hydraulic system (Ref. 29-10-00 P. Block 301).
(d)Position warning notice prohibiting pressurization of the hydraulic systems
(e)Open, safety and tag the following circuit breakers.

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY SLATS/SYS 1	9CV	333/T66

(f)Open access doors 512BB, (612BB).
(g)Remove the Asymmetry Position Pick-Off Unit (APPU) (Ref. 27-86-11, P. Block 401).
(h)Remove transmission shaft 5275 (5423) inboard of slat screwjack 1 (Ref. 27-84-21, P. Block 401).

(2)Manual Operation of the Slats
(Ref. Fig. 301)

WARNING : BEFORE OPERATING SLATS, MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.

(a)Connect 24 teeth drive tool PN98A27808003000 to screwjack 1 input.
(b)Install a pneumatic motor or any other power source to the 24 teeth drive tool.

NOTE : The power source should not have more than 500 rpm.

CAUTION : TO PREVENT FRICTION BRAKE OVERHEATING DURING MAINTENANCE CHECKS THE SLAT SYSTEM MUST NOT BE OPERATED MORE THAN THREE CONSECUTIVE CYCLES DURING ANY ONE HOUR PERIOD. IF THIS LIMIT IS REACHED, THE FRICTION BRAKES MUST BE ALLOWED TO COOL FOR 30 MINUTES BEFORE FURTHER OPERATION OF THE SLAT SYSTEM.

(c)Extend the slats to the required position by operating the pneumatic motor.

CAUTION : RETRACTION OF SLATS CLOSE TO ZERO POSITION MUST BE PERFORMED VERY CAREFULLY, OTHERWISE SLATS COULD RETRACT OVER ZERO AND APPLY EXCESSIVE LOAD TO SCREWJACKS.

(d)Fully retract slats with the pneumatic motor to the slat zero position.

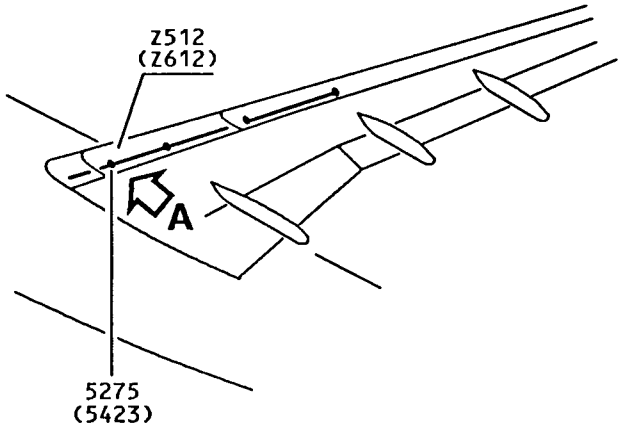
NOTE : The slat zero position is reached when the angular distance between the clawstops of the screwjacks at screwjacks 1 and 2 is 180 ± 15 deg. and at screwjacks 3 thru 6 270 ± 15 deg. (Ref. 27-80-00, P. Block 501).

(e)Install the transmission shaft 5275 (5423) (Ref. 27-84-21, P. Block 401).
R (f)If the APPU was removed in a slat position which was not at zero,

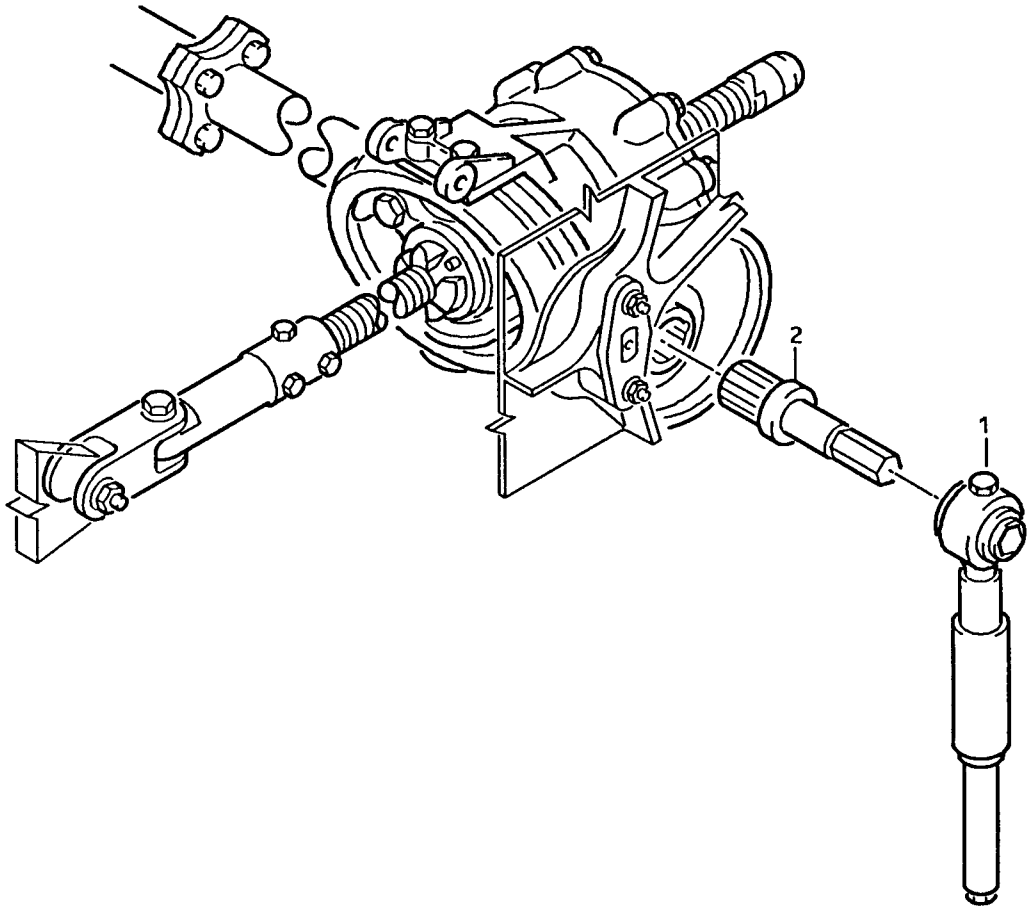
R adjust the APPU to zero (Ref. 27-56-00, P. Block 501).
R (g)Install the APPU (Ref. 27-86-11. P. Block 401).

(3)Test
(a)Remove safety clips and tags and close circuit breakers 3CV, 4CV, 7CV 8CV and 9CV.
(b)Do the operational test of the slat system (Ref. 27-84-00, P. Block 501).

(4)Close-up
(a)Make certain that work area is clean and clear of miscellaneous items of equipment.
(b)Install the access door 512BB (612BB).
(c)Remove safety barriers.
(d)Remove warning notices.



A SLAT SCREWJACK 1 ON
RIGHT WING SHOWN.
LEFT WING IS MIRROR IMAGE.



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Manual Operation of Slats
Figure 301

R LIFT AUGMENTING (SLATS AND KRUEGER FLAPS) -
R ADJUSTMENT/TEST

R WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL
R FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING
R GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN
R THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT
R POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.
R WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT
R ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
R WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE
R CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
R WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS
R ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES
R THEY OPERATE.

R 1. Adjustment

R A. Reason for the Job
R (1)To check and adjust slat transmission to zero position
R (2)To adjust slat surfaces 1, 2 and 3 to zero position

R B. Equipment and Materials

R ITEM	DESIGNATION
R (1)	Access Platform, 3.5 to 5.5 m (10 to 16 ft.)
R (2)98A27808005000	Measuring Device - Slat Trailing Edge
R (3)98A27808006001	Measuring Device - Slat Leading Edge
R (4)98A27808003000	Drive Tool - Slat Torque Shaft
R (5)98A27808007000	Locking Device - Slat Drive Shaft
R (6)	Circuit Breaker Safety Clips and Tags
(7)	Spacing Washers
(8)	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)

Referenced Procedures

- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-21, P. Block 401	Transmission Shafts
- 27-86-11, P. Block 401	Asymmetry Position Pick-Off Unit

C. Procedure
(1)Job Set-Up
(a)Fully retract slats (Ref. 27-80-00, P. Block 301).
(b)Open, safety and tag the following circuit breakers:

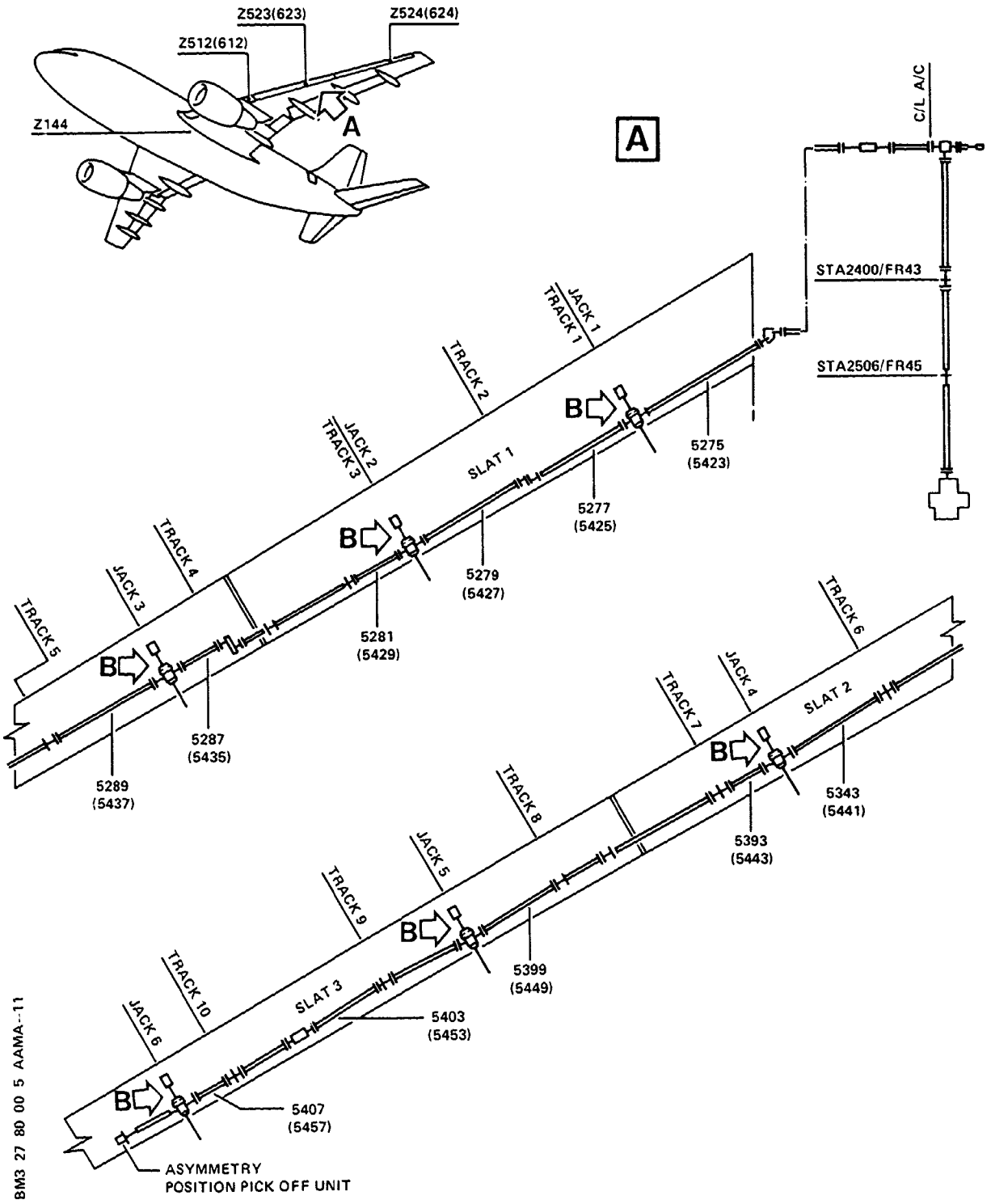
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

(c)Position access platform.

(2)Adjustment of Slat Transmission to Zero Position
(Ref. Fig. 501) (Sheet 1/2)

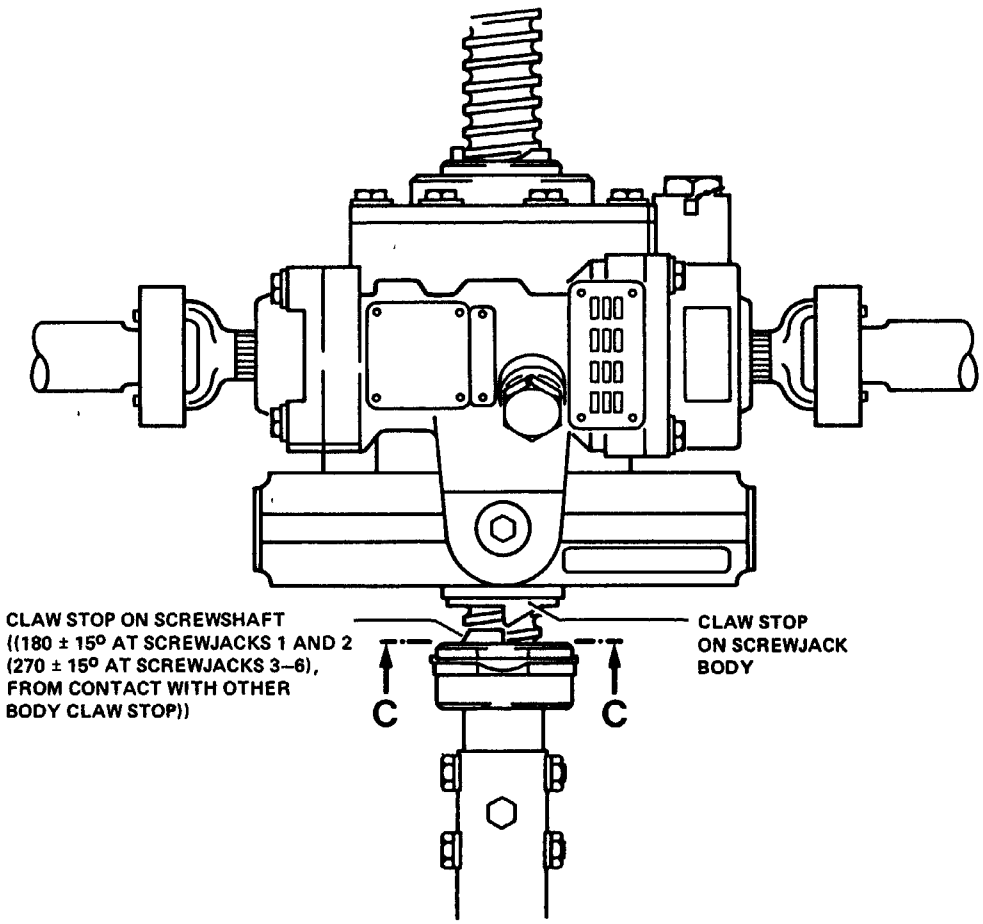
R (Ref. Fig. 501) (Sheet 2/2)

R (a)Remove following access panels to check zero position:
R screwjack 1 512CB (612CB)
R screwjack 2 512HB (612HB)
R screwjack 3 523DB (623DB)
R screwjack 4 523KB (623KB)
R screwjack 5 524DB (624DB)
R screwjack 6 524JB (624JB)
R (b)Check zero position of transmission at screwjacks 1 thru 6.
R Zero position of slat transmission is achieved when the slats are retracted and the distance at each screwjack between claw stops on shaft and screwjack body is 180 ±15° at screwjacks 1 and 2 and 270 ±15° at screwjacks 3 thru 6.
R (c)If any screwjack is found to be not in zero position, adjust as follows:
R NOTE : The following describes adjustment of individual screwjacks. Note that only one shaft with appropriate access panel need be removed between screwjacks if adjacent screwjacks are to be adjusted.
R 1 Remove following access panels for access to transmission shafts:
R screwjack 1, 512BB (612BB), 512DB (612DB), 512EB (612EB)
R screwjack 2, 512FB (612FB), 512GB (612GB), 512JB (612JB)
R screwjack 3, 523CB (623CB), 523EB (623EB)
R screwjack 4, 523JB (623JB), 523LB (623LB)
R screwjack 5, 524CB (624CB), 524FB (624FB)
R screwjack 6, 524HB (624HB)
R 2 Install slat drive shaft locking device PN 98A27808007000 outboard of track 9.
R 3 Only if screwjack 6 is to be adjusted:

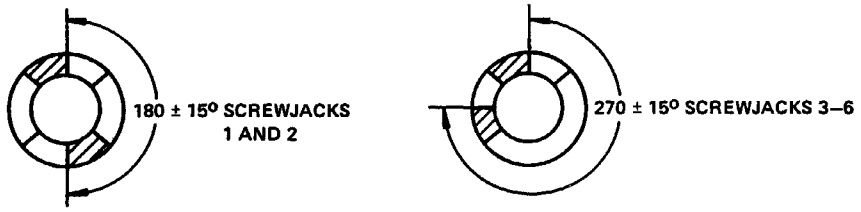


Adjustment of Slat Transmission System
(Sheet 1 of 2)
Figure 501

B



SECTION
C–C



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Adjustment of Slat Transmission System
(Sheet 2 of 2)
Figure 501

R

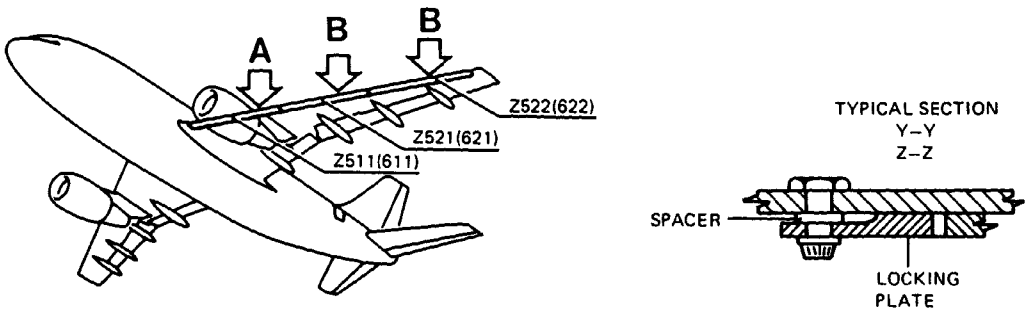
R Remove asymmetry position pick-off unit (Ref. 27-86-11, P. Block 401).
R 4 Remove following transmission shafts (Ref. 27-84-21, P. Block 401) as applicable for adjustment of individual screwjack:
R screwjack 1, shafts 5277 (5425) and 5275 (5423)
R screwjack 2, shafts 5281 (5429) and 5279 (5427)
R screwjack 3, shafts 5289 (5437) and 5287 (5435)
R screwjack 4, shafts 5393 (5443) and 5343 (5441)
R screwjack 5, shafts 5403 (5453) and 5399 (5449)
R screwjack 6, shaft 5407 (5457)
R 5 Using drive tool PN 98A27808003000, adjust appropriate screwjack by turning the input until zero position is achieved.
R NOTE : Adjustment should be performed starting from screwjack 1.
R 6 Install transmission shafts removed at step 4 (Ref. 27-84-21, P. Block 401) making certain that zero position is not disturbed during installation.
R NOTE : If the holes in flanges of transmission shafts do not align with those in the universal joint, withdraw universal joint, displace it by the required number of teeth until holes in flanges are aligned.
R 7 Only if screwjack 6 has been adjusted:
R Install asymmetry position pick-off unit (Ref. 27-86-11, P. Block 401).
R 8 Remove drive shaft locking device PN 98A27808007000.
R 9 Install access panels removed at step 1.
R 10 Check clearances between slat surfaces and wing, see steps (3) and (4).
R (d)Install access panels removed at step (a).

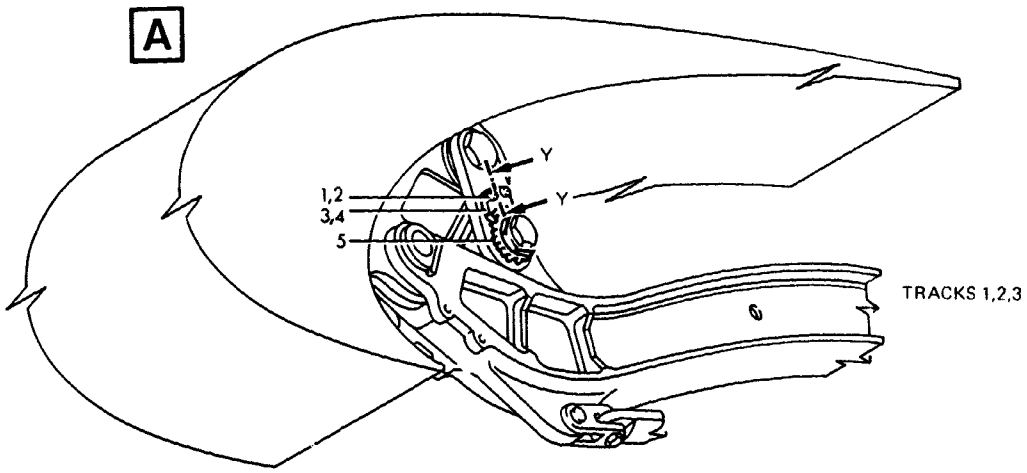
R (3)Adjustment of Slat Surface 1

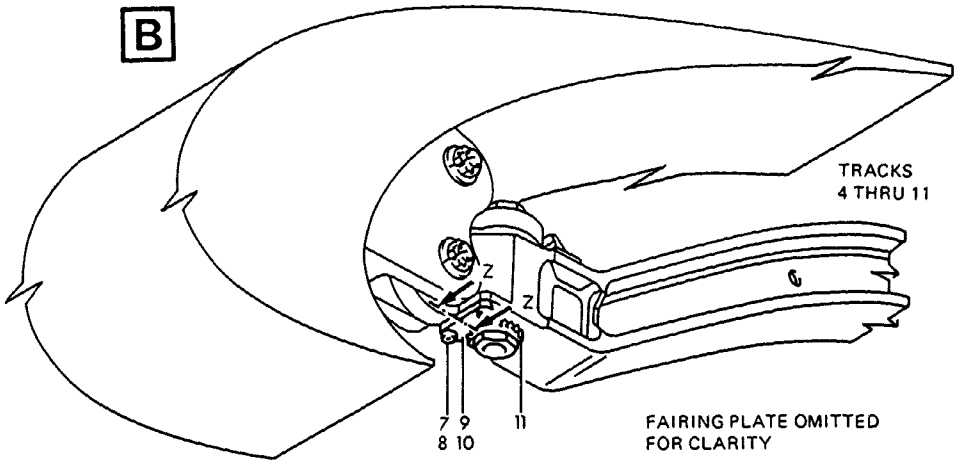
(Ref. Fig. 502)

(Ref. Fig. 503)

(Ref. Fig. 504)
(Ref. Fig. 505)
(a)Make certain that slat transmission is in zero position (Ref. step (2)).
(b)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
WARNING : BEFORE OPERATING SLATS, MAKE CERTAIN THAT TRAVEL RANGES OF THE SURFACES ARE CLEAR.
(c)Extend slats to 15° position (Ref. 27-80-00, P. Block 301).
(d)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
(e)Remove nuts (1), bolts (2), locking plates (3) and spacers (4) from all







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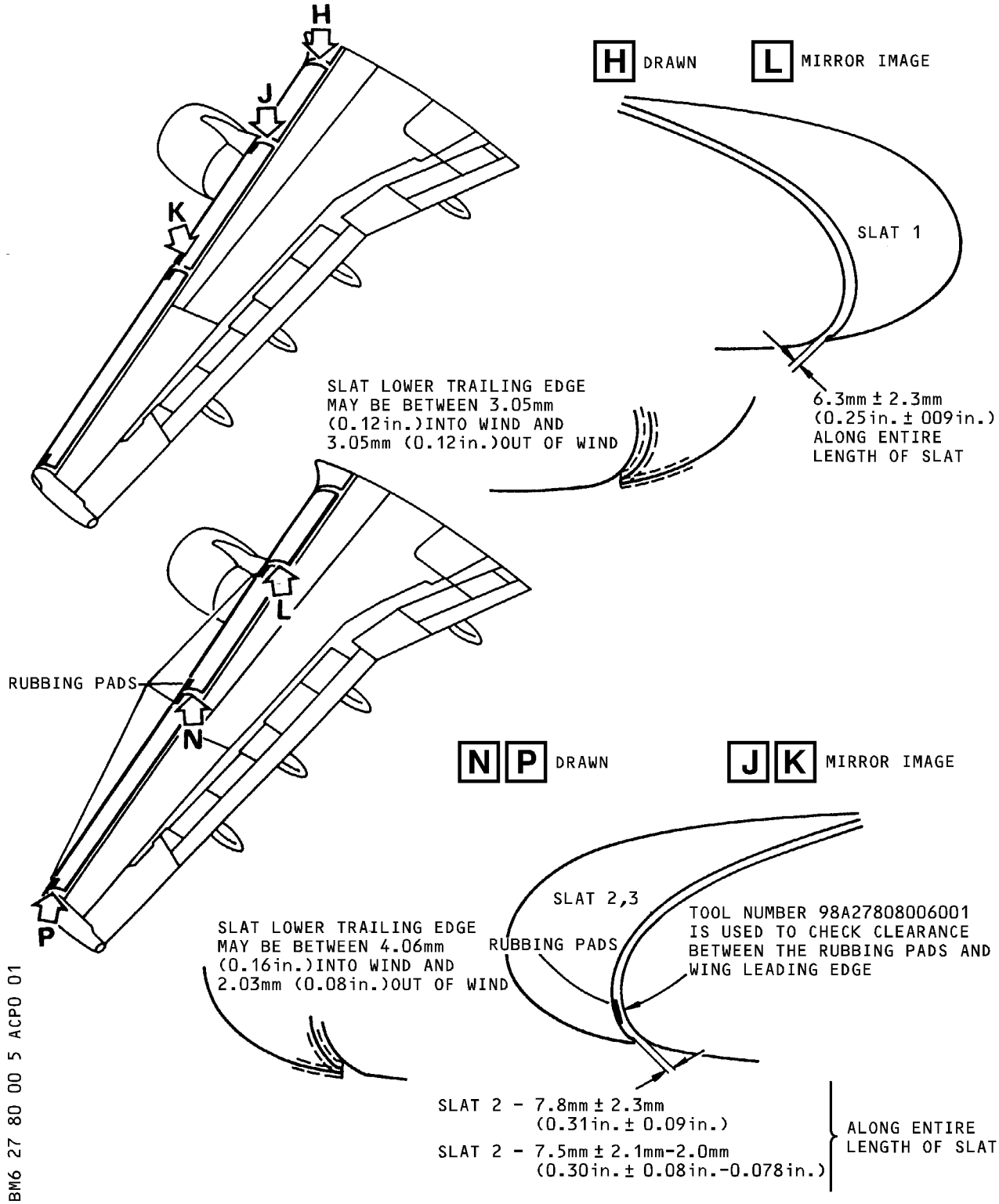
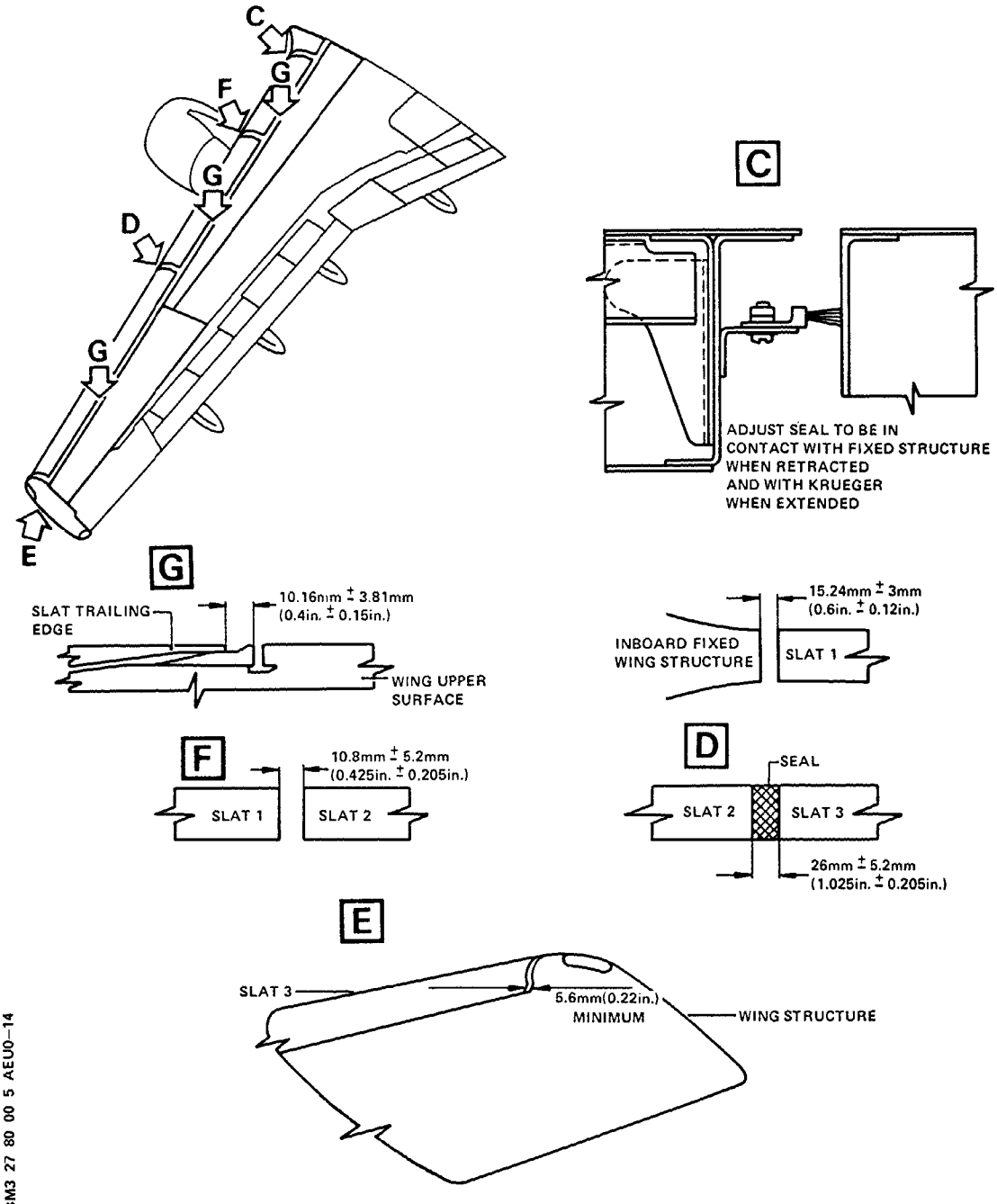
Slat Adjustment
Figure 502



Slat Adjustment
Figure 503

R



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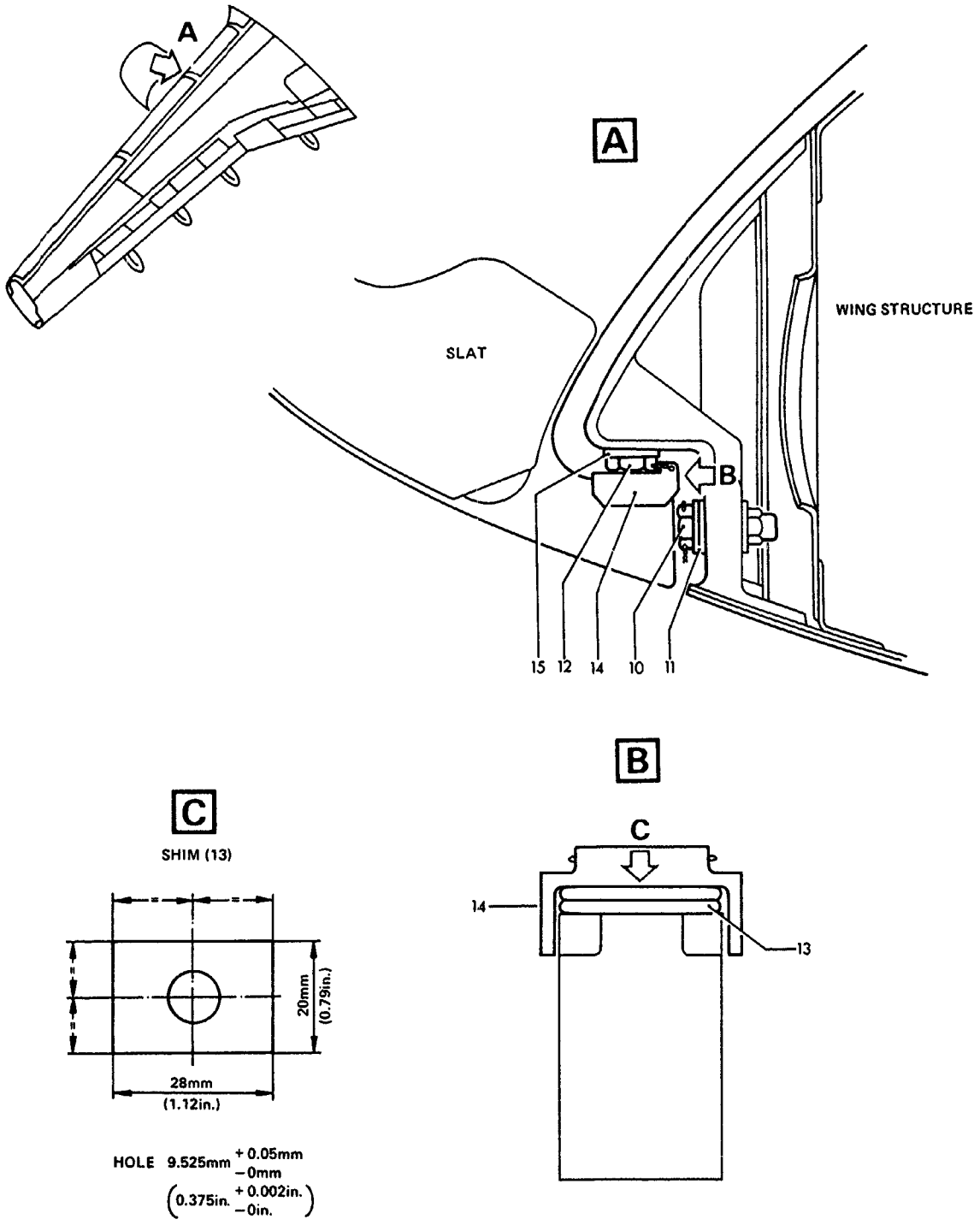
Slat Adjustment
Figure 504



Slat Adjustment
Figure 505

tracks.
(f)Cut and discard lockwire, remove bolts (10),(12), washers (11), saddle (14) and shim (13) from slat 1 outboard stop.
(g)Install bolts (10),(12) without washers (11), saddle (14) or shim (13) and screw fully home but do not tighten.
(h)Starting at outer track, rotate eccentric bushes (5) to raise slat upper trailing edge to its highest position.
NOTE : To avoid undue deformation of slat, rotate all eccentrics in same direction.
NOTE : To prevent setting of eccentrics being disturbed as a result of adjustment of other eccentrics, it is necessary to temporarily install eccentric locking plates at all times other than when an eccentric is in process of being adjusted.
NOTE : If locking plates do not engage with eccentrics, a half serration adjustment is available by reversing locking plate.
(i)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
(j)Retract slats (Ref. 27-80-00, P. Block 301).
(k)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
(l)By rotating eccentric bushes (5), starting at outer track, lower slat in small steps until trailing edge contacts the rubbing strip on the wing upper surface in at least 3 locations, one within approximately 50 cm (20 in.) of each track centerline.
(m)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
(n)Extend slats to 15° position (Ref. 27-80-00, P. Block 301).
(o)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
(p)Install trailing edge measuring device PN 98A27808005000 on wing upper surface at track 2 centerline and set to zero.
(q)By adjusting track 2 eccentric, lower trailing edge of slat by between 1.9 and 2.1 mm (0.075 and 0.083 in.).
(r)Repeat steps (p) and (q) for tracks 1 and 3.
(s)Install spacers (4), locking plates (3), bolts (2) and nuts (1) at all tracks.
(t)Remove trailing edge measuring device PN 98A27808005000.
(u)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
(v)Retract slats (Ref. 27-80-00, P. Block 301).
(w)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
(x)Using feeler gages, measure and record gap between horizontal bolt (10) and rear face of stop fitting.
(y)Using a screwdriver inserted in hole in stop fitting lower surface, screw vertical bolt (12) out until head of bolt contacts abutment pad (15).
(z)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
(aa)Extend slats to 30° position (Ref. 27-80-00, P. Block 301).
(ab)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
(ac)Using feeler gages, measure and record gap between underside of head of vertical bolt (12) and upper surface of stop fitting.
(ad)Remove both bolts (12),(10).

(ae)Install washers (11) on bolts (10) to a thickness corresponding to gap dimensions determined in step (x).
(af)Install bolt (10) in stop fitting.
(ag)Tighten bolt (10) and safety with lockwire.
(ah)Measure thickness of saddle top section and subtract from value determined at step (ac).
(ai)Manufacture a shim (13) of correct thickness to make up the difference in values as determined at step (ah).
(aj)Install shim (13), saddle (14) and bolt (12).
(ak)Tighten bolt (12) and safety with lockwire, utilizing hole thru aft end of saddle for lockwire.
(al)Check that adjustment of seal between inner end of slat and Krueger flap is satisfactory (Ref. Fig. 504), if not, adjust as required.
(am)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
(an)Retract slats to 0° position (Ref. 27-80-00, P. Block 301).
(ao)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
(ap)Check adjustment of seal betweeen inner end of slat and wing structure is satisfactory (Ref. Fig. 504), if not, adjust as required, taking care not to compromise adjustment of seal in slat extended position.
(aq)Check that following gaps/clearances are within limits shown:
- between outer end of slat 1 and slat 2
- between rear face of slat and fixed wing leading edge
- at upper trailing edge of slat
- at lower trailing edge of slat.

(4)Adjustment of Slat Surfaces 2 and 3
(Ref. Fig. 502,)
(Ref. Fig. 504)
NOTE : Method is similar for both slats. Procedure is described for slat 2, variations for slat 3 are indicated in parenthesis.
WARNING : BEFORE OPERATING SLATS, MAKE CERTAIN THAT TRAVEL RANGES OF THE SURFACES ARE CLEAR.
(a)Make certain that transmission is in zero position (Ref. step (2)).
(b)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
(c)Extend slats to 15° position (Ref. 27-80-00, P. Block 301).
(d)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
(e)Remove nuts (7), bolts (8), locking plates (9) and spacers (10) from all tracks.
(f)Starting at outer track, rotate eccentric bolts (11) to raise slat upper trailing edge to its highest position.
NOTE : To avoid undue deformation of slat, rotate all eccentrics in same direction.
NOTE : To prevent setting of eccentrics being disturbed as a result of adjustment of other eccentrics, it is necessary to temporarily install eccentric locking plates at all times other than when an eccentric is in process of being adjusted.
NOTE : If locking plates do not engage with eccentrics, a half serration adjustment is available by reversing locking plate.
(g)Remove safety clips and tags and close circuit breakers 7CV, 8CV and

9CV.
(h)Retract slats (Ref. 27-80-00, P. Block 301).
(i)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
(j)By rotating eccentric bolts (11), starting at outer track, lower slat in small steps until trailing edge contacts the rubbing strip on the wing upper surface in at least 4 locations, one within approximately 50 cm (20 in.) of each track centerline.
(k)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
(l)Extend slats to 15° position (Ref. 27-80-00, P. Block 301).
(m)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
(n)Install trailing edge measuring device PN 98A27808005000 on wing upper surface at track 5 (9 for slat 3) centerline and set to zero.
(o)By adjusting track 5 (9 for slat 3) eccentric bolt, lower trailing edge of slat by amount detailed below.

Track	4	5	6	7	8	9	10	11
Lower by (mm)	0	0.7	1.3	2.0	2.0	2.0	2.0	2.0
Lower by (in.)	0	0.028	0.050	0.079	0.079	0.079	0.079	0.079

NOTE : All the above values have a tolerance of +0.3, -0.5 mm. (+0.012, -0.020 in.).

(p)Repeat steps (n) and (o) for tracks 4, 6, 7 (8, 10, 11 for slat 3).
(q)Install spacers (10), locking plates (9), bolts (8) and nuts (7) on all tracks.
(r)Remove trailing edge measuring device PN 98A27808005000.
(s)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
(t)Retract slats (Ref. 27-80-00, P. Block 301).
(u)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
(v)Check that following gaps/clearances are within the limits shown:
- between slats 2 and 3

- at upper trailing edge of slat
- at lower trailing edge of slat
- between slats 2 and 1 (only if slat 2 has been adjusted).
- between lower outer end of slat 3 and fixed wing structure (only if slat 3 has been adjusted).

R (w)Use measuring device PN 98A27808006001 and check that the clearances between rubbing pads at rear face of slats and wing leading edge are within the limits shown.
R (5)Close-Up
R (a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

R (b)Remove access platform.
R (c)Remove safety clips and tags and close circuit breakers 7CV, 8CV and
R 9CV.

R WARNING : LANDING GEAR - MAKE SURE THAT THE GROUND SAFETIES AND CHOCKS ARE IN POSITION.

R FLIGHT CONTROLS - MAKE SURE THAT THE GROUND SAFETIES AND NOTICES ARE
R IN POSITION.

R FLIGHT CONTROLS - MAKE SURE THAT THE TRAVEL RANGES OF THE CONTROL
R SURFACES ARE CLEAR.

R HYDRAULICS - BEFORE YOU PRESSURIZE THE SYSTEM, MAKE SURE THAT THE
R CONTROL SURFACE POSITIONS AND THE FLIGHT CONTROL POSITIONS ARE THE
R SAME.

R MAKE SURE THAT YOU ISOLATE THE ELECTRICAL CIRCUITS UPON WHICH WORK IS
R IN PROGRESS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4.5m (15 ft)
B.	Circuit Breaker Safety Clips and Tags
C.	Hydraulic Ground-Power Cart
D.	Torque Wrench 800-900 lbf.in (9.04-11.19 m.daN)
E.	Torque Wrench 500-610 lbf.in (5.65-6.89 m.daN)
F.	Torque Wrench 260-325 lbf.in (2.94-3.67 m.daN)
G.	Trestle(s)
H.	Warning Notice - Prohibiting Operation of Slats and Flaps
J. 98A27808004000	Sling, Slat 1, 2 and 3
K.	Clean Lint-Free Cloth
L.	Cotter-Pins
M.	Lockwire - Corrosion Resistant Steel, Dia. 0.8mm (0.032 in).
N. Material No. 04-004	Common Greases (Ref. 20-31-00)
P. Material No. 05-005	Special Materials (Ref. 20-31-00)
Q. Material No. 09-005	Sealants (Ref. 20-31-00)
R. Material No. 09-013	Sealants (Ref. 20-31-00)
S. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
T. Material No. 13-002	Pretreatment for Painting (Ref. 20-31-00)
U. Material No. 16-006	Structure Paints (Ref. 20-31-00)
V. Material No. 16-018	Structure Paints (Ref. 20-31-00)
Referenced Procedures	
- 12-11-28, P. Block 301	Replenishing of Fuel Tanks
- 24-41-00, P. Block 301	A/C External Power Control
- 27-80-00, P. Block 301	Lift Augmenting
- 27-80-13, P. Block 301	Tracks, Slat 1
- 27-81-34, P. Block 401	Spring Rod, Folding Nose
- 28-25-00, P. Block 301	Refuel/Defuel System

ITEM	DESIGNATION
- 29-10-00, P. Block 301	Main Hydraulic Power
- 51-23-10, P. Block 1	SRM - Paint Coatings

2. Procedure
(Ref. Fig. 401)
(Ref. Fig. 402)
(Ref. Fig. 403)

CAUTION: ALL RIGGING MUST BE CARRIED OUT WITH THE WING FUEL TANKS EMPTY. THE AIRCRAFT MUST BE STABLE ON ITS LANDING GEAR, OR SUPPORTED ON ITS MAIN JACKING POINTS, WITH OR WITHOUT THE ENGINES INSTALLED.

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers:

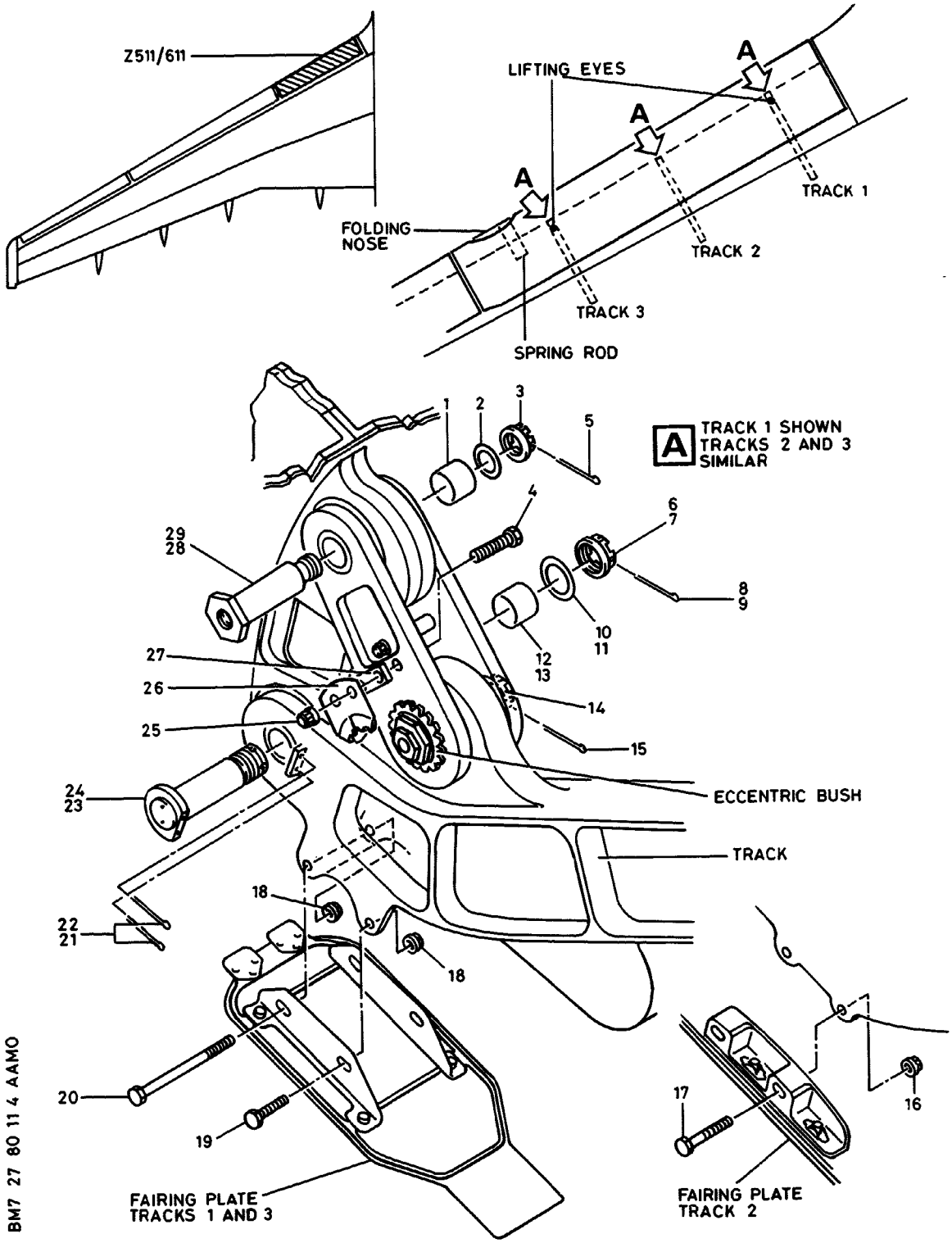
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 1/26 VAC	1CV	335/R61
133VY	FLT CTL/FLAPS/SYS 2/26 VAC	2CV	334/S62
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/FLAPS/ SYS 1	10CV	335/R67

(2)Place slat/flap control lever in gate 2 and partially extend slats (Ref. 27-80-00, P. Block 301).
(3)Display warning notices.
(4)Open, safety and tag the following circuit breakers:

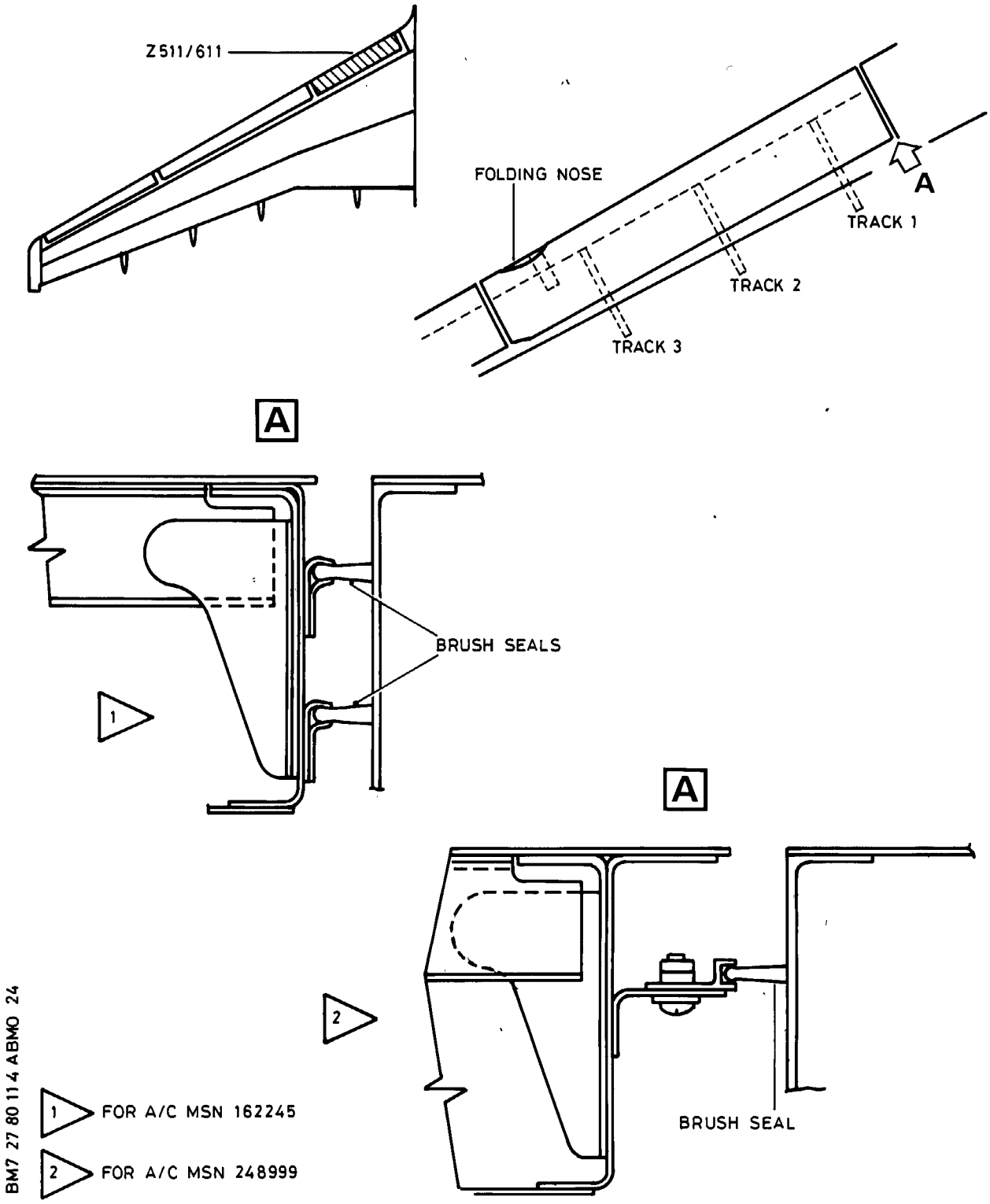
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/26 VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC LAND RECOVERY SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SLATS/WTB 1	13CV	336/Q65
133VU	FLT CTL/SLATS/WTB 2	14CV	335/Q64
133VU	FLT CTL/KRUGER	45CV	333/T61

(5)Defuel the wing tanks until they are empty (Ref. 28-25-00, P. Block 301).
(6)Put the access platform in position at zone 511 (611).
(7)Disconnect the spring rod from the folding nose (Ref. 27-81-34, P. Block 401) and secure the folding nose in the folded position.

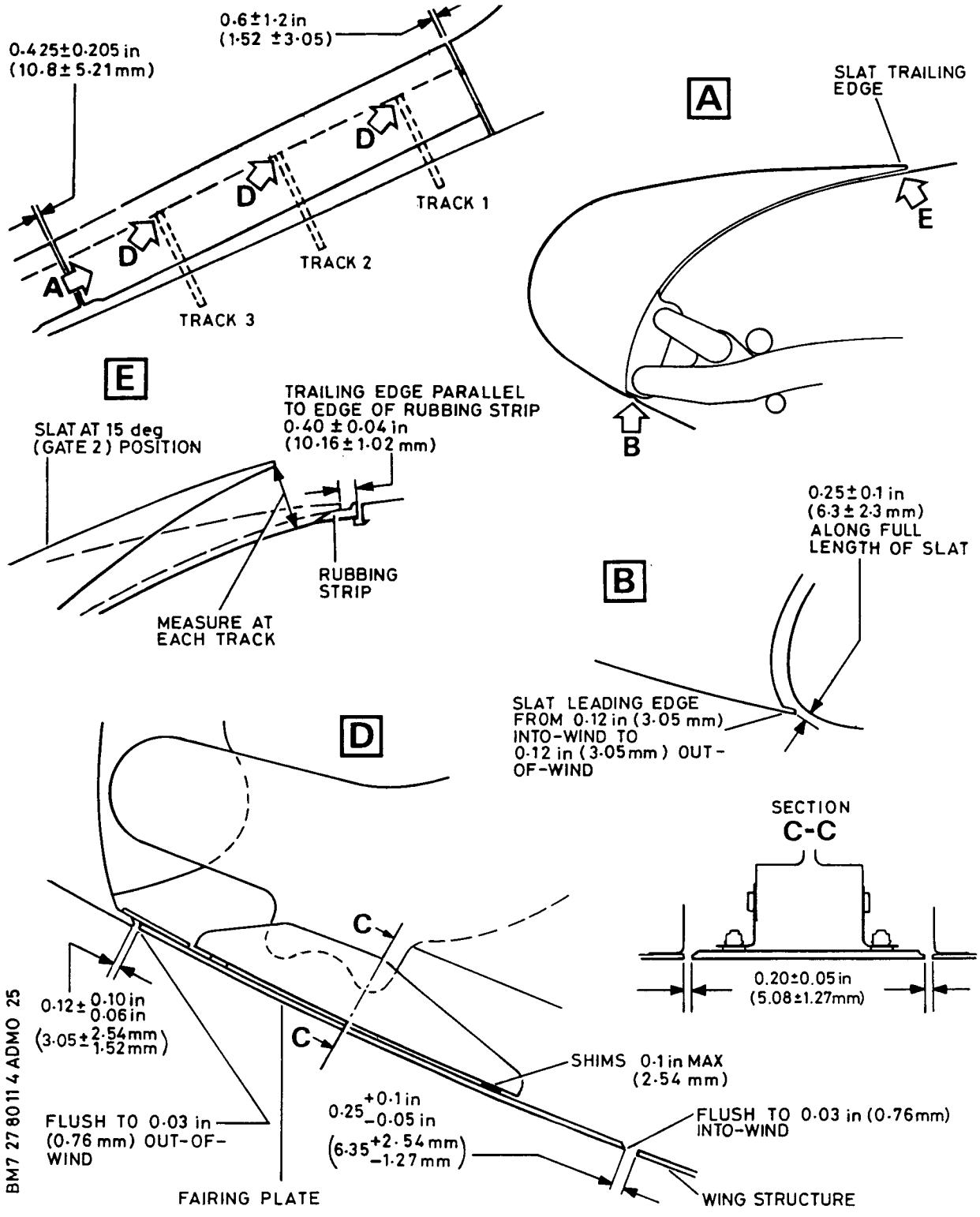
WARNING: MAKE SURE THAT THE TRAVEL RANGE OF THE SLATS AND KRUEGER IS CLEAR.



Slat 1 - Installation
Figure 401



Slat 1 - Brush Seals
Figure 402



Slat 1 - Clearances
Figure 403

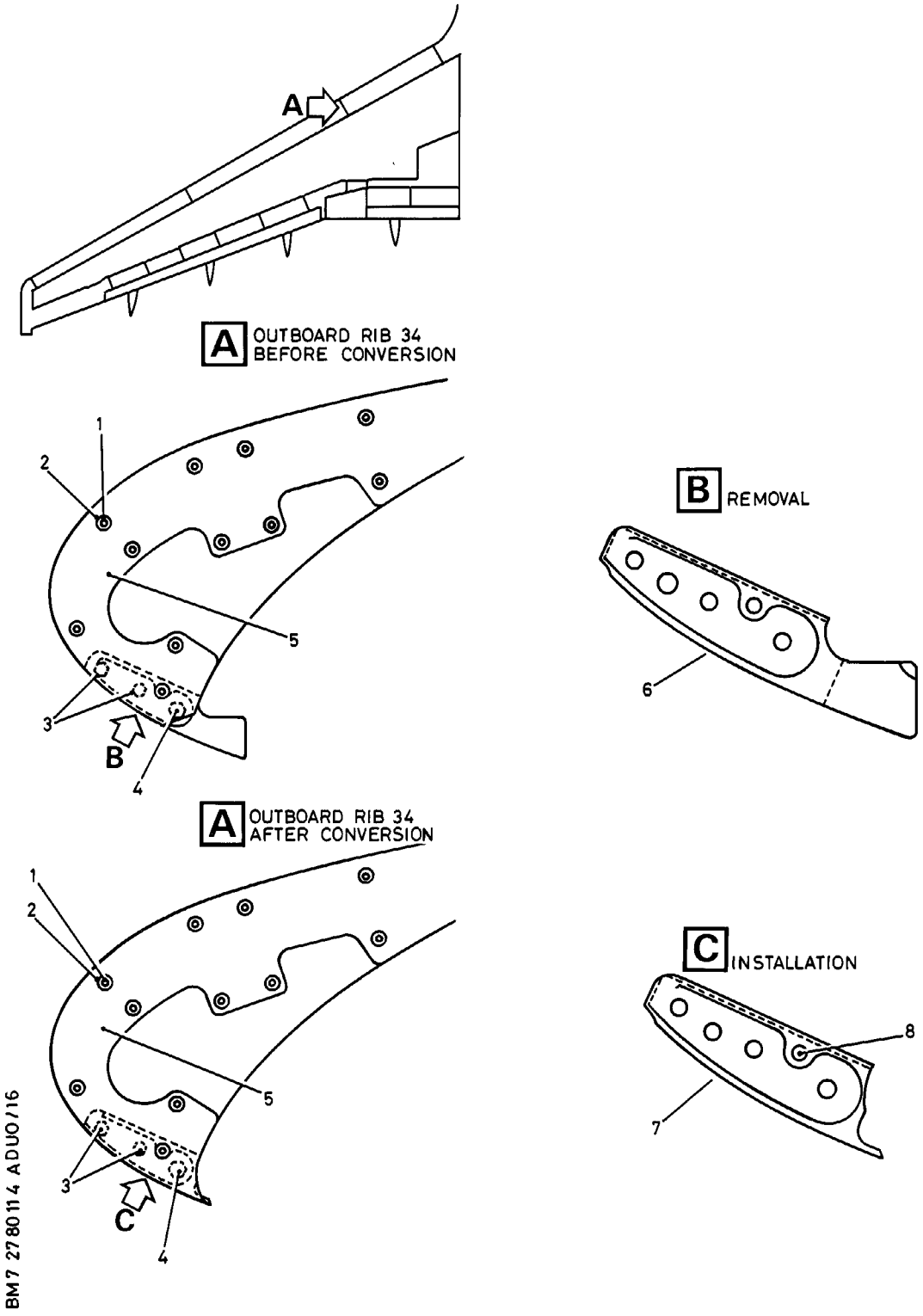
(8)On panel 133VU, remove safety clips and tags and close the SLAT circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.
(9)Fully extend the slats (Ref. 27-80-00, P. Block 301).
(10)On panel 133VU, open, safety and tag SLAT circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.

B. Removal
(1)Reverse the slat lifting eyes and attach the sling PN 98A27808004000.
(2)Take the weight of the slat (232 lb (105 Kg)) on the sling PN 98A27808004000.
(3)Remove the nuts (16) and (18) and the bolts (17), (19) and (20), then remove the fairing plates, complete with the mounting brackets.
(4)At tracks 1 and 3, remove the cotter-pins (5), (8) and (21), the nuts (3) and (6), the washers (2) and (10) and the bolts (23) and (28). Keep the sliding bushes (1) and (12). Discard the cotter-pins (5), (8) and (21).
(5)At track 2, remove the cotter-pins (5), (9) and (22), the nuts (3) and (7), the washers (2) and (11), and the bolts (24) and (29). Keep the sliding bushes (1) and (13). Discard the cotter-pins (5), (9) and (22).
(6)Remove the slat and put it on the trestles.
(7)Use a clean lint-free cloth with cleaning agent (Material No. 11-004) to clean the slat and the interface surfaces.
(8)Examine the bearings and bushes for the correct condition.
(9)If applicable, remove the sling PN 98A27808004000 and reverse the lifting eyes.

C. Preparation of Replacement Component
(1)Reverse the lifting eyes and attach the sling PN 98A27808004000.
(2)Conversion of a slat with an adjustable stop, for installation on aircraft without an adjustable stop, in the leading edge.
(a)Equipment and Materials

ITEM	DESIGNATION
A. A578-43078-000/001	"Fill in" Piece
B. Material No. 09-005	Sealants (Ref. 20-31-00)
C. Material No. 09-013	Sealants (Ref. 20-31-00)

(b)Procedure
(Ref. Fig. 404)
1Remove screws (1), washers (2) and teflon plate (5).
2Remove bolts (3) and (4) and bracket (6).
3Make certain screw insert (8) has been installed in filler piece (7) and coat filler piece with corrosion sealant (Material No. 05-005).
4Make certain bolts (3) and (4) as removed in step 2 are clean and apply sealant (Material No. 09-013)
5Install filler piece (7) and secure with bolts (3) and (4).
6Refit teflon plate (5) using bolts (1) and washers (2) as removed in step 1.
7Retain bracket (6) in stores for future use.



Slat 1 - Conversion
Figure 404

D. Preparation for Installation
(1)At tracks 1, 2 and 3, remove nuts (25), bolts (4), locking plates (26), spacers (27) and cotter-pins (15). Loosen nuts (14).
(2)Screw adjustable stops, in slat outboard rib protrusion and in corresponding housing in leading edge, fully in with no packing under heads of stops.

E. Installation
(1)Make sure that the sling PN 98A27808004000 is installed, then take the weight of the slat (232 lbs (105 kg)). Lift the slat and put it in position between the tracks.
(2)Apply special materials (Material No. 05-005) to the sliding bushes (1), (12) and (13), then install them in the tracks.
(3)Apply grease (Material No. 04-004) to the bolts (23), (24), (28) and (29).
(4)At track 2, install the bolt (24) and safety the bolt head with a new cotter-pin (22). Install the washer (11) and the nut (7). TORQUE the nut (7) to between 800 and 990 lbf.in (9.04 and 11.19 m.daN). Safety with a new cotter-pin (9).

NOTE : If the cotter-pin holes cannot be aligned, the designated alternative washer may be used.

(5)At tracks 1 and 3, install the bolts (23) and safety the bolt heads with new cotter-pins (21). Install the washers (10) and the nuts (6). TORQUE the nuts (6) to between 500 and 610 lbf.in (5.65 and 6.89 m.daN). Safety with new cotter-pins (8).

NOTE : If the cotter-pin holes cannot be aligned, the designated alternative washer may be used.

(6)At tracks 1, 2 and 3, turn the eccentric bushes to give the maximum height, of the slat trailing edge, above the wing structure.
(7)At track 2, install the bolt (29), the washer (2), and the nut (3). TORQUE the nut (3) to between 260 and 325 lbf.in (2.94 and 3.67 m.daN). Safety with a new cotter-pin (5).
(8)At track 2, temporarily install the spacer (27), the locking plate (26), the bolts (4) and the nuts (25).

NOTE : The lockplates may be reversed, to provide a half serration adjustment on installation.

(9)Remove the sling PN 98A27808004000 and reverse the lifting eyes.
(10)Connect the spring-rod to the folding nose and install the spring-rod fairing plate (Ref. 27-81-34, P. Block 401).
(11)Connect the hydraulic ground-power cart.

(12)On panel 133VU, close SLAT and KRUEGER circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.
(13)Using hydraulic ground power cart, slowly retract slats to fully retracted position (Ref. 27-80-00, P. Block 301). Make certain no

fouling occurs.

(14) Depressurize the hydraulic system (Ref. 29-10-00, P. Block 301).

(15) On panel 133VU, open, safety and tag SLAT and KRUEGER circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.

(16) At track 2, remove nuts (25), bolts (4), spacer (27) and locking plate (26). Rotate eccentric bush until slat trailing edge just contacts rubbing strip on wing structure. Note direction of rotation of eccentric bush.

NOTE: It is permissible for point of contact to be at any position within 19.7 in (500 mm) either side of track 2.

CAUTION: ALWAYS ROTATE ECCENTRIC BUSHES AT TRACKS 1 AND 3 IN SAME DIRECTION AS ECCENTRIC BUSH AT TRACK 2.

(17) At tracks 1 and 3, rotate eccentric bushes to align upper bolt holes.

(18) Install bolts (28), washers (2) and nuts (3). TORQUE nuts to between 260 and 325 lbf.in (2.94 and 3.67 m.daN). Safety with cotter-pin (5).

(19) At track furthest from initial point of trailing edge contact, rotate eccentric bush so that trailing edge just contacts rubbing strip at a position within 19.7 in (500 mm) either side of the track. Repeat the procedure at remaining track.

(20) At tracks 1 and 3, temporarily install spacer (27), locking plate (26), bolts (4) and nuts (25).

NOTE: The lockplates may be reversed to provide a half serration adjustment on installation.

(21) On panel 133VU, remove safety clips and tags and close SLAT and KRUEGGER circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.

(22) Place slat/flap control lever in gate 2 and extend slats (Ref.27-80-00. P. Block 301). Depressurize hydraulic system.

(23) On panel 133VU, Open, safety and tag SLATS and KRUEGGER circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.

(24) Remove nuts (25), locking plate (26), spacer (27) and bolts (4) at each track.

(25) At each track, measure and note the distance between the slat trailing edge and the wing structure, then rotate eccentric bushes to reduce each dimension by between 0.075 and 0.083 in (1.9 and 2.1 mm).

(26) At each track, install spacer (27), locking plate (26), bolts (4) and nuts (25).

NOTE: The lockplates may be reversed to provide a half serration on installation.

(27) At each track, TORQUE nut (14) to between 260 and 325 lbf.in (2.94 and 3.67 m.daN). Safety with cotter-pin (15).

(28) Seal around heads of bolts (23)(24)(28)(29), nuts (3)(6)(7)(14) and eccentric bushes with sealant (Material No. 09-013.)

(29)Fully retract slats (Ref.27-80-00. P. Block 301). Depressurize hydraulic system. On panel 133VU open, safety and tag SLATS and KRUEGER circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV and 45CV.

(30)Using a suitable gap measuring tool, make certain that gap between slat leading edge and wing structure is 0.25 ± 0.091 in. (6.3 ± 2.3 mm) along the full length of the slat.
(31)Make certain that slat leading edge is between 0.12 in (3.05 mm) into-wind and 0.12 in (3.05 mm) out-of-wind.
(32)Make certain that slat trailing edge is parallel to, and between 0.36 and 0.44 in (9.14 and 11.18 mm) from edge of rubbing strip.
(33)Make certain that clearance between inboard end of slat and wing structure is between 0.48 and 0.72 in (12.19 and 18.29 mm).
(34)Make certain that clearance between outboard end of slat and slat 2 is between 0.22 and 0.63 in (5.59 and 16.00 mm).
(35)At inboard end of slat, make certain that seal is in contact with fixed structure. If necessary, adjust seal to suit.
(36)Place slat/flap control lever in gate 2 and extend slats (Ref. 27-80-00, P. Block 301). Depressurize hydraulic system. On panel 133VU, open safety and tag SLATS and KRUEGER circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.
(37)Install fairing plates with bolts (17) (19) (20) and nuts (16) (18).
(38)Fully retract slats (Ref. 27-80-00, P. Block 301). On panel 133VU, open, safety and tag SLATS and KRUEGER circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.
(39)Make certain that clearances between fairing plates and surrounding structure are correct.
(40)If necessary, trim fairing plate on track 1 and 3 to obtain correct gap:
   (a)Deflect track inboard to limit of clearance between side load rollers and tracks.
   (b)Trim inboard edge of fairing plate to obtain correct gap between fairing plate and skin.
   (c)Deflect track outboard to limit of clearance between side load rollers and tracks.
   (d)Trim outboard edge of fairing plate to obtain correct gap between fairing plate and skin.
   (e)Treat bare edges of fairing plate with pretreatment for painting (Material No. 13-002), then apply structure paints (Material No. 16-006) and structure paints (Material No. 16-018) to the treated edges (Ref.SRM 51-23-10, P. Block 1).
(41)Make certain that leading and trailing edges of each fairing plate are within into-wind and out-of-wind limits. If necessary, adjust shims to suit.
(42)Adjust stop bolts at slat outboard end rib protrusion:
   (a)Measure gap 'X' between face of slat protrusion and head of adjustable bolt (35) in leading edge indent.
   (b)Adjust stop bolt (39) in slat outboard rib protrusion using a screwdriver in bolt end slot, until it just abuts leading edge indent.
   (c)Extend slats (Ref. 27-80-00, P. Block 301).
   (d)On panel 133VU, open, safety and tag SLATS and KRUEGER circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.

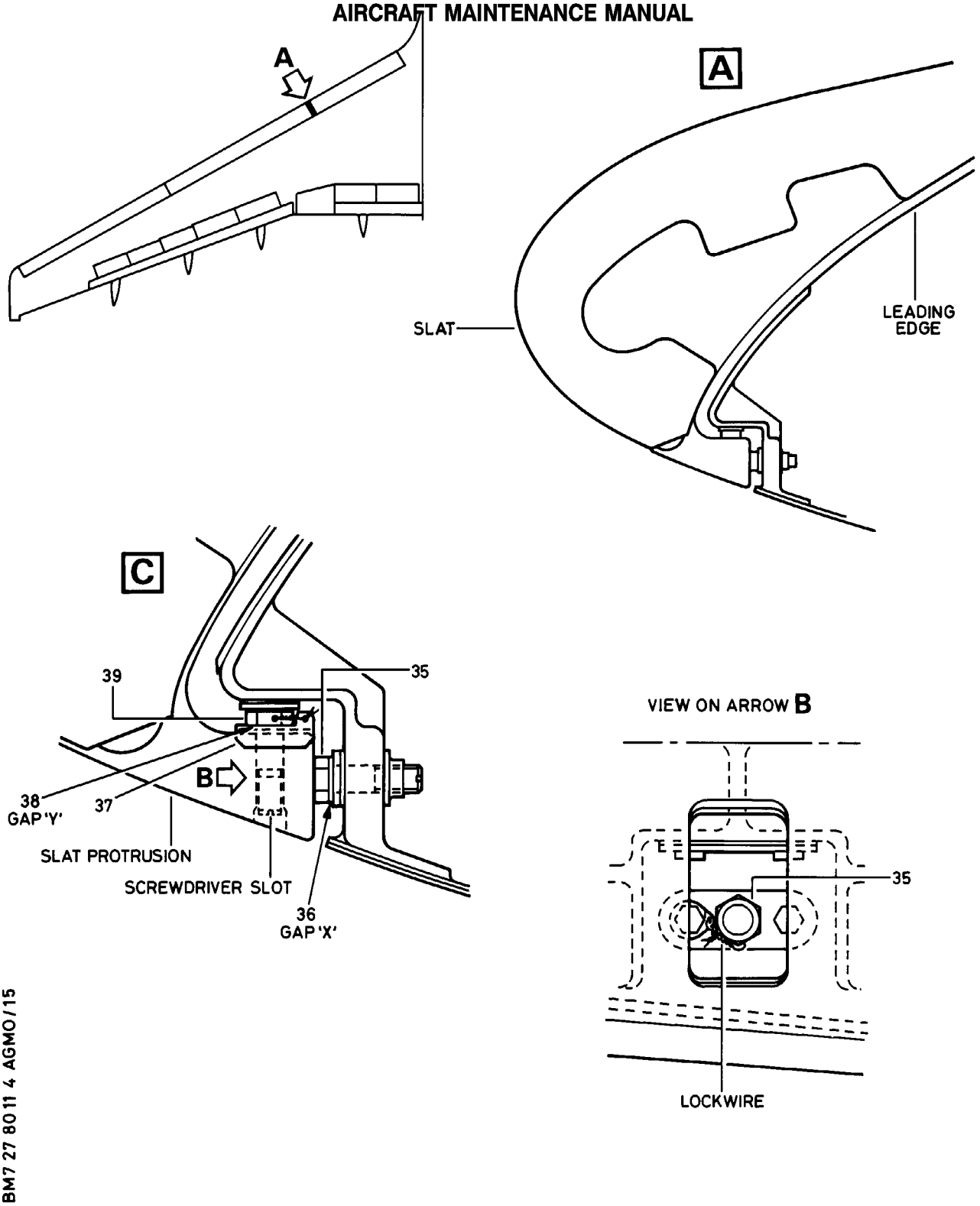
(e)Measure gap 'Y' under head of bolt (39) which abuts leading edge indent. Remove bolt.
(f)Check thickness of saddle (37) and subtract from gap measured. Make shim (38) to this thickness.
(g)Replace bolt (39) with shim (38) under saddle (37), safety bolt (39) with lockwire through hole in saddle (37).
(h)Fit shims (36) under head of bolt (35) equal to gap 'X' and safety bolt (35) with lockwire.
(j)Retract slats (Ref. 27-80-00, P. Block 301).
(Ref. Fig. 405)

F. Preparation for Test
(1)Remove warning notice.
(2)Pressurize hydraulic system (Ref. 29-10-00, P. Block 301).

(3)On panel 133VU, remove safety clips and tags and close SLATS and KRUEGER circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.

G. Test

ACTION	RESULT
During slat extension and retraction, make certain that: - slat moves freely and smoothly through full range - folding nose and all shutters operate correctly - no fouling occurs between moving parts and fixed structure - at inboard end of slat, check that brush seal is in contact with Krueger flap (extended) up to an interference of 0.10 in (2.54 mm) If necessary trim/adjust seal to suit (Ref. also E.(35)).	
On flight compartment center pedestal: - place slats/flaps control lever in gate 5 (Ref.27-80-00, P. Block 301)	Slats extend On panel 4VU: - SLATS FLAPS indicator moves to SLATS 30 position
Make certain clearance between pylon and folding nose is correct (Ref. 27-81-34, P. Block 401).	
On flight compartment center pedestal: - place slats/flaps control lever in gate 1	Slats retract On panel 4VU: - SLATS FLAPS indicator moves to SLATS 0 position



Stop Bolt Adjustment
Figure 405

H. Close-Up
(1)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(2)Shut down and disconnect hydraulic ground power cart.

(3)On panel 133VU, remove safety clips and tags and close FLAP circuit breakers 1CV, 2CV, 5CV, 6CV, 10CV.
R (4)Refuel the aircraft as required (Ref. 12-11-28, P. Block 301).
(5)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
R (6)Make sure that the work area is clean and clear of tools and all other
R items of equipment.
R (7)Remove the access platform.

R 3. Procedure for Removal/Installation with Tracks (Ref. Fig. , 406)

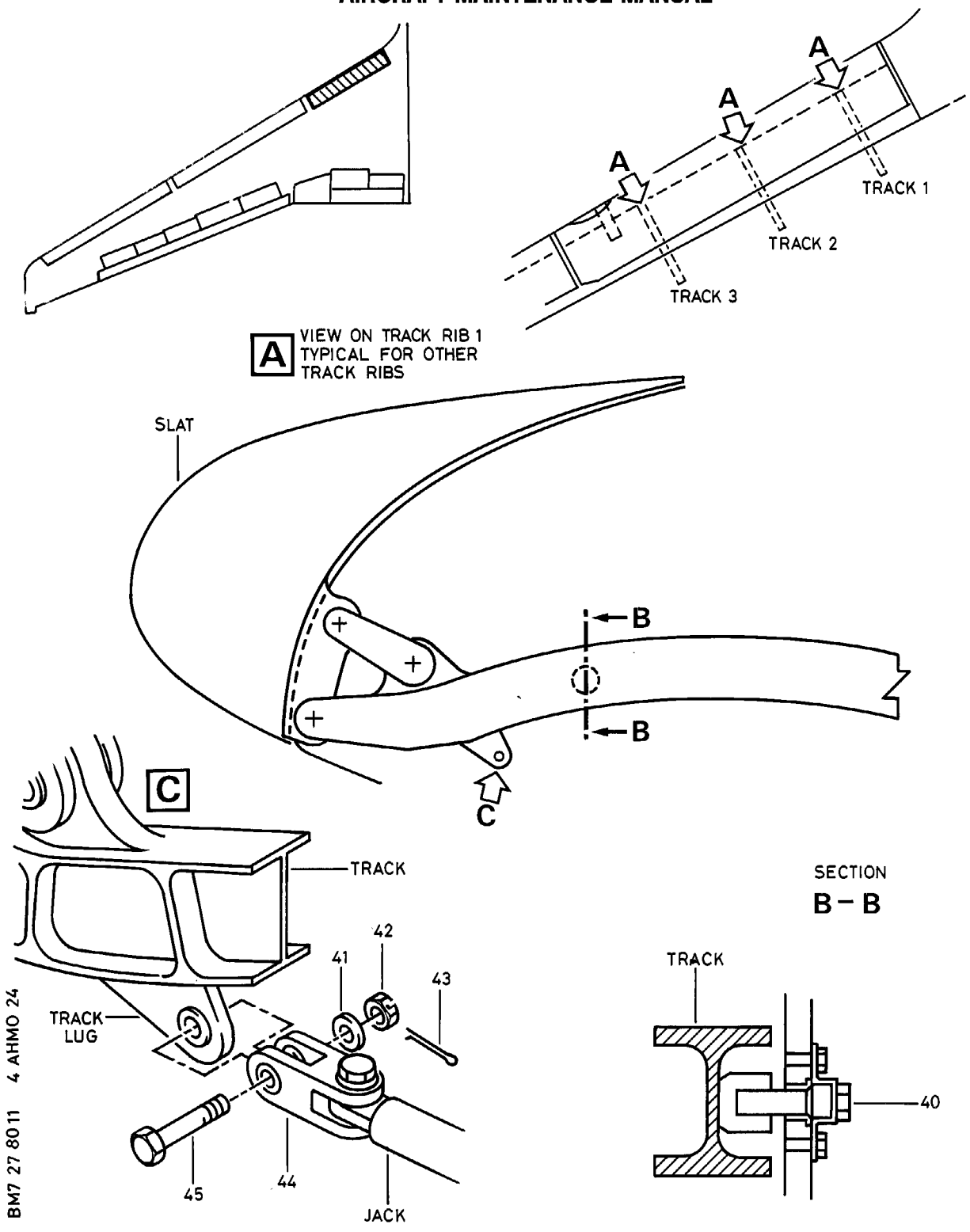
CAUTION: ALL RIGGING MUST BE CARRIED OUT WITH THE WING FUEL TANKS EMPTY. THE AIRCRAFT MUST BE STABLE ON ITS LANDING GEAR OR SUPPORTED ON ITS MAIN JACKING POINTS, WITH OR WITHOUT THE ENGINES INSTALLED.

A. Job Set Up
(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 1/26 VAC	1CV	335/R61
133VU	FLT CTL/FLAPS/SYS 2/26 VAC	2CV	334/S62
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/ SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY /FLAPS/SYS 1	10CV	335/R67

(2)Place set/flap control lever in gate 2 and partially extend slats (Ref. 27-80-00, P.Block 301).
(3)Display warning notices.
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/26 VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/ SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/ SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY /SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SLATS/WTB 1	13CV	336/Q65
133VU	FLT CTL/SLATS/WTB 2	14CV	336/Q64
133VU	FLT CTL/KRUGER	45CV	333/T61



Slat 1 - Installation
Figure 406

(5)Defuel the fuel from the wing tanks until they are empty (Ref. 28-25-00, P. Block 301).
(6)Put the access platform in position at zone 511 (611).
(7)Disconnect the spring rod from the folding nose (Ref. 27-81-34, P. Block 401) and secure the folding nose in the folded position.

WARNING: MAKE SURE THAT THE TRAVEL RANGE OF THE SLATS AND KRUEGER IS CLEAR.

(8)On panel 133VU remove safety clips and tags and close SLATS circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.
(9)Fully extend the slats (Ref. 27-80-00, P. Block 301)
(10)On panel 133VU safety and tag SLATS circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.
(11)Open the applicable access doors:
- Track 1 512(612)BB, CB and DB.
- Track 2 512(612)EB and FB.
- Track 3 512(612)GB, HB and JB.

(12)If necessary, use hand force to push open the slat-track sealing shutter and then retain it, in the open position.
(13)De-pressurize the green and/or blue hydraulic system(s).

B. Removal
(1)Reverse the slat lifting eyes and attach the sling PN 98A27808004000.
(2)Tracks 1 and 3.
(a)Remove the cotter-pin (43), the nut (42), the washer (41) and the bolt (45), then turn the jack link (44) to clear the track lug. Discard the cotter-pin (43).
(3)Hold the slat, remove the lockwire and then the stop bolts (40). Discard the lockwire.

NOTE : The stop bolt (40) is installed on, the inboard rib for the left wing and the outboard rib for the right wing.

(4)Remove the slat from the aircraft, take care when you remove the tracks from the leading edge. Put the slat on the trestles.
(5)Use a clean lint-free cloth with cleaning agents (Material No. 11-004) to clean the slat and the interface surfaces. Examine the interfaces for the correct condition.
(6)Examine the bearings and bushes for the correct condition.
(7)If applicable, remove the sling PN 98A27808004000 and reverse the lifting eyes.

C. Preparation of Replacement Component
(1)If a track is to be replaced, refer to 27-80-13, P. Block 301.

D. Not applicable..

E. Installation
(1)If necessary, install the sling PN 98A27808004000, then take the weight of the slat (232 lbs (105 kg)). Liftoist the slat and put it in position between the tracks at the wing leading edge. Take care when you guide

the tracks into the cut outs.

(2)Install the stop bolt (40), and safety with lockwire to the tag.

NOTE : The stop bolt (40) is installed on, the inboard rib for the left wing and the outboard rib for the right wing.

(3)Tracks 1 and 3.

(a)Turn the jack link (44) to align it in position and install the bolt (45), the washer (41) and the nut (42). Safety with a new cotter-pin (43).

(4)Remove the sling PN 98A27808004000 and reverse the lifting eyes.

(5)Release the sealing shutters.

(6)Connect the spring-rod to the folding nose and install the spring-rod fairing plate (Ref. 27-81-34, P. Block 401).

(7)Connect the hydraulic ground-power cart.

(8)On panel 133VU, close SLATS and KRUGER circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.

(9)Using the hydraulic ground power cart, slowly retract the slats fully (Ref. 27-80-00, P. Block 301). Make sure that the slats do not catch on surrounding structure.

(10)On panel 133VU, open, safety and tag SLATS and KRUGER circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.

(11)Using a suitable gap measuring tool, make certain that gap between slat leading edge and wing structure is 0.25 ± 0.091 in. (6.3 ± 2.3 mm) along full length of slat.

(12)Make certain that slat leading edge is between 0.12 in (3.05 mm) into-wind and 0.12 in (3.05 mm) out-of-wind.

(13)Make certain that slat trailing edge is parallel to, and between 0.36 and 0.44 in (9.14 and 11.18 mm) from edge of rubbing strip.

(14)Make certain that clearance between inboard end of slat and wing structure is between 0.48 and 0.72 in (12.19 and 18.29 mm).

(15)Make certain that clearance between outboard end of slat and slat 2 is between 0.22 and 0.63 in (5.59 and 16.00 mm).

(16)At inboard end of slat, make certain that seal is in contact with fixed structure, if necessary, adjust seal to suit.

F. Preparation for Test.

(1)Pressurize hydraulic system (Ref. 29-10-00, P. Block 301).

(2)On panel 133VU, remove safety clips and tags and close SLATS and KRUEGER circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV, 13CV, 14CV and 45CV.

(3)Remove warning notice.

G. Test

ACTION	RESULT
During slat extension and retraction, make certain that: - slat moves freely and smoothly through full range - folding nose and all shutters	

ACTION	RESULT
operate correctly - no fouling occurs between moving parts and fixed structure - at inboard end of slat, check that brush seal is in contact with Krueger flap (extended) up to an interference of 0.10 in (2.54 mm) If necessary trim seal to suit (Ref. also E.(12)).	
On flight compartment center pedestal: - place slats/flaps control lever in gate 5 (Ref. 27-80-00, P. Block 301)	Slats extend On panel 4VU: - SLATS FLAPS indicator moves SLATS 30 position
Make certain clearance between pylon and folding nose is correct (Ref. 27-81-34, P. Block 401).	
On flight compartment center pedestal: - place slats/flaps control lever in gate 1	Slats retract On panel 4VU: - SLATS FLAPS indicator moves SLATS 0 position

H. Close-Up
(1)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(2)Shut down and disconnect hydraulic ground power cart.
(3)Remove safety clips and tags and close circuit breakers 1CV, 10CV, 5CV, 6CV, 2CV.
(4)Refuel the aircraft as required (Ref. 12-11-28, P. Block 301).
(5)De-energize the aircraft electrical network and disconnect the electrical ground power unit (Ref. 24-41-00, P. Block 301).
(6)Close the access doors.
(7)Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.
(8)Remove the access platform.

WARNING: LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROL SURFACES - MAKE CERTAIN TRAVEL RANGE IS CLEAR.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Reason for the Job

A. Removal/Installation of Slats 2 and 3 Without Tracks (Para. 2.).

B. Removal/Installation of Slats 2 and 3 Complete with Tracks (Para.3.).

2. Removal/Installation of Slats 2 and 3 Without Tracks
(Ref. Fig. 401)

**ON A/C 001-002,

(Ref. Fig. 402)

R **ON A/C 003-200,

(Ref. Fig. 403)

**ON A/C ALL

(Ref. Fig. 404)

A. Equipment and Materials

ITEM	DESIGNATION
A. 98A27808005000	Measuring Device - Slat Trailing Edge
B. 98A27808004000	Hoisting Sling - Slat 1, 2 and 3
C.	Torque Wrench 50 to 530 lbf.in (0.56 to 6.0 mdaN)
**ON A/C 001-002,	
D. 98A27808006000	Measuring Device - Slat Leading Edge
R **ON A/C 003-200,	
D. 98A27808006001	Measuring Device - Slat Leading Edge

ITEM	DESIGNATION
R **ON A/C ALL	
R E.	Warning Notice - Prohibiting Unauthorized
R	Operation of Flap and Slat Control Lever
R F.	Access Platform 4.5 m (15 ft)
R G.	Circuit Breaker Safety Clips and Tags
R H.	Blanking Caps
R J.	Trestles
R K.	Cotter-Pins
R L. Material No. 04-004	Common Greases (Ref. 20-31-00)
R M. Material No. 05-005	Special Materials (Ref. 20-31-00)
R N. Material No. 09-013	Sealants (Ref. 20-31-00)
R P. Material No. 16-016	Structure Paints (Ref. 20-31-00)
R Referenced Procedures	
R - 12-11-28, P. Block 301	Replenishing of Fuel Tanks
R - 24-41-00, P. Block 301	AC External Power Control
R - 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
R - 28-25-00, P. Block 301	Refuel/Defuel System
R - 29-10-00, P. Block 301	Main Hydraulic Power
R - 30-11-00, P. Block 601	Wing Ice Protection

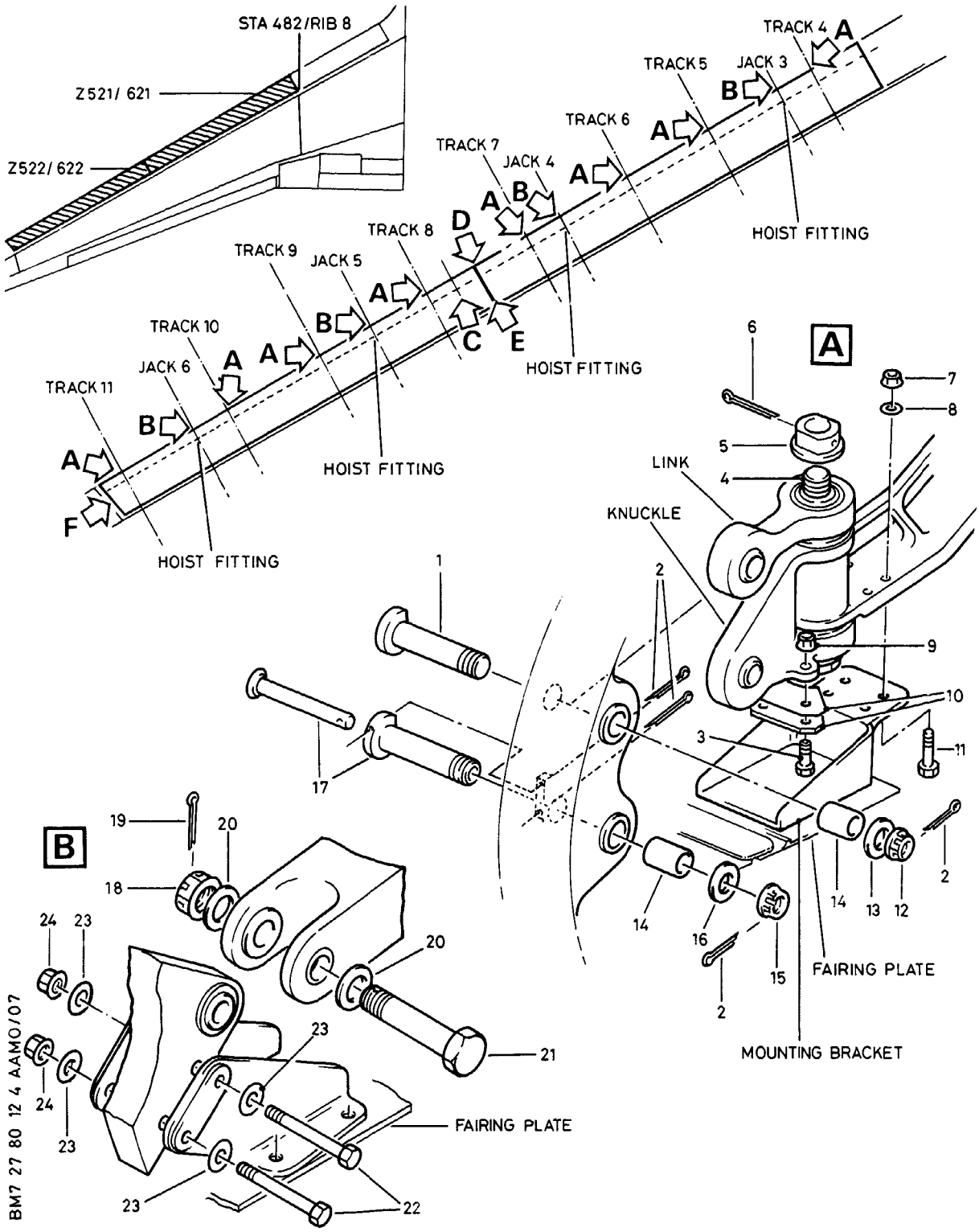
R CAUTION: ALL RIGGING MUST BE CARRIED OUT WITH THE WING FUEL TANKS EMPTY. THE AIRCRAFT MUST BE STABLE ON ITS LANDING GEAR OR SUPPORTED ON ITS MAIN JACKING POINTS, WITH OR WITHOUT THE ENGINES INSTALLED.

R B. Job Set-Up
R (1)Fully extend slats (Ref. 27-80-00, P. Block 301).
R (2)Open, safety and tag the following circuit breakers:

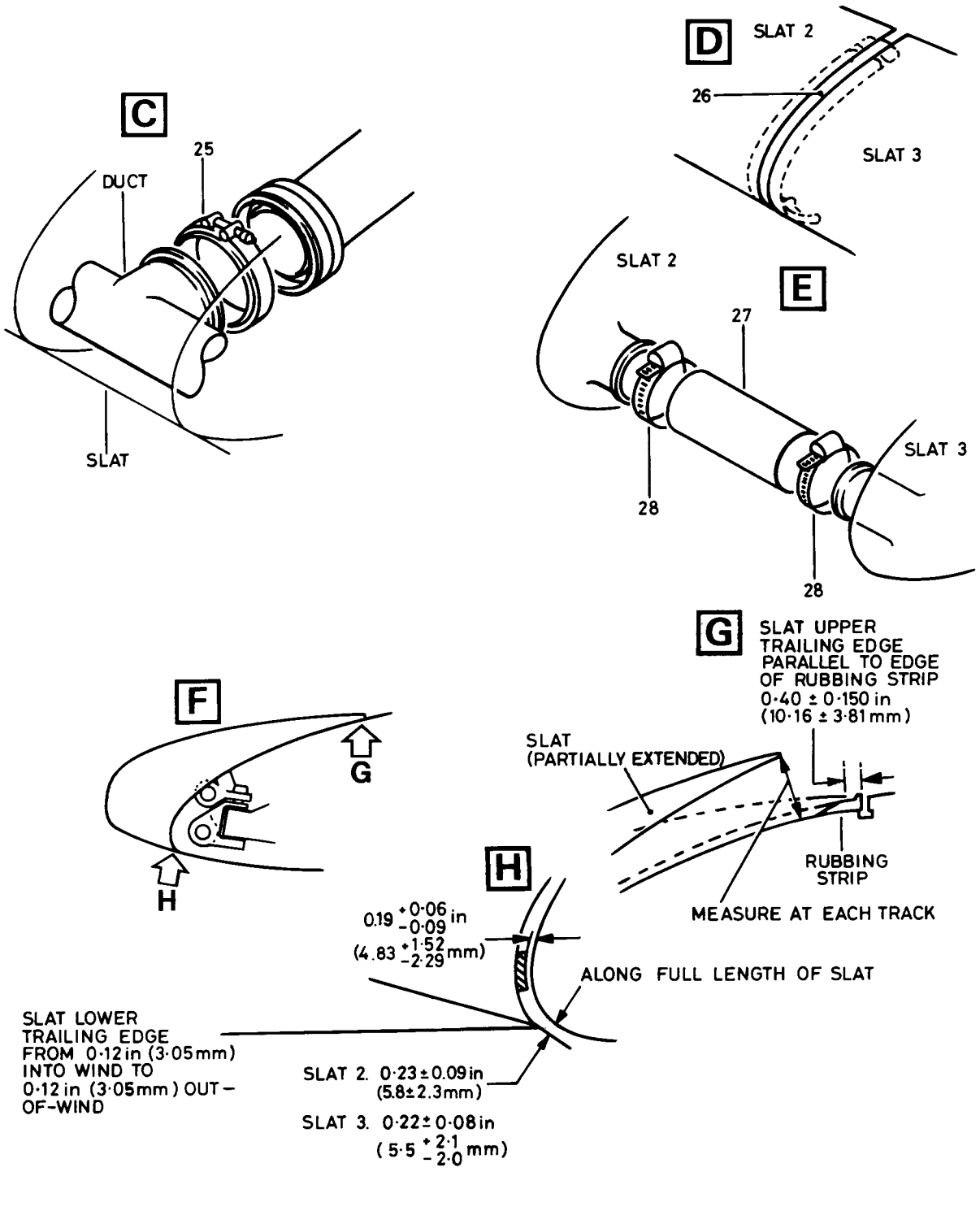
R

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT/CTL/SLATS/26 VAC SYS 2	4CV	335/R64
133VU	FLT/CTL/SFCC NORM SUPPLY/SLATS SYS 2	8CV	333/T64
133VU	FLT/CTL/SFCC LAND RECOVERY SUPPLY/SLATS SYS 2	9CV	335/R66
133VU	FLT/CTL/SFCC NORM SUPPLY/SLATS SYS 1	7CV	333/T63
133VU	FLT/CTL/SLATS/26 VAC SYS 1	3CV	335/R65
133VU	KRUGER	45CV	333/T61

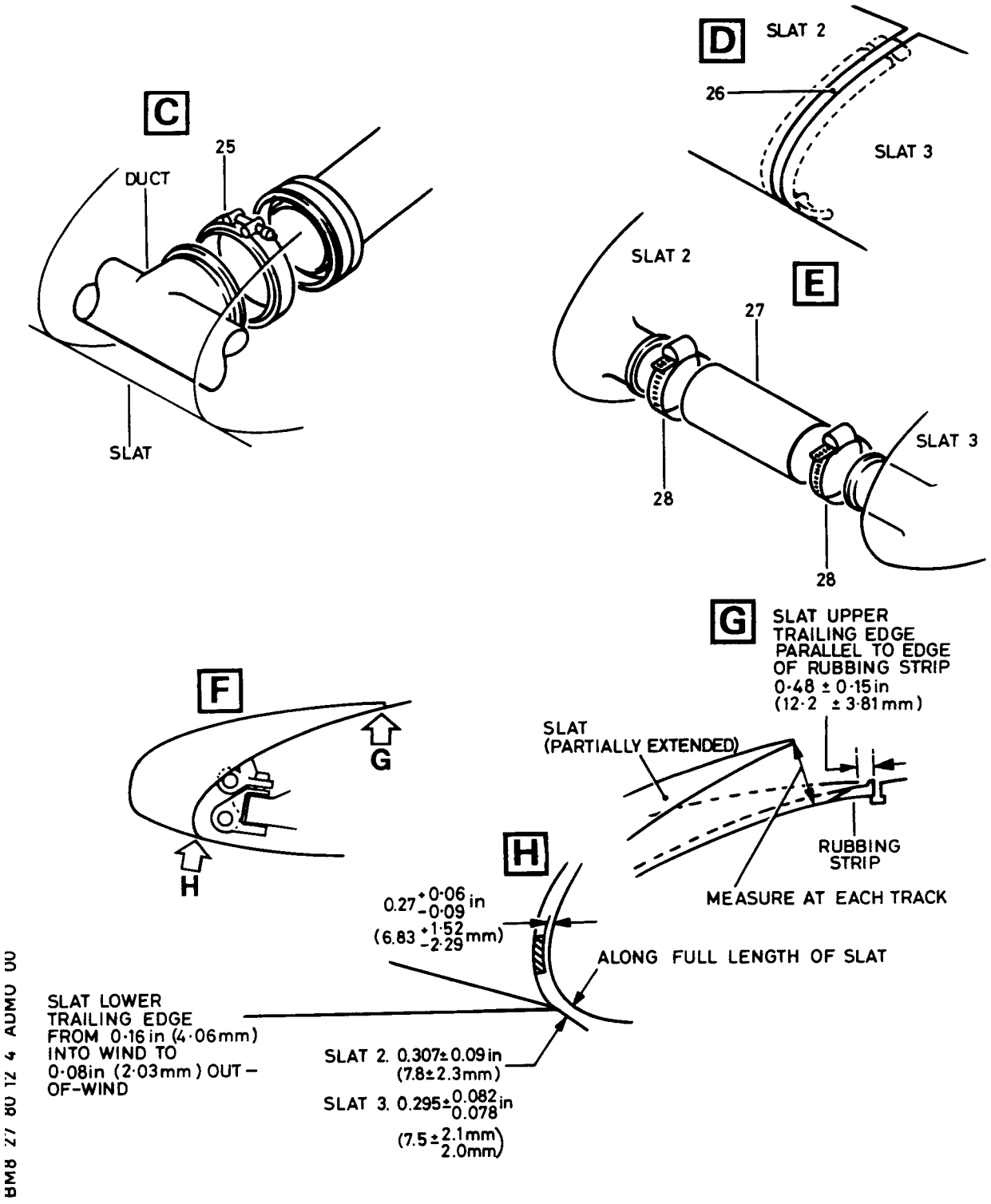
(3)Display the warning notice prohibiting unauthorized operation of the flaps and slats.
(4)Depressurize the Green and/or the Blue hydraulic system (Ref. 29-10-00,



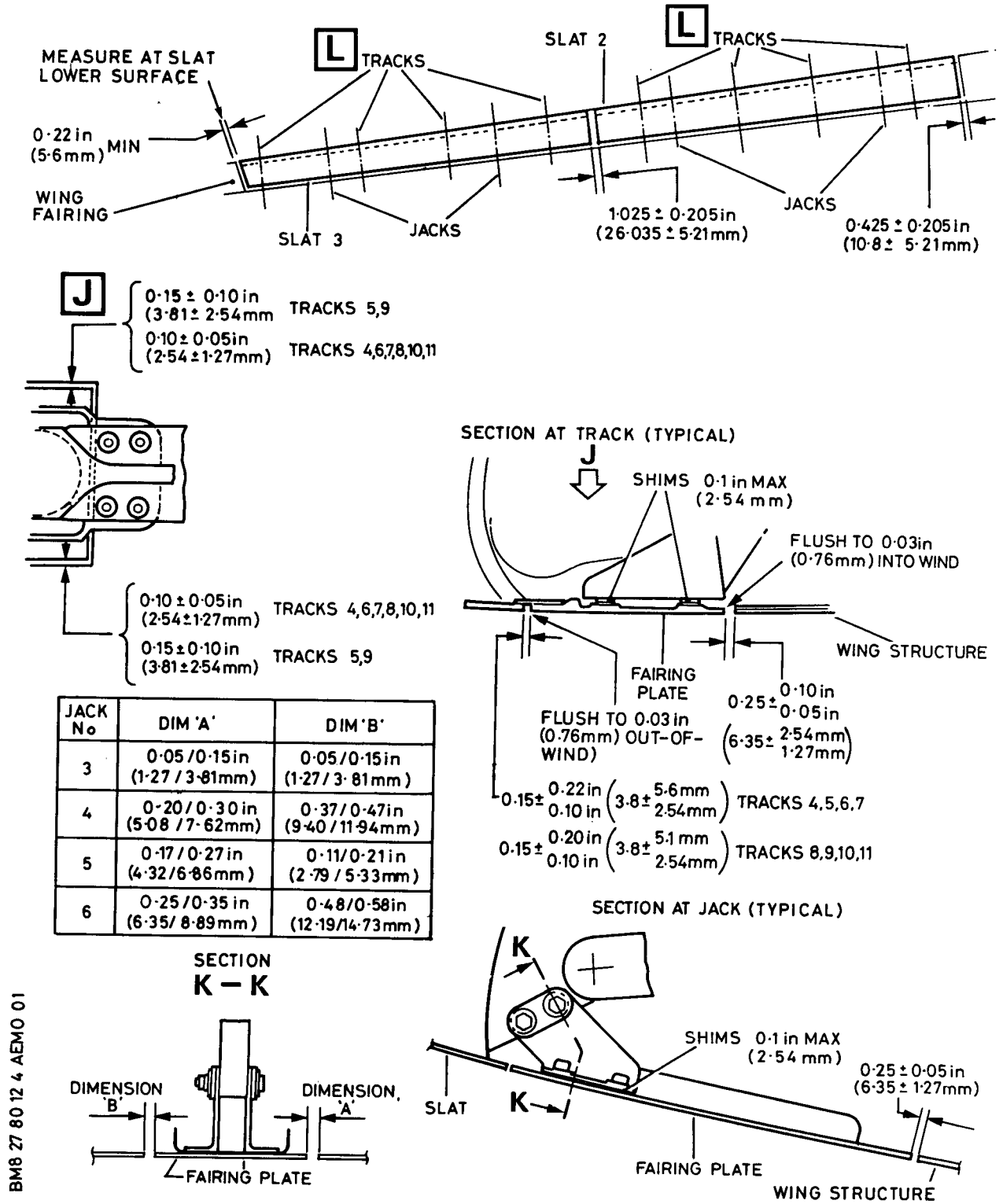
Slats 2 and 3 - Installation
Figure 401



Slats 2 and 3 - Installation
Figure 402



Slats 2 and 3 - Installation
Figure 403


MEASURE AT SLAT LOWER SURFACE
0·22 in (5·6 mm) MIN
WING FAIRING
L TRACKS
SLAT 3
JACKS
SLAT 2
L TRACKS
1·025 ± 0·205 in (26·035 ± 5·21 mm)
JACKS
0·425 ± 0·205 in (10·8 ± 5·21 mm)
J
0·15 ± 0·10 in (3·81 ± 2·54 mm) TRACKS 5,9
0·10 ± 0·05 in (2·54 ± 1·27 mm) TRACKS 4,6,7,8,10,11
0·10 ± 0·05 in (2·54 ± 1·27 mm) TRACKS 4,6,7,8,10,11
0·15 ± 0·10 in (3·81 ± 2·54 mm) TRACKS 5,9
SECTION AT TRACK (TYPICAL)
J
SHIMS 0·1 in MAX (2·54 mm)
FLUSH TO 0·03 in (0·76 mm) INTO WIND
WING STRUCTURE
FAIRING PLATE
FLUSH TO 0·03 in (0·76 mm) OUT-OF-WIND)
0·25 ± 0·10 in 0·05 in (6·35 ± 2·54 mm 1·27 mm)
0·15 ± 0·22 in 0·10 in (3·8 ± 5·6 mm 2·54 mm) TRACKS 4,5,6,7
0·15 ± 0·20 in 0·10 in (3·8 ± 5·1 mm 2·54 mm) TRACKS 8,9,10,11
SECTION AT JACK (TYPICAL)
K
SHIMS 0·1 in MAX (2·54 mm)
0·25 ± 0·05 in (6·35 ± 1·27 mm)
SLAT
K
FAIRING PLATE
WING STRUCTURE
SECTION K – K
DIMENSION 'B'
DIMENSION 'A'
FAIRING PLATE
BM8 27 80 12 4 AEMO 01

JACK No	DIM 'A'	DIM 'B'
3	0·05 / 0·15 in (1·27 / 3·81 mm)	0·05 / 0·15 in (1·27 / 3·81 mm)
4	0·20 / 0·30 in (5·08 / 7·62 mm)	0·37 / 0·47 in (9·40 / 11·94 mm)
5	0·17 / 0·27 in (4·32 / 6·86 mm)	0·11 / 0·21 in (2·79 / 5·33 mm)
6	0·25 / 0·35 in (6·35 / 8·89 mm)	0·48 / 0·58 in (12·19 / 14·73 mm)

Slats 2 and 3 Clearances
Figure 404

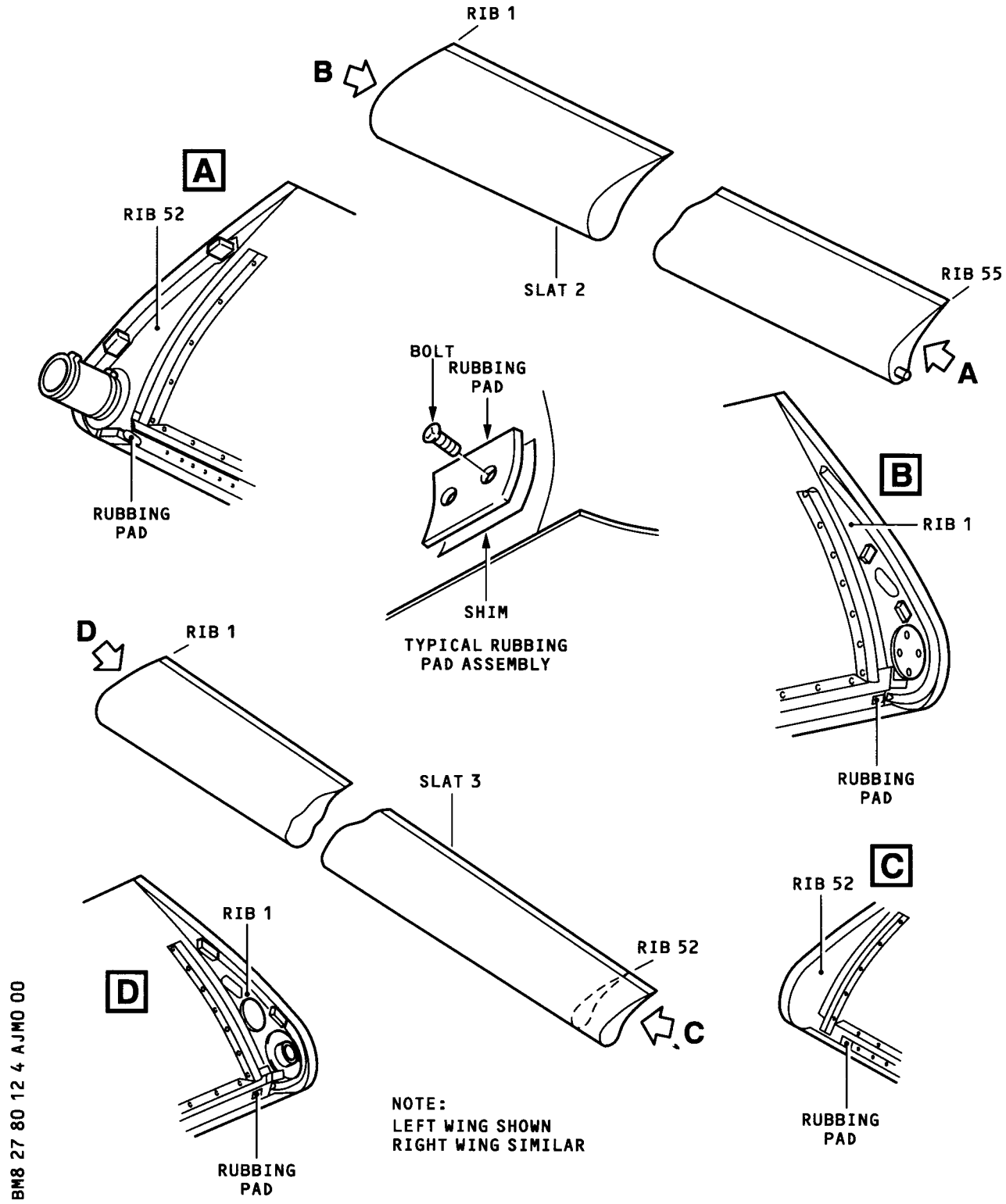
P. Block 301).
(5)Defuel the wing tanks until they are empty (Ref. 28-25-00, P. Block 301).
(6)Put the access platform in position at zone 522 (622) or 523 (623).

C. Removal
(1)Remove and discard seal (26) from between slat 2 and slat 3.
(2)Loosen clips (28) and remove hose (27) and clips from between slat 2 and slat 3.
(3)Remove clamp (25) and disconnect telescopic duct from slat 3. Cap telescopic and slat ducts. Temporarily retain telescopic duct in retracted position, clear of slat travel range.
(4)Remove nuts (7), washers (8) and bolts (11) securing mounting brackets and fairing plates at each track position.
(5)Remove nuts (24), washers (23) and bolts (22), securing fairing plates at each screwjack position.
(6)Measure and record the extension of each screwjack.
(7)Reverse hoist fittings and attach hoisting sling PN98A27808004000.
(8)Support slat.
(9)Remove cotter pins (19), nuts (18), washers (20) and bolts (21). Observe and record position of each bolthead. Disconnect screwjacks from slat.
(10)Remove cotter pins (2), nuts (12) (15), washers (13) (16), shoulder bolts (1) and failsafe bolt assemblies (17). Disconnect slat from tracks. Retain bushes (14).
(11)Lift slat clear of aircraft and lower onto trestles.
(12)If a new slat is to be installed, remove hoisting sling.

D. Preparation of Replacement Component
(1)Reverse hoist fittings and attach hoisting sling.

E. Installation
(1)Hoist slat and position slat on tracks.
(2)Manually extend each slat track until it is resting on its inner stop.
(3)Remove nuts (9) and bolts (3) and separate lockplates (10) from eccentric bolts (4).
(4)Remove cotter pins (6) and loosen nuts (5).
(5)Check eccentric bolts (4), links and knuckles for freedom of movement. Lubricate with grease (Material No.04-004).
(6)Adjust eccentric bolts (4), on all tracks, so that when connected, slat trailing edge will be at maximum height above wing.
(7)Lubricate shoulder bolts (1) and failsafe bolt assemblies (17) with grease (Material No.04-004) and bushes (14) with corrosion preventative lacquer (Material No.05-005).
(8)Install bushes (14), shoulder bolts (1), failsafe bolt assemblies (17), washers (13) (16), and nuts (12) (15) on tracks 5 and 9.
(9)TORQUE the nuts (12) and (15), on tracks 5 and 9, to between 270 and 330 lbf.in (3.05 and 3.73 m.daN). Safety with cotter pins (2).

NOTE: If necessary, use specified alternative washers (13) (16) to facilitate installation of cotter pins (2).



Slats 2 and 3 - Adjustable Rubbing Pads
Figure 405

R

(10)On tracks 4 thru 11 install lockplates (10) on eccentric bolts (4) and secure with bolts (3) and nuts (9).

NOTE: The lockplates may be reversed to provide a half serration adjustment on installation.

(11)Remove hoisting sling and install hoist fittings flush in slat.
(12)Measure the extension of each screwjack and make certain that the dimensions agree with those recorded in step 2.C.(6).
(13)Manually retract slat to meet screwjack attachment points and making sure that the boltheads are installed on the positions recorded in step 2. C.(9), install bolts (21), washers (20) and nuts (18), and safety with cotter pins (19).
(14)Pressurize Blue or Green hydraulic system (Ref. 29-10-00, P. Block 301).
(15)On panel 133VU, remove safety clips and tags and close circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(333/R66), 7CV(333/T63), 3CV(335/R65), 45CV(333/T61), 14CV(335/Q64), and 13CV(335/Q65).
(16)Fully retract slats (Ref. 27-80-00, P. Block 301).
(17)On panel 133VU, open, safety and tag circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(333/T61), 14CV(335/Q64), and 13CV(335/Q65).
(18)Remove nuts (9) and bolts (3) and remove lockplates (10) from eccentric bolts (4).
(19)Turn eccentric bolts (4) in the same direction on tracks 5 and 9, as applicable, until slat trailing edge just contacts wing rubbing strip in at least one position. Record direction of eccentric bolts rotation.

NOTE: The point of contact must be within 19.685 in.(500 mm) of each track centerline.

(20)Turn eccentric bolts (4) on remaining tracks in the direction recorded in step 2.E.(19) until it is possible to install shoulder bolts (1).
(21)Install bushes (14), shoulder bolts (1), failsafe bolt assemblies (17), washers (13) (16), and nuts (12) (15), on tracks 4,6,7,8,10 and 11.
(22)TORQUE nuts (12) (15) on tracks 4, 6, 7, 8 and 10 to between 270 and 330 lbf.in (3.051 and 3.729 m.daN). TORQUE nut (12) on track 11 to between 140 and 180 lbf.in (1.582 and 2.034 m.daN). Torque nut (15) on track 11 to between 270-330 lbf.in (3.051 and 3.729 m.daN). Safety with cotter pins (2).
(23)Turn eccentric bolt (4) on tracks 7 and/or 11 in the same direction as recorded in step 2.E.(19), until slat trailing edge just contacts wing rubbing strip in at least one position. Record direction of eccentric bolt rotation.
(24)Repeat step 2.E.(23) for tracks 4 and/or 8, then for tracks 6 and/or 10.

NOTE: The point of contact must be within 19.685 in. (500 mm) of each track centerline.

(25)Install lockplates (10) on eccentric bolts (4) and secure with bolts (3) and nuts (9).

NOTE: The lockplates may be reversed to provide a half-serration adjustment on installation.

(26) On panel 133VU, remove safety clips and tags and close circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63). 3CV(335/R65), 45CV(333/T61), 14CV(335/Q64), and 13CV(335/Q65).

(27) Place flap and slat control lever in second notch and partially extend slats (Ref. 27-80-00, P. Block 301).

(28) On panel 133VU, open, safety and tag circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(333/T61), 14CV(335/Q64), and 13CV(335/Q65).

(29) Install measuring device PN98A27808005000 in trackwise direction on upper wing skin so that sensing bolt of measuring device dial gage rests on slat trailing edge.

(30) Remove nuts (9) and bolts (3) that secure lockplates (10) to eccentric bolts (4).

(31) Turn all eccentric bolts, in the direction recorded in step 2.E.(19), to lower slat trailing edge at each track position, (Ref. Table 1), as indicated on the dial gage of measuring device.

TRACK NO.	4	5	6	7-11
TRAILING EDGE REDUCTION	0.0mm (0.0in)	0.2 to 1.00mm (0.0079 to 0.0394in)	0.8 to 1.6mm (0.0315 to 0.0630in)	1.5 to 2.3mm (0.0591 to 0.0906in)

Table 1

(32) Install lockplates (10) on eccentric bolts and secure with bolts (3) and nuts (9). Remove measuring device.

NOTE: The lockplates may be reversed to provide a half-serration adjustment on installation.

(33) On panel 133VU, remove safety clips and tags and close circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(333/T61), 14CV(335/Q64), and 13CV(335/Q65.

(34) Fully extend slats (Ref. 27-80-00, P. Block 301).

(35) On panel 133VU, open, safety and tag circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(333/T61), 14CV(335/Q64), and 13CV(335/Q65).

(36) Remove nuts (9) and bolts (3), securing lockplates (10) to eccentric bolts (4).

(37) On tracks 4 thru 10, TORQUE nuts (5) to between 470 and 530 lbf.in. (5.310 and 5.988 m.daN). On track 11, TORQUE nut (5) to between 270 and 330 lbf.in. (3.051 and 3.729 m.daN). Safety nuts (5) with cotter pins (6).

CAUTION : DO NOT ROTATE ECCENTRIC BOLTS.

(38) Install lockplates (10) on eccentric bolts (4) and secure with bolts (3) and nuts (9).

NOTE: The lockplates may be reversed to provide a half-serration adjustment on installation.

(39)On panel 133VU, remove safety clips and tags and close circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(333/T61), 14CV(335/Q64), and 13CV(335/Q65).

(40)Fully retract slats (Ref. 27-80-00, P. Block 301).

(41)On panel 133VU, open, safety and tag circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(333/T61). 14CV(335/Q64), and 13CV(335/Q65).

**ON A/C 001-002,

(42)Use the measuring device PN 98A27808006000 to examine the clearance between:

(a)The slat rivet heads and the wing leading edge along the full length of the slat.

(b)The slat rubbing pads and the wing surface (Ref. Fig. 405).

R **ON A/C 003-200,

(42)Use the measuring device PN 98A27808006001 to examine the clearance between:

(a)The slat rivet heads and the wing leading edge along the full length of the slat.

(b)The slat rubbing pads and the wing surface (Ref. Fig. 405).

**ON A/C ALL

(43)Check the clearance between the slat lower trailing edge and the wing surface along the full length of the slat (detail H).

(44)Check the dimension of the slat upper trailing edge, parallel to the edge of the fixed wing structure rubbing strip (detail G).

(45)Check the clearances between slats 1 and 2 and between slats 2 and 3.

(46)On panel 133VU, remove safety clips and tags and close circuit breakers 4CV(335/R65), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(333/T61), 14CV(335/Q64), and 13CV(335/Q65).

(47)Fully extend slats (Ref. 27-80-00, P. Block 301).

(48)On panel 133VU, open, safety and tag circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(333/T61). 14CV(335/Q64), and 13CV(335/Q65).

(49)Install fairing plates and brackets, at each track and screwjack position, and secure with bolts (11, 22), washers (8, 23) and nuts (7, 24).

(50)Seal eccentric bolts and slat attachment bolts with sealant (Material No.09-013).

(51)Remove caps from telescopic and slat ducts and secure telescopic duct to slat 3 with clamp (25). TORQUE nut to between 50 and 70 lbf.in (0.565 and 0.791 m.daN).

(52)Install hose (27) between slats 2 and 3 and secure with clips (28).
(53)Install new seal (26) between slat 2 and 3.
(54)On panel 133VU, remove safety clips and tags and close circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(333/T61), 14CV(335/Q64), and 13CV(335/Q65).
(55)Fully retract slats (Ref. 27-80-00, P. Block 301).
(56)On panel 133VU, open, safety and tag circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(333/T61).
(57)Check clearances and into and out-of-wind limits of fairing plates at each track and screwjack position. If necessary adjust shims.
(58)On panel 133VU, remove safety clips and tags and close circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(333/T61),14CV(335/Q64), and 13CV(335/Q65).

F. Test
(1)Perform the following:

ACTION	RESULT
1. Fully extend slats (Ref. 27-80-00, P. Block 301)	- slats extend
2. Make certain slat travel is smooth, that shutters close, and that telescopic duct extends correctly	
3. Retract slats (Ref. 27-80-00, Block 301)	- slats retract fully
4. Make certain slat travel is smooth, that shutters open, and that telescopic duct retracts correctly	

(2)On panel 133VU, open, safety and tag circuit breakers 3CV(335/R65), 4CV(355/R64), 7CV(333/T63), 8CV(333/T64), 9CV(335/R66), 45CV(333/T61) 14CV(335/Q64), and 13CV(335/Q65).
(3)Perform leak test on telescopic duct (Ref. 30-11-00, P. Block 601). On completion of test, paint a red line across clamp (25) and nut with paint (Material No.16-016).

G. Close-Up
(1)Depressurize Blue and Green hydraulic systems (Ref. 29-10-00, P. Block 301).
(2)On panel 133VU, remove safety clips and tags and close circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(335/R64), 14CV(335/Q64), and 13CV(335/Q65).
(3)Refuel the aircraft as required (Ref. 12-11-28, P. Block 301).
(4)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(5)Remove the warning notice.

(6)Remove the access platform.
(7)Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.

3. Removal/Installation of Slats 2 and 3 Complete with Tracks
(Ref. Fig. 401, 402, 404)
(Ref. Fig. 406)

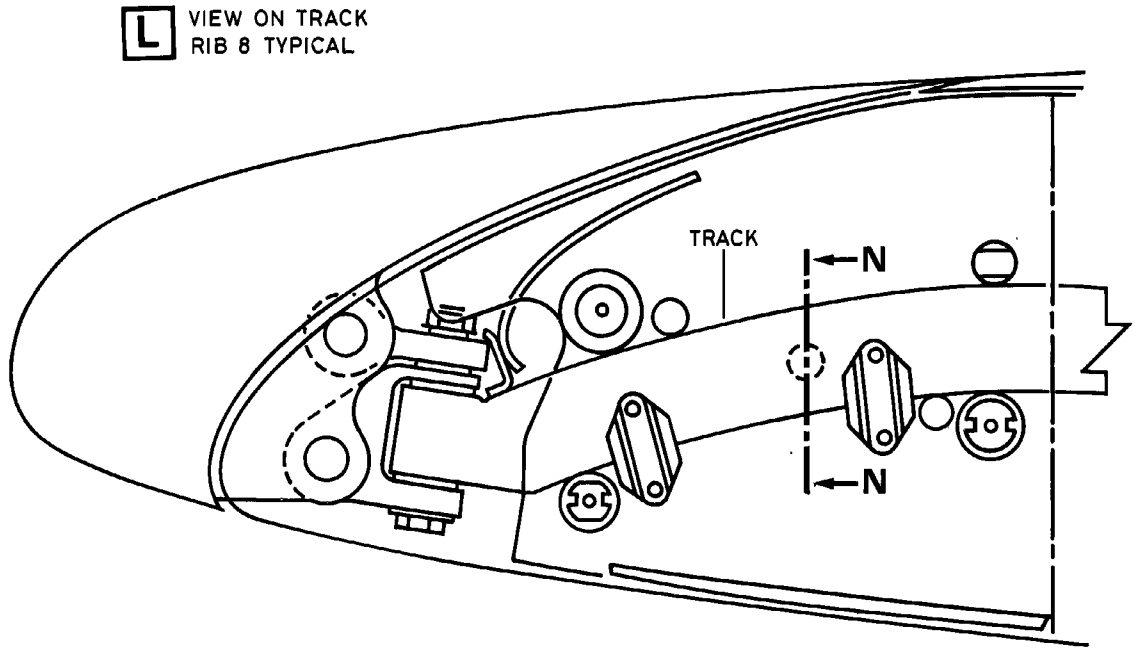
A. Equipment and Materials

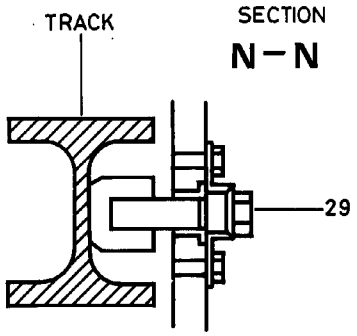
ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips and Tags
B.	Warning Notice Prohibiting Unauthorized Operation of Flap and Slat Control Lever
C.	Access Platform 4.5 m (15 ft)
D. 98A27808004000	Hoisting Sling - Slat 1-2-3
E.	Trestles
F.	Blanking Plugs and Caps
G.	Torque Wrench 50-70 lbf. in. (0.56-0.79 mdaN)
H.	Cotter Pins
J.	Lockwire, Corrosion Resistant Steel, Dia 0.8 mm (0.32 in)
K. Material No. 16-016	Structure Paints (Ref. 20-31-00)
Referenced Procedures	
- 12-11-28, P. Block 301	Replenishing of Fuel Tanks
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Kruger Flaps)
- 27-80-14, P. Block 401	Tracks - Slat 2 and 3
- 28-25-00, P. Block 301	Refuel/Defuel System
- 29-10-00, P. Block 301	Main Hydraulic Power
- 30-11-00, P. Block 601	Wing Ice Protection

CAUTION: ALL RIGGING MUST BE CARRIED OUT WITH THE WING FUEL TANKS EMPTY. THE AIRCRAFT MUST BE STABLE ON ITS LANDING GEAR OR SUPPORTED ON ITS MAIN JACKING POINTS, WITH OR WITHOUT THE ENGINES INSTALLED.

B. Job Set-Up
(1)Fully extend the slats (Ref. 27-80-00, P. Block 301).
(2)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS SYS 2	8CV	335/T64
133VU	FLT CTL/SFCC LAND RECOVERY SUPPLY/SLATS SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS SYS 1	7CV	333/T63
133VU	FLT CTL/SLATS/26 VAC SYS 1	3CV	335/R65
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SLATS/WTB2	14CV	335/Q64
133VU	FLT CTL/SLATS/WTB1	13CV	335/Q65





NOTE STOP BOLT (29) IS INSTALLED ON INBOARD RIB FOR LEFT WING AND OUTBOARD RIB FOR RIGHT WING

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Track - Stop Bolt Location
Figure 406

(3)Display the warning notice prohibiting unauthorized operation of the flaps and slats.
(4)De-pressurize the Green and Blue hydraulic systems (Ref. 29-10-00, P. Block 301.)
(5)Defuel the wing tanks until they are empty (Ref. 28-25-00, P. Block 301).
(6)Put the access platform in position.
(7)Open the applicable slat-track access door:
(a)Track 4 523(623)BB and CB.
(b)Track 5 523(623)EB and FB.
(c)Track 6 523(623)GB, HB and JB.
(d)Track 7 523(623)LB and MB.
(e)Track 8 524(624)BB and CB.
(f)Track 9 524(624)EB and FB.
(g)Track 10 524(624)GB and HB.
(h)Track 11 524(624)KB.
(8)If necessary use hand force to push open a slat track sealing shutter and retain in open position.

C. Removal
R (1)Remove and discard the seal (26) from between slat 2 and slat 3.
R (2)Loosen the clips (28) and remove the hose (27) and the clips (28), from between slat 2 and 3.
R (3)Remove the clamp (25) and disconnect the telescopic duct from slat 3. Cap the telescopic and slat ducts. Temporarily retain the telescopic duct in the retracted position, clear of the slat travel range.
(4)Measure and record the extension of each screwjack.
R (5)Reverse the hoist fittings and attach the sling PN98A27808004000.
R (6)Hold the slat.
R (7)Remove the cotter-pins (19), the nuts (18), the washers (20) and the bolts (21). Record the position of each bolthead. Disconnect the screwjacks from the slat. Discard the cotter-pins (19).
R (8)Remove the lockwire and the stop bolts (29). Discard the lockwire.

R NOTE : The stop bolt (29) is installed on the inboard rib for the left wing and the outboard rib for the right wing.

R (9)Hold the weight of the slat (232 lbs (105 kg)) with the crane and carefully move the slat forward until the slat tracks are removed.
R (10)Lift the slat clear of the aircraft and lower onto the trestles.

D. Not applicable.

E. Preparation for Installation.
(1)To replace a track refer to 27-80-14, P. Block 401.

F. Installation
(1)Lift slat into position carefully guiding tracks into fixed leading edge.
(2)Install stop bolts (29), and safety with lock wire to tag.

NOTE : Stop bolt (29) is installed on inboard rib for left wing and outboard rib for right wing.

(3)Remove hoisting sling and install hoist fittings flush in slat.
(4)Measure extension of each screwjack and make certain that the dimensions agree with those recorded in step 3.C.(4).
(5)Manually retract slat to meet screwjack attachment points and making sure that the boltheads are installed in the positions recorded in step 3.C.(7), install the bolts (21), washers (20) and nuts (18), and safety with cotter pins (19).
(6)Remove caps from telescopic and slat ducts and secure telescopic duct to slat 3 with clamp (25). TORQUE nut to between 50 and 70 lbf. in. (0.565 and 0.791 m.daN).
(7)Install hose (27) between slats 2 and 3 and secure with clips (28).
(8)Install new seal (26) between slat 2 and 3.
(9)Release track shutters.
(10)On panel 133VU, remove safety clips and tags and close SLATS and KRUGER circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(335/R61), 14CV(335/Q64), and 13CV(335/Q65).

G. Test
(1)Perform the following :

ACTION	RESULT
1. Fully retract slats (Ref. 27-80-00, P. Block 301).	- slats retract fully
2. Make sure that slat travel is smooth, that shutters open, and that telescopic duct retracts correctly	
3. Fully extend slats (Ref. 27-80-00, P. Block 301)	- slats extend fully
4. Make sure that slat travel is smooth, that shutters open, and that telescopic duct extends correctly	
5. Fully retract slats (Ref. 27-80-00, P. Block 301).	- slats retract fully.

(2)On panel 133VU, open, safety and tag SLAT and KRUGER circuit breakers 3CV(335/R65), 4CV(335/R64), 7CV(333/T63), 8CV(333/T64), 9CV(335/R66), 45CV(333/T61), 14CV(335/Q64) and 13CV(335/Q65).
(3)Perform leak test on telescopic duct (Ref. 30-11-00, P. Block 601). On completion of test, paint a red line across clamp (25) and nut with paint (Material No.

16-016).

H. Close-Up
(1) De-pressurize Green and Blue hydraulic systems (Ref. 29-10-00, P. Block 301).
(2) On panel 133VU, remove safety clips and tags and close circuit breakers 4CV(335/R64), 8CV(333/T64), 9CV(335/R66), 7CV(333/T63), 3CV(335/R65), 45CV(333/T61), 14CV(335/Q64), and 13CV(335/Q65).
(3) Refuel the aircraft as required (Ref. 12-11-28, P. Block 301).
(4) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(5) Close the applicable access doors.
(6) Remove the warning notice.
(7) Remove access platform.
(8) Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.

TRACKS 1 THRU 3, SLAT 1 - REMOVAL/INSTALLATION

WARNING: LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS SURFACES - MAKE CERTAIN TRAVEL RANGE IS CLEAR.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

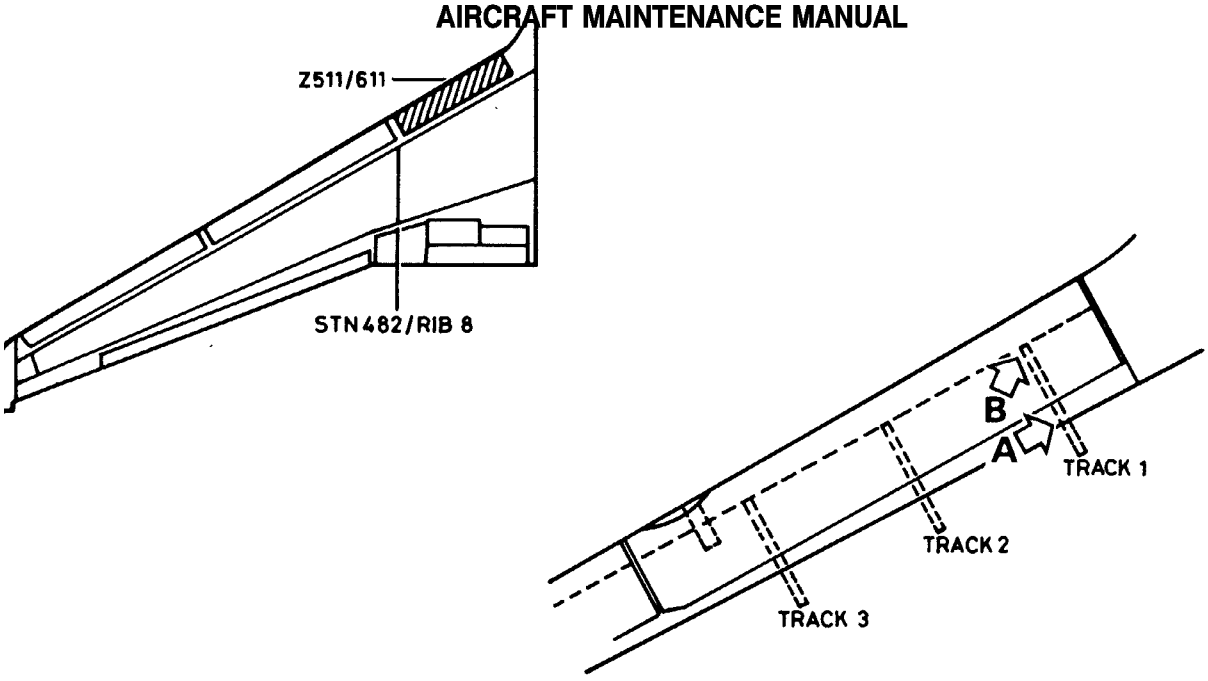
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

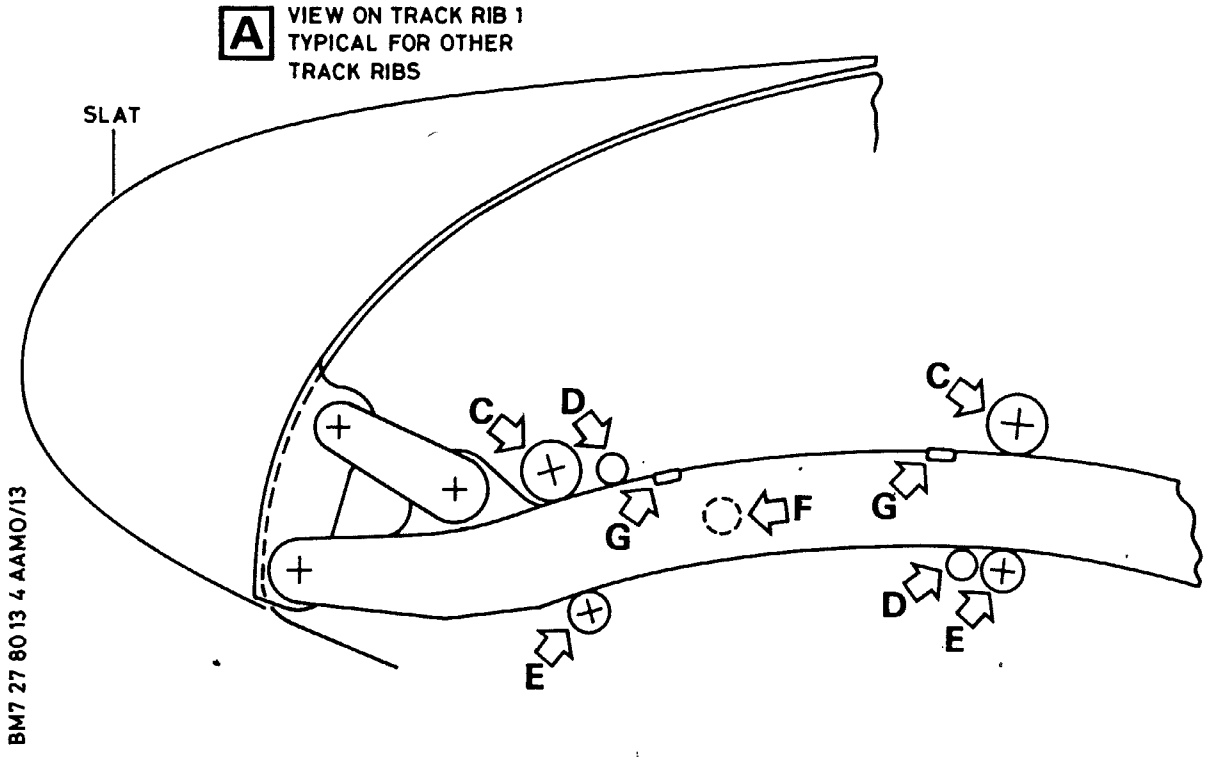
1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.5 m (8 ft)
B.	Warning Notices
C.	Circuit Breaker Safety Clips
D.	Torque Wrench 800-900 lbf.in (9.04-11.19 m.daN)
E.	Torque Wrench 500-610 lbf.in (5.65-6.89 m.daN)
F.	Torque Wrench 260-325 lbf.in (2.94-3.67 m.daN)
G.	Spring Balance 0 to 20 lb (0 to 9.1 kg)
H.	Grease Gun (Push On)
J.	Cotter-Pins
K.	Lockwire, Corrosion Resistant Steel 0.060 in (1.4 mm) dia.
L. Material No. 04-004	Common Greases (Ref.20-31-00)
M. Material No. 05-005	Special Materials (Ref.20-31-00)
N. Material No. 09-013	Sealants (Ref.20-31-00)
P. Material No. 13-002	Pretreatment for Painting (Ref. 20-31-00)
Q. Material No. 16-006	Structure Paints (Ref. 20-31-00)
Referenced Procedures	
- 27-80-00, P. Block 301	Lift Augmenting(Slats and Krueger Flaps)
- 27-80-00, P. Block 501	Lift Augmenting(Slats and Krueger Flaps)
- 27-81-39, P. Block 401	Sealing Shutter - Tracks 2
- 27-81-43, P. Block 401	Sealing Shutter - No. 1 Screwjack/ Track 1 and No. 2 Screwjack/Track 3)
- 29-10-00, P. Block 301	Main Hydraulic Power
- 51-12-00, P. Block 1	Paint Coatings

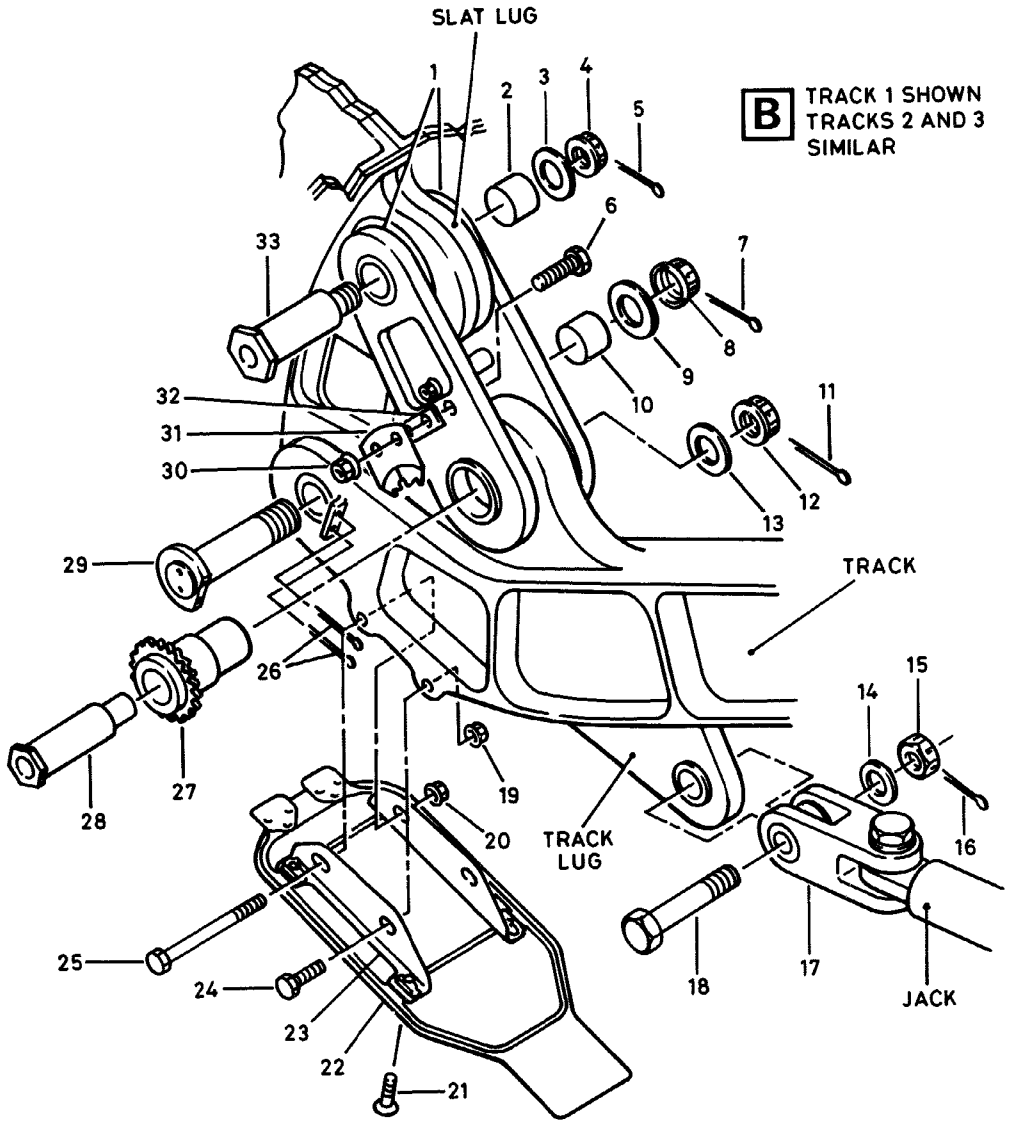
2. Procedure

(Ref. Fig. 401)
(Ref. Fig. 402)
(Ref. Fig. 403)
(Ref. Fig. 404)





Installation, Track 1 thru 3 - Slat 1
Figure 401



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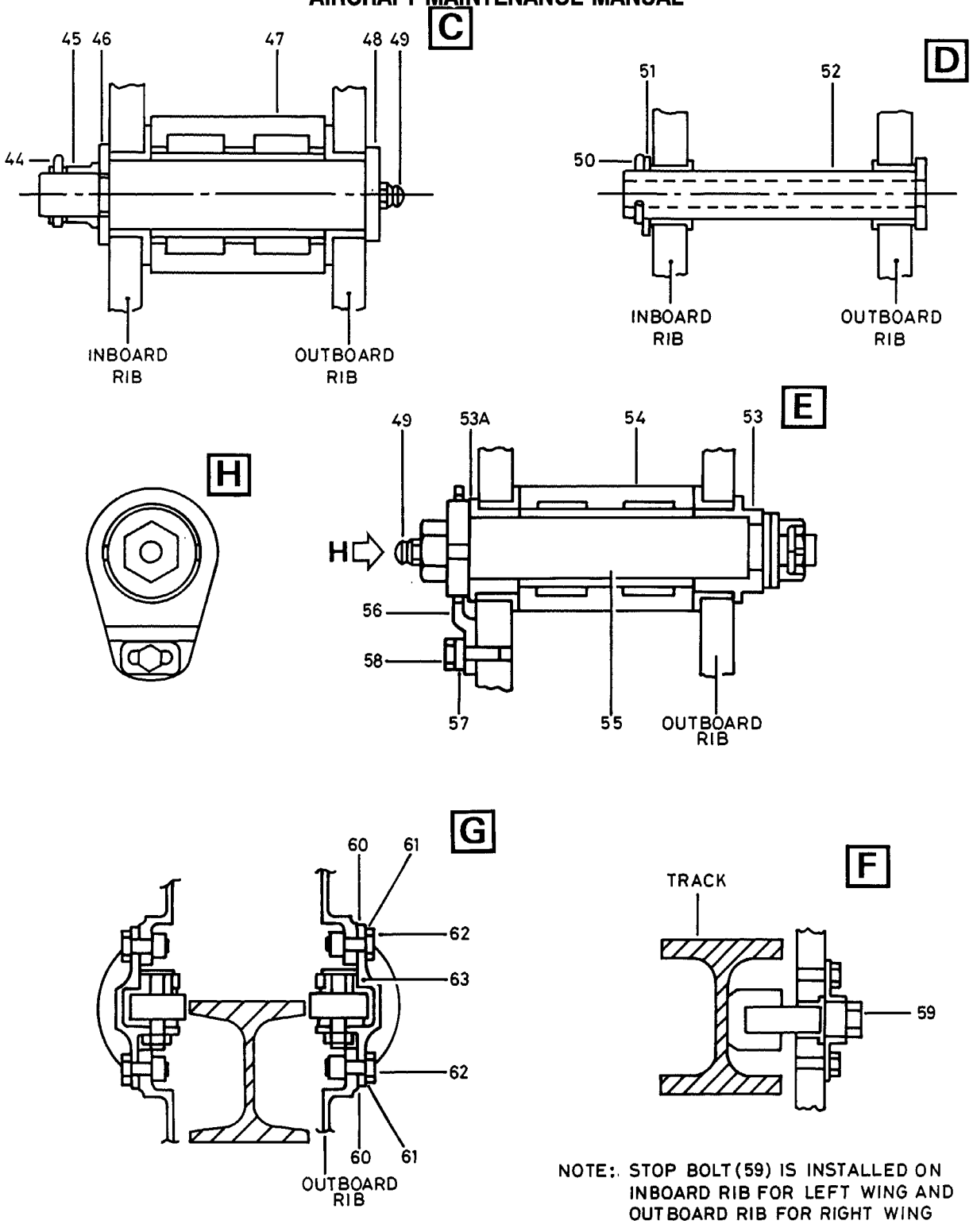
Installation, Track 1 thru 3 - Slat 1
Figure 402



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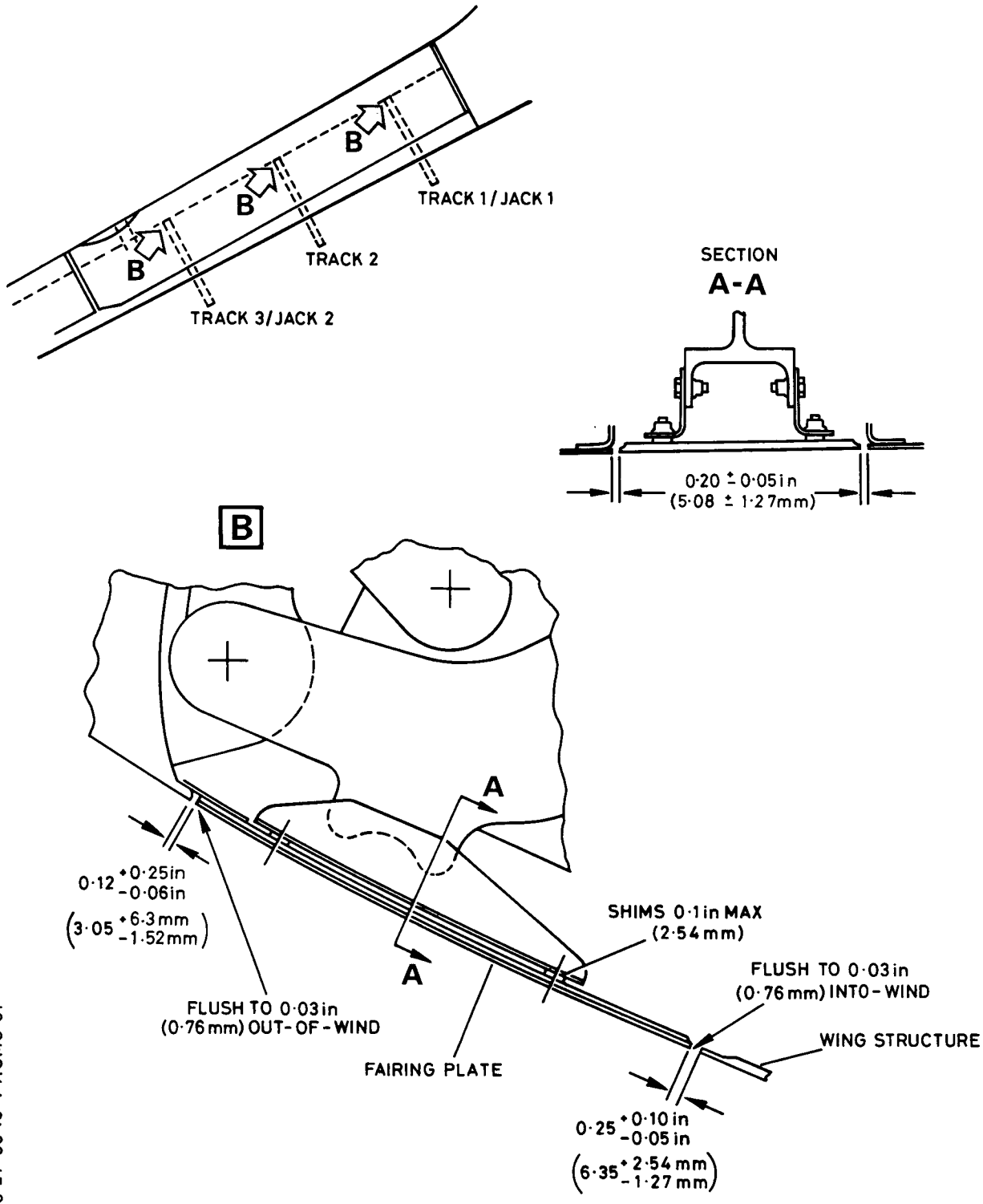
Installation, Track 1 thru 3 - Slat 1
Figure 403



Clearances, Fairing Plate - Track 1 thru 3
Figure 404

R

A. Job Set-Up
(1)Extend slats (Ref.27-80-00, P. Block 301).
(2)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/26 VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC NORM SYPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC LAND RECOVERY SYPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SLATS/WTB 1	13CV	336/Q65
133VU	FLT CTL/SLATS/WTB 2	14CV	336/Q64
133VU	FLT CTL/KRUGER	45CV	333/T61

(3)Display warning notice prohibiting movement of slats.
(4)Depressurize Green and Blue hydraulic systems (Ref. 29-10-00, P. Block 301).
(5)Position access platform.
(6)Open appropriate access doors:
- Track 1 512(612)BB, CB and DB.
- Track 2 512(612)EB and FB.
- Track 3 512(612)GB, HB and JB.

(7)Remove relevant sealing shutter:
- Track 2 (Ref.27-81-39, P. Block 401).
- Track 1 and 3 (Ref.27-81-43, P. Block 401).

B. Removal

CAUTION: REPLACE ONE TRACK BEFORE REMOVING ANOTHER.

(1)Remove nuts (19 and 20), bolts (24 and 25) and fairing plate (22) together with brackets (23).
(2)Remove cotter-pins (5, 7 and 26), nuts (4 and 8) and washers (3 and 9) from failsafe bolt (29) and bolt (33). Withdraw the bolts and retain sliding bushes (2 and 10).
(3)Swivel links (1), to clear slat lug.
(4)Tracks 1 and 3
(a)Remove cotter-pin (16), nut (15), washer (14) and bolt (18). Swivel link (17), to clear track lug.
(5)Remove cotter-pins (44), nuts (45), washers (46), pins (48) and rollers (47).
(6)Remove cotter-pin (50), washer (51) and forward upper failsafe pin (52).
(7)At lower forward and rear rollers, remove lockwire, bolts (58), serrated locking plates (57) and locking rings (56).
(8)Support relevant track. Cut and remove lockwire. Remove stop bolt (59) and withdraw track. Remove track from aircraft.
(9)Mark position of eccentric bush (27). Remove nuts (30), bolts (6), locking plate (31) and spacer (32). Remove cotter-pin (11), nut (12) and washer (13) from bolt (28). Withdraw bolt (28) and eccentric

bush (27). Collect and retain links (1).
(10)Remove bolts (21) and separate fairing plate (22) from brackets (23). Collect and retain shims.
(11)Clean and inspect component interface.

C. Preparation for Installation
(1)Lubricate eccentric bush (27) and bolt (28) with Material No.04-004.
(2)If removed, track and links are to be installed:
- Install links (1) on track using eccentric bush (27), bolt (28), washer (13) and nut (12). Turn eccentric bush (27) to position marked during removal. TORQUE nut (12) to between 260 and 325 lbf. in (2.94 and 3.67 m.daN). Safety with cotter-pin (11). Install spacer (32), locking plate (31), bolts (6) and nuts (30). Apply sealant (Material No.09-013) to bolt (28), eccentric bush (27) and nut (12).

(3)If a new track or links are to be installed:
- Install links (1) on track using eccentric bush (27), bolt (28), washer (13) and nut (12). Do not TORQUE at this stage.

D. Installation
(1)Install relevant track between track ribs and rollers.
(2)Install stop bolt (59) and safety with lockwire.
(3)Install rollers (47) with pins (48), washers (46) and nuts (45). Safety with cotter-pins (44).
(4)Install forward upper failsafe pin (52) and washer (51). Safety with cotter-pin (50).
(5)Lubricate roller assemblies thru grease nipples (49) with grease (Material No 04-004).
Make certain that grease exudes at ends of roller.
(6)With track hard against upper rollers (47). Adjust bolt (55) complete with eccentric bushes (53) and (53A), at lower rollers (54), to give a clearance of 0.002 in (0.05 mm) between lower rollers and track at the tightest point throughout track travel. Install locking rings (56), serrated locking plates (57) and bolts (58). Safety bolts (58) to bolts (55) with lockwire.

NOTE: When track is in contact with rollers, failsafe pins (52) must be clear of the track.

(7)Track 2
(a)Make certain that there is just zero clearance between side rollers (63) and track at the tightest point throughout track travel. If necessary, adjust shims (60) at outboard side roller (63). Secure washers (61) and bolts (62). Safety bolts (62) together with lockwire.
(8)Using a spring balance, check that load to move track thru full travel is:
(a)Track 2, between 12 and 15 lb (5.4 and 6.8 kg).
(b)Tracks 1 and 3, less than 4 lb (1.8 kg).
(9)Tracks 1 and 3
(a)Align link (17) with track; install bolt (18), washer (14) and

nut (15). Safety with cotter-pin (16).

(10)Install relevant sealing shutter:
-Track 2 (Ref.27-81-39, P. Block 401).
-Track 1 and 3 (Ref.27-81-43, P. Block 401).

(11)Lubricate failsafe bolt (29) and bolt (33) with grease (Material No 04-004).

(12)Lubricate bushes (2 and 10) with lacquer (Material No.05-005), install the bushes.

(13)Install failsafe bolt (29). Safety bolt head to track with cotter-pins (26). Install washer (9) and nut (8). On track 2 TORQUE nut (8) to between 800 and 990 lbf.in (9.04 and 11.19 m.daN). On tracks 1 and 3 TORQUE nut (8) to between 500 and 610 lbf.in (5.65 and 6.89 m.daN). Safety nut (8) with cotter-pin (7).

NOTE: If necessary use designated alternative washer (9) to install cotter-pin (7), or change nut (8).

(14)Install bolt (33), washer (3)and nut (4). TORQUE nut (4) to between 260 and 325 lbf.in (2.94 and 3.67 m.daN). Safety nut (4) with cotter-pin (5).

(15)Apply sealant (Material No.09-013) to head and tail of failsafe bolt (29) and bolt (33).

(16)If a new track and/or links have been installed on relevant track:
(a)Check trailing edge rigging (Ref.27-80-00, P. Block 501).
(b)TORQUE nut (12) to between 260 and 325 lbf.in (2.94 and 3.67 m.daN). Safety nut (12) with cotter-pin (11). Install spacer (32), locking plate (31), bolts (6) and nuts (30). Apply Material No.09-013 to bolt (28), eccentric bush (27) and nut (12).

(17)Secure brackets (23) to track with bolts (24) (25) and nuts (19) and (20).

(18)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(19)Temporarily remove warning notices.

(20)On panel 133VU, close circuit breakers 3CV (335/R65), 4CV (335/R64), 7CV (333/T63), 8CV (33/T64), 9CV (335/R66) and 45CV (333/T61).

(21)Fully retract slats (Ref.27-80-00, P. Block 301).

(22)On panel 133VU, open safety and tag circuit breakers 3CV (335/R65), 4CV (335/R64), 7CV (333/T63), 8CV (333/T63), 9CV (335/R66) and 45CV (333/T61).

(23)Reinstate warning notices.

(24)Depressurize Green and Blue hydraulic systems (Ref.29-10-00, P. Block 301).

(25)To install existing fairing plate.
(a)Secure fairing plate (22) to brackets (23) with shims and bolts (21).

(26)To install new fairing plate (Ref. Fig. 404)
(a)With fairing plate (22) service bolted to brackets (23), deflect nose of track sideways inboard as far as possible.
(b)Measure clearance at inboard edge of fairing plate and, if necessary, trim fairing plate to achieve clearances as given in the figure.

NOTE : A maximum of 0.10 in (2.54 mm) may be trimmed from any edge of the fairing plate to achieve clearances.

(c)Deflect nose of track sideways outboard as far as possible.
(d)Measure clearance at outboard edge of fairing plate and, if necessary, trim fairing plate to achieve clearance as given in the figure.
(e)Measure clearances at leading edge and trailing edge of fairing plate and, if necessary, trim fairing plate to achieve clearance as given in the figure.
(f)Restore protective finish using pretreatment for painting (Material No. 13-002) and structure paint (Material NO. 16-006). (Ref. 51-23-10, P. Block 1).
(g)Secure fairing plate (22) to brackets (23) with shims and bolts (21).
(27)Make certain clearances and into-wind and out-of-wind limits of fairing plate are correct. If necessary adjust shims.

E. Preparation for Test
(1)Make certain working area is clean and clear of tools and miscellaneous items of equipment.
(2)Make certain travel ranges are clear.
(3)Remove warning notices.
(4)On panel 133VU, close circuit breakers 3CV (335/R65), 4CV (335/R64), 7CV (333/T63), 8CV (333/T64), 9CV (335/R66), 13CV (336/Q65), 14CV (336/Q64) and 45CV (333/T61).

F. Test
(1)Perform the following:

ACTION	RESULT
1. Fully extend slats (Ref.27-80-00, P. Block 301)	slats and Krueger flap surfaces extend fully and aileron surfaces droop
2. Make certain slat moves smoothly and freely and that there is no fouling or scuffing of moving parts with structure	
3. Fully retract slats (Ref.27-80-00 P. Block 301)	slats and Krueger flap surfaces retract fully and aileron surfaces move to neutral position
4. Make certain slat moves smoothly and freely and that there is no fouling or scuffing of moving parts with structure	

G. Close-Up
(1)Make certain that working area is clean and clear of miscellaneous items of equipment.
(2)Close access doors.

(3)Remove access platform.
(4)Remove all ground handling and maintenance equipment, standard/special tools, together with ground power and replenishing equipment.

TRACKS - SLAT 2 AND 3 - REMOVAL/INSTALLATION

R WARNING : LANDING GEAR - MAKE SURE THAT THE GROUND SAFETIES AND CHOCKS ARE IN POSITION.

R FLIGHT CONTROL SURFACES - MAKE SURE THAT THE TRAVEL RANGE IS CLEAR.

R HYDRAULICS - BEFORE YOU PRESSURIZE A HYDRAULIC SYSTEM MAKE SURE THAT
R THE CONTROLS MATCH THE SURFACE POSITION.

R BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE SURE THAT THE ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Equipment and Materials

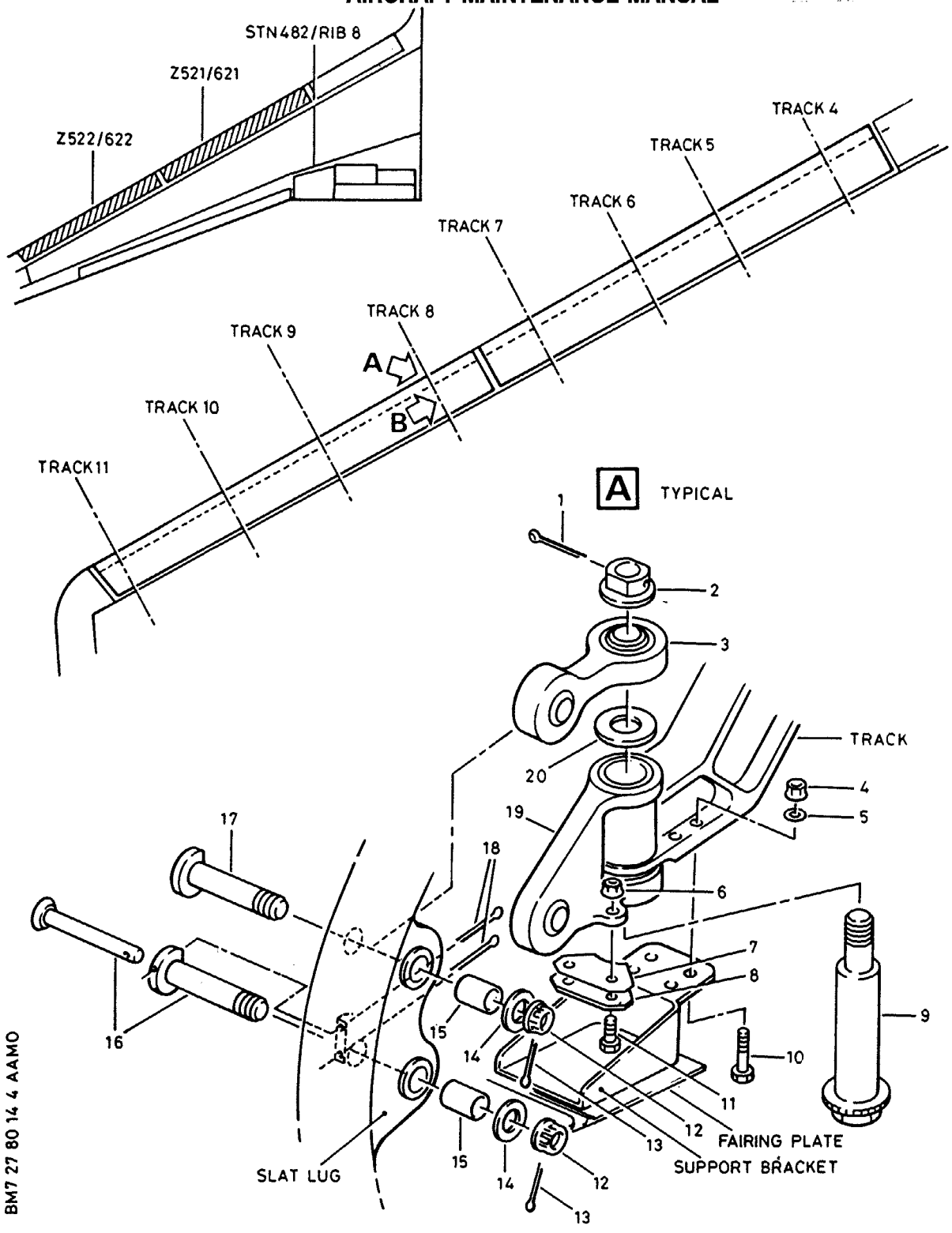
	ITEM	DESIGNATION
R	A.	Access Platform 4.5 m (15 ft)
R	B.	Circuit Breaker Safety Clips and tags
R	C.	Cotter-Pins
R	D.	Lockwire, Corrosion Resistant Steel 0.032 in
R	E.	Grease Gun (Push On)
R	F.	Slave Pins 0.125 in (3.18 mm)
R	G.	Spring Balance 0 to 20 lb (0 to 9.1 kg) (0.8 mm) dia
R	H.	Torque Wrench 140 to 530 lbf.in. (1.582 to 5.988 m.daN)
R	J.	Warning Notices, Prohibiting Operation of Slats and Krueger Flap
R	K. Material No. 04-004	Common Greases (Ref. 20-31-00)
R	L. Material No. 05-005	Special Materials (Ref. 20-31-00)
R	M. Material No. 09-013	Sealants (Ref. 20-31-00)
R	N. Material No. 13-002	Pretreatment for Painting (Ref. 20-31-00)
R	P. Material No. 16-006	Structure Paints (Ref. 20-31-00)
	Referenced Procedures	
	- 24-41-00, P. Block 301	AC External Power Control
	- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
	- 27-80-00, P. Block 501	Lift Augmenting (Slats and Krueger Flaps)
	- 27-81-41, P. Block 401	Sealing Shutters Tracks 4 to 11
	- 29-10-00, P. Block 301	Main Hydraulic Power
	- 51-23-10, P. Block 1	Paint Coatings

2. Procedure

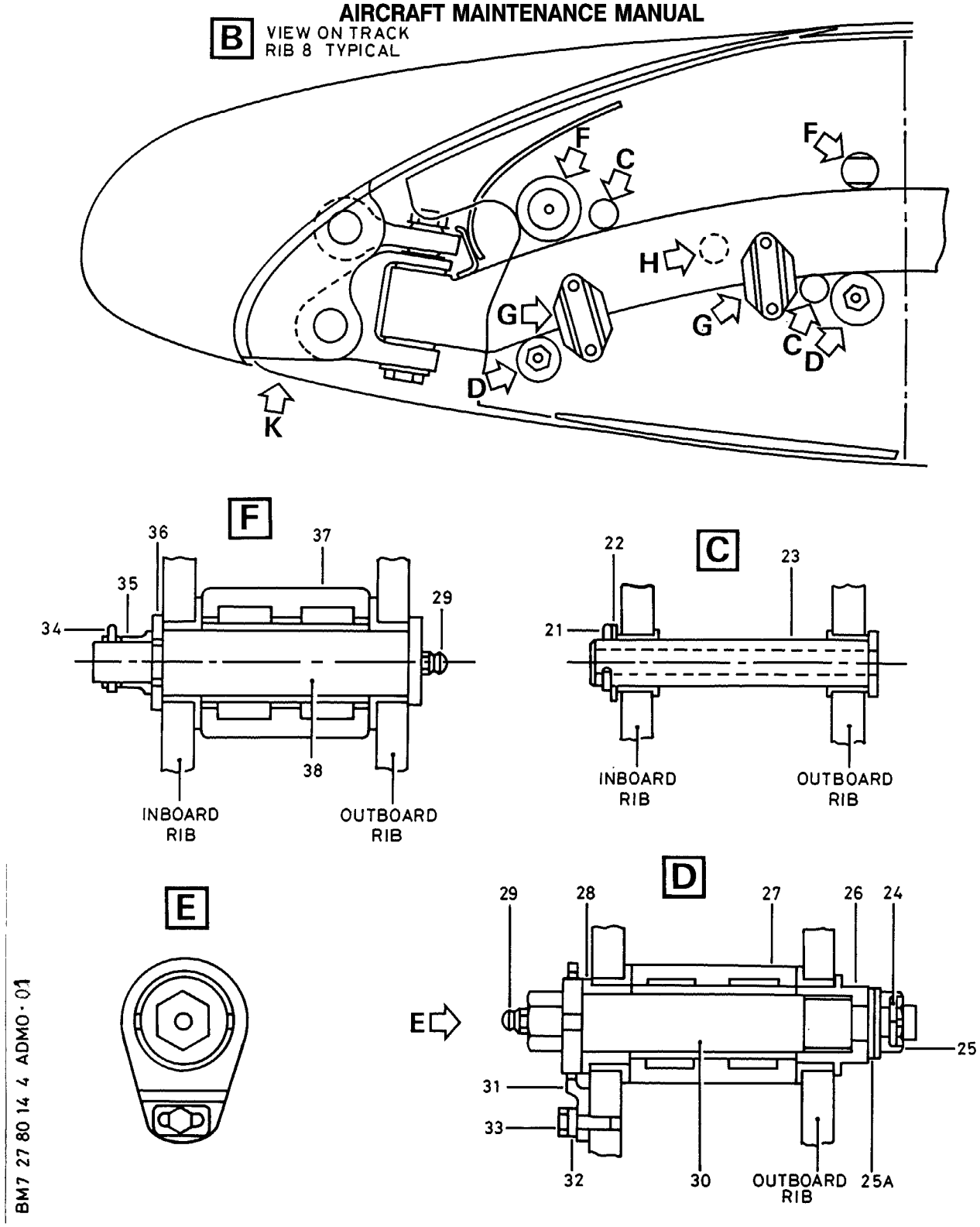
(Ref. Fig. 401)

(Ref. Fig. 402)

(Ref. Fig. 403)

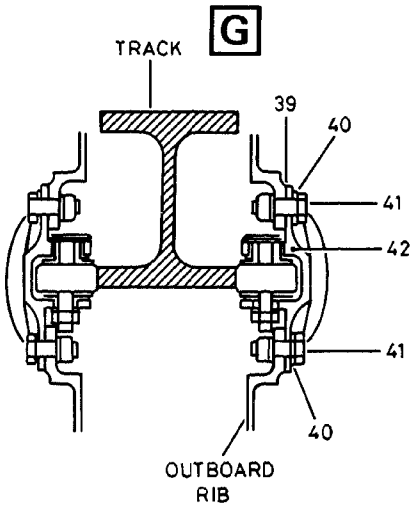


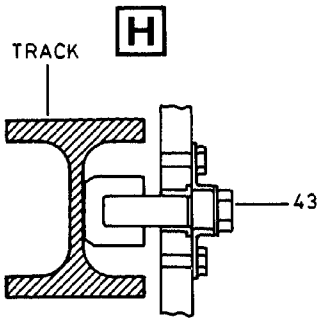
Installation of Track to Slat
Figure 401



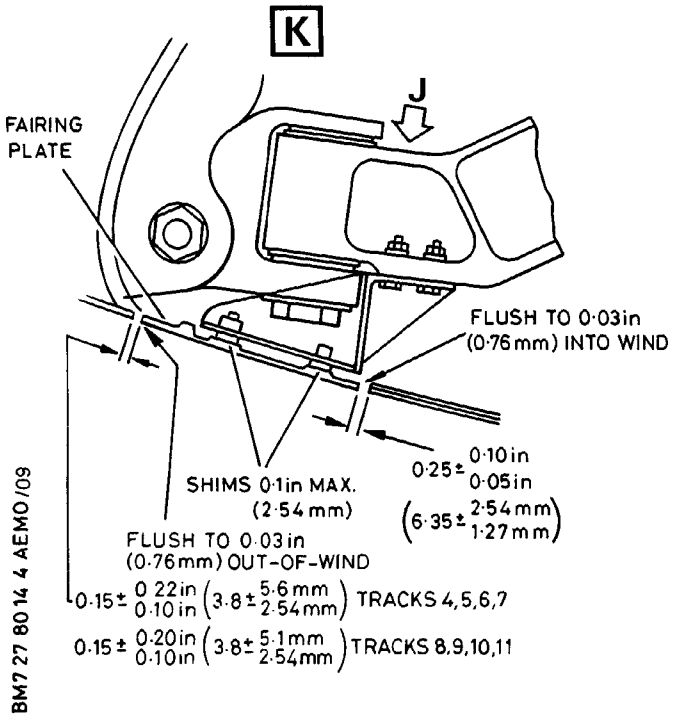
Installation of Track Rollers and Pins
Figure 402

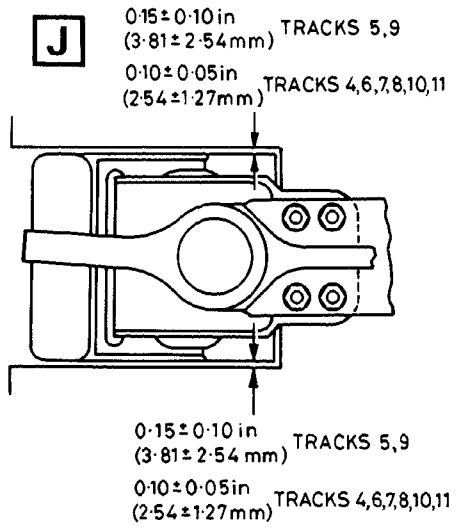
R





NOTE: STOP BOLT (43) IS INSTALLED ON INBOARD RIB FOR LEFT WING AND OUTBOARD RIB FOR RIGHT WING.





Installation of Track - Details
Figure 403

A. Job Set-Up
(1)Fully extend slats (Ref. 27-80-00, P. Block 301).
(2)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC LAND RECOVERY SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26 VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/KRUGER	45CV	333/T61

(3)Display warning notices.
(4)Depressurize Green and/or Blue hydraulic system(s) (Ref. 29-10-00, P. Block 301).
(5)Position access platform.
(6)Open appropriate access door:
(a)Track 4-523(623)BB and CB.
(b)Track 5-523(623)EB and FB.
(c)Track 6-523(623)GB, HB and JB.
(d)Track 7-523(623)LB and MB.
(e)Track 8-524(624)BB and CB.
(f)Track 9-524(624)EB and FB.
(g)Track 10-524(624)GB and HB.
(h)Track 11-524(624)KB.
(7)Remove relevant sealing shutter (Ref. 27-81-41, P. Block 401).

B. Removal

CAUTION : REPLACE ONE TRACK BEFORE REMOVING ANOTHER.

NOTE : Tracks are to be removed individually, with slats extended.

(1)At each roller position, except the rear lower roller, remove cotter-pins (24), (34), nuts (25), (35) and washers (25A) (36).
(2)At forward and rear lower rollers, remove lockwire, bolts (33), serrated locking plates (32) and locking rings (31).
(3)At forward lower roller position withdraw eccentric bush (26).

R CAUTION : MAKE SURE THAT THE SLAVE PINS DO NOT DAMAGE THE ROLLERS.

R (4)Use the slave pins (0.125 in (3.18 mm) dia.) at each roller position
R except the rear-lower roller. Push out the pins (30) and (38) and let
R the rollers (27) and (37) stay loosely retained in position between the
R inboard and outboard track ribs.

R NOTE : If you cannot easily push out the upper-forward roller pin at

R Track 11, you must embody SB 57-2017.

R (5)Remove the eccentric bush (28) from the forward-lower roller position.
R (6)Remove the cotter-pin (21), the washer (22) and the forward-upper failsafe pin (23).
R (7)Remove the lockwire and the stop bolt (43). Discard the lockwire.
R (8)Remove the four nuts (4), the washers (5) and the bolts (10). Collect the support bracket and the fairing plate. Disconnect the fairing plate from the support bracket.
R (9)Remove the cotter-pins (13) and (18), the nuts (12), the washers (14), the bolt (17) and the failsafe bolt (16). Push out the bushes (15) from the slat lug. Discard the cotter-pins (13) and (18).
R (10)Push the track rearwards and turn the knuckle (19) (there is no knuckle on tracks 5 and 9) and the link (3) thru 90 deg. Move the track forward until it pivots in the cut-away in the fixed leading edge. Slowly remove the track to clear the slat lug.
R (11)Remove the track from the aircraft.
R (12)Make marks to record the radial position of the eccentric bolt (9).
R (13)Remove the two nuts (6), the bolts (11), the lockplates (7) and (8), the cotter-pin (1) and the nut (2). Remove the eccentric bolt (9) from the track and collect the link (3), the knuckle (19) and the washer (20). Discard the cotter-pin (1).

C. Preparation of Replacement Component

R (1)Use grease (Material No. 4-004) to lubricate the eccentric bolt (9).
R (2)When a new track, link (3), knuckle (19) or eccentric bolt (9) are to be installed:
R (a)Install the knuckle (19), the washer (20) and the link (3) to the related track with the eccentric bolt (9) and the nut (2). Make sure that the washer (20) is installed chamfer first. Do not TORQUE the nut (2) at this stage.

R NOTE : If you install a new eccentric bolt (9) there will be no hole for a cotter-pin. The hole is drilled later in this procedure after the eccentric bolt (9) is radially adjusted and the nut (2) is tightened.

R (3)Attach the knuckle (19), the washer (20) and the link (3) to the related track with the eccentric bolt (9) and the nut (2). Make sure that the washer (20) is installed, chamfer first. Turn the eccentric bolt (9) to the position that you marked during removal.
R (4)TORQUE the nut (2):
R - on tracks 4 thru 10, to between 470 and 530 lbf.in (5.3 and 6.0 m.daN)
R - on track 11, to between 270 and 330 lbf.in (3.1 and 3.7 m.daN).
R (5)Safety with the nut (2) with a new cotter-pin (1).
R (6)Install the lockplates (7) and (8) on the eccentric bolt (9) and attach with the bolts (11) and the nuts (6).
R (7)Apply sealant (Material No. 09-013) to the eccentric bolt (9), the lockplates (7) and (8) and the washer (20).

D. Installation

R (1)Put the related track on the cut-away in the fixed leading edge. Turn
R the knuckle (19) and the link (3) thru 90 deg and slowly push the track
R (rearward) between the track ribs and the rollers.
R (2)Install the stop bolt (43) and safety with lockwire to the tag.
R (3)Install the forward-upper failsafe pin (23) and the washer (22). Safety
R with a new cotter-pin (21).
(4)Locate eccentric bush (28) on pin (30), carefully install the pin at forward lower roller position. Collect slave pin. Fully insert eccentric bush (26) making certain that it locates on machined flat on pin (30). Rotate pin (30) complete with eccentric bushes (16), (28) to lowest position. Install washer (25A) and nut (25). Safety with cotter-pin (24).

(5)Carefully install pins (38) at forward and rear upper roller positions; collect slave pins. Install washers (36) and nuts (35). Safety with cotter-pins (34).

(6)Charge roller grease nipples (29) with grease (Material No. 04-004). Make certain that grease exudes at ends of roller.

(7)With relevant track hard against upper rollers (37), adjust pins (30) complete with eccentric bushes (26) and (28) at lower rollers (27) to give a clearance of 0.002 in (0.051 mm) between lower rollers and track at tightest point over full track travel. Install locking rings (31) serrated locking plates (32) and bolts (33). Safety bolts (33) to pins (30) with lockwire.

R NOTE : When the track touches the rollers, the failsafe pins (23) must
R be away from the track.

R (8)Tracks 5 and 9 only:
R (a)Make sure that there is zero clearance between the side rollers (42)
R and the track at the tightest point along the full travel of the track.
R If necessary, adjust the shims (39) at the outboard side roller (42).
R Install the washers (40) and the bolts (41). Safety the bolts (41) to
R each other with lockwire.

R NOTE : Tracks 5 and 9 are the master tracks for the adjustment of the
R lateral movement of the slats 2 and 3. For all the other tracks
R on slats 2 and 3, this adjustment procedure is not applicable.

R (9)Use a spring balance and make sure that the load to move the track thru
R its full range of travel is:
R - for tracks 5 and 9, between 12 and 15 lb (5.4 and 6.8 kg)
R - for tracks 4, 6, 7, 8, 10 and 11, not more than 4 lb (1.8 kg).
R (10)Install the related sealing shutter (Ref. 27-81-41, P. Block 401).
R (11)Use grease (Material No. 04-004) to lubricate the bolt (17) and the
R failsafe bolt (16).
R (12)Apply a layer of anti-corrosion compound (Material No. 05-005) to the
R bushes (15).
R (13)Install one bush (15), the bolt (16) complete with the failsafe pin, the

R washer (14) and the nut (12). Safety the failsafe bolt (16) to the slat
R lug with new cotter-pins (18). TORQUE the nut (12) on the failsafe bolt
R (16) to between 270 and 330 lbf.in (3.0 and 3.7 m.daN). Safety the nut
R (12) with a new cotter-pin (13).

R NOTE : If necessary use the alternative washer (14) to help you install
R the cotter-pin (13).

R (14)Install one bush (15), the bolt (17), the washer (14) and the nut (12).
R TORQUE the nut (12):
R - on tracks 4 thru 10, to between 270 and 330 lbf.in (3.0 and 3.7 m.daN).
R - on track 11, to between 140 and 180 lbf.in (1.6 and 2.0 m.daN).
R Safety the nut (12) with a new cotter-pin (13).

R NOTE : If necessary, use the specified alternative washer (14) to help
R you to install the cotter-pin (13).

R (15)Seal the head and the tail of the bolt (17) and the failsafe bolt (16)
R with sealant (Material No. 09-013).
R (16)When a new track, link, knuckle, or eccentric bolt have been installed,
R on the related track:
R (a)Do the rigging check of the trailing edge (Ref. 27-80-00,
R P. Block 501).
R (b)TORQUE the nut (2):
R - on tracks 4 thru 10, to between 470 and 530 lbf.in
R (5.3 and 6.0 m.daN)
R - on track 11, to between 270 and 330 lbf.in (3.0 and 3.7 m.daN).
R (c)Install the lockplates (7) and (8) on the eccentric bolt (9) and
R install the bolts (11) and the nuts (6).
R (d)Apply sealant (Material No. 09-013) to the eccentric bolt (9), the
R lockplates (7) and (8) and the washer (20).

R NOTE : If you install a new eccentric bolt (9) there will be no hole
R for a cotter-pin. Drill a 3.4 mm (0.134 in.) dia. hole for the
R cotter-pin (1) after you tighten the nut (2).

R (e)Safety the nut (2) with a new cotter-pin (1).
R (17)Attach the support bracket to the track with the bolts (10), the
R washers (5) and the nuts (4).
R (18)Remove the tools and other equipment from the work area.
R (19)Temporarily remove the warning notices.

(20)On panel 133VU, close circuit breakers 3CV(335/R65), 7CV(333/T63),
9CV(335/R66), 8CV(333/T64), 4CV(335/R64) and 45CV(333/T61).

(21)Fully retract slats (Ref. 27-80-00, P. BLock 301).
(22)Reinstate warning notices.

(23)On panel 133VU, open circuit breakers 3CV(335/R65), 7CV(333/T63),
9CV(335/R66), 8CV(333/T64), 4CV(335/R64) and 45CV(333/T61).

(24)To install existing fairing plate.
(a)Secure fairing plate to support brackets with shims and bolts.
(25)To install new fairing plate (Ref. Fig. 403).
(a)With fairing plate service bolted to support brackets, deflect nose of track sideways and inboard as far as possible.
(b)Measure clearance at inboard edge of fairing plate and, if necessary, trim fairing plate to achieve clearance as given in the figure.

NOTE : A maximum of 0.10 in (2.54 mm) may be trimmed from any edge of the fairing plate to achieve clearances

(c)Deflect nose of track sideways outboard as far as possible.
(d)Measure clearance at outboard edge of fairing plate and, if necessary, trim fairing plate to achieve clearance as given in the figure.
(e)Measure clearances at leading edge and trailing edge of fairing plate and, if necessary, trim fairing plate to achieve clearance as given in the figure.
(f)Restore protective finish using pretreatment for painting (Material No. 13-002) and structure paint (Material No. 16-006) (Ref. 51-23-10, P. Block 1).
(g)Secure fairing plate to support brackets with shims and bolts.
(26)Make certain clearances and in-to-wind and out-of-wind limits of fairing plate are correct. If necessary, adjust shims.
(27)At tracks 6, 7 and 10, after adjusting fairing plate, check length of tails of bolts securing fairing plate to support brackets. Trim bolt tails as necessary to leave 0.12 in (0.305 mm) maximum protusion through nut.
(28)Apply protective finish to bolt tails (Material No. 16-006).
(29)Subsequent to satisfactory checks, remove warning notices.

(30)On panel 133VU, close circuit breakers 3CV(335/R65), 7CV(333/T63), 9CV(335/R66), 8CV(333/T64), 4CV(335/R64) and 45CV(333/T61).

E. Preparation for Test
(1)Make certain working area is clean and clear of tools and miscellaneous items of equipment.
(2)Make certain travel ranges are clear.

F. Test

(1)Perform the following:-

ACTION	RESULT
On center pedestal	
1. Place slat and flap control lever in fully extended position (gate 5) (Ref. 27-80-00, P. Block 301)	- slat surfaces move to selected position, krueger flap surfaces extend and aileron surfaces droop.
2. Check that relevant slat(s) move(s) smoothly and freely and that there is no fouling of moving parts with	

ACTION	RESULT
adjacent structure	
On center pedestal	
3. Place slat and flap control lever in fully retracted position (gate 1 (Ref. 27-80-00, P. Block 301)	- slat surfaces move to selected position, krueger surfaces retract and aileron surfaces move to neutral position.
4. Check that relevant slat(s) move(s) smoothly and freely and that there is no fouling of moving parts with adjacent structure.	

G. Close-Up
(1)Depressurize Green and/or Blue hydraulic system (Ref. 29-10-00, P. BLock 301).
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Close appropriate access doors.
(4)Remove access platform.
(5)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

WARNING : FLIGHT CONTROLS - MAKE SURE THAT THE GROUND SAFETIES AND NOTICES ARE IN POSITION.

FLIGHT CONTROLS - MAKE SURE THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

HYDRAULICS - BEFORE PRESSURIZING, MAKE SURE THAT THE CONTROLS MATCH THE SURFACE POSITION.

ELECTRICAL POWER - BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE SURE THAT ANY ELECTRICAL CIRCUIT UPON WHICH WORK IS IN PROGRESS IS ISOLATED.

1. Reason for the Job

R A. Removal/Installation of the hinged door.

R B. Removal/Installation of the folding nose only.

R C. Removal/Installation of the Krueger flap and folding nose.

R D. Removal/Installation of the flight control rod.

R 2. Hinged Door

R A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Circuit Breaker Safety Clips and Tags
R C.	Torque Wrench, 31 to 40 lbf.in. (0.35 - 0.45 m.daN)
R D.	Torque Wrench, 75 to 90 lbf.ft (10.17 to 12.20 m.daN)
E.	Warning Notices Prohibiting Use of Slats and Krueger Flap Systems
R F. SL90.313-0.8750	Installation Tool
R G. SL90.314-0.8750	Removal Tool
R H. SL90.374-0.8750	Wrench Tool
R J. 98A27808011000	Rigging Pin - Krueger Flap

ITEM	DESIGNATION
K.	Cotter Pins
L. Material No. 04-004	Common Greases (Ref. 20-31-00)

Referenced Procedures

- 20-21-16, P. Block 1	STA LOK Nuts and Lockwashers
- 20-31-00, P. Block 1	List of Materials Required for Aircraft Service and Maintenance
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power
- 29-21-00, P. Block 301	Green Auxiliary Power

B. Procedure

(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Pressurize the Green hydraulic system (Ref. 29-21-00 or 29-10-00, P. Block 301).

WARNING : IF THE SELECTOR SOLENOID IS USED TO EXTEND THE KRUEGER FLAP IT WILL CAUSE THE AILERON TO DROOP BY 10 DEGREES.

NOTE : If the position of the slats is 15 deg. or greater, the Krueger flaps will already be extended.

(c)On the Krueger selector solenoid-valve (50CV), at STA 2612/FR47, push (in) the button II on the solenoid II to extend the Krueger flap.
(d)Open, safety and tag the circuit breakers that follow:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26VAC/SYS2	4CV	335/R64
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/SLATS/SYS1	9CV	335/R66
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS1	7CV	333/T63
133VU	FLT CTL/SLATS/26VAC/SYS1	3CV	335/R65
133VU	FLT CTL/KRUEGER	45CV	333/T61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC LAND RECOVERY SUPPLY/FLAPS SYS1	10CV	335/R67
133VU	FLT CTL/FLAPS SYS 1/26VAC	1CV	335/R61

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS & SLATS POS/ECAM	2CN	334/S65
133VU	FLT CTL/FLAPS & SLATS POS/IND	1CN	334/S66

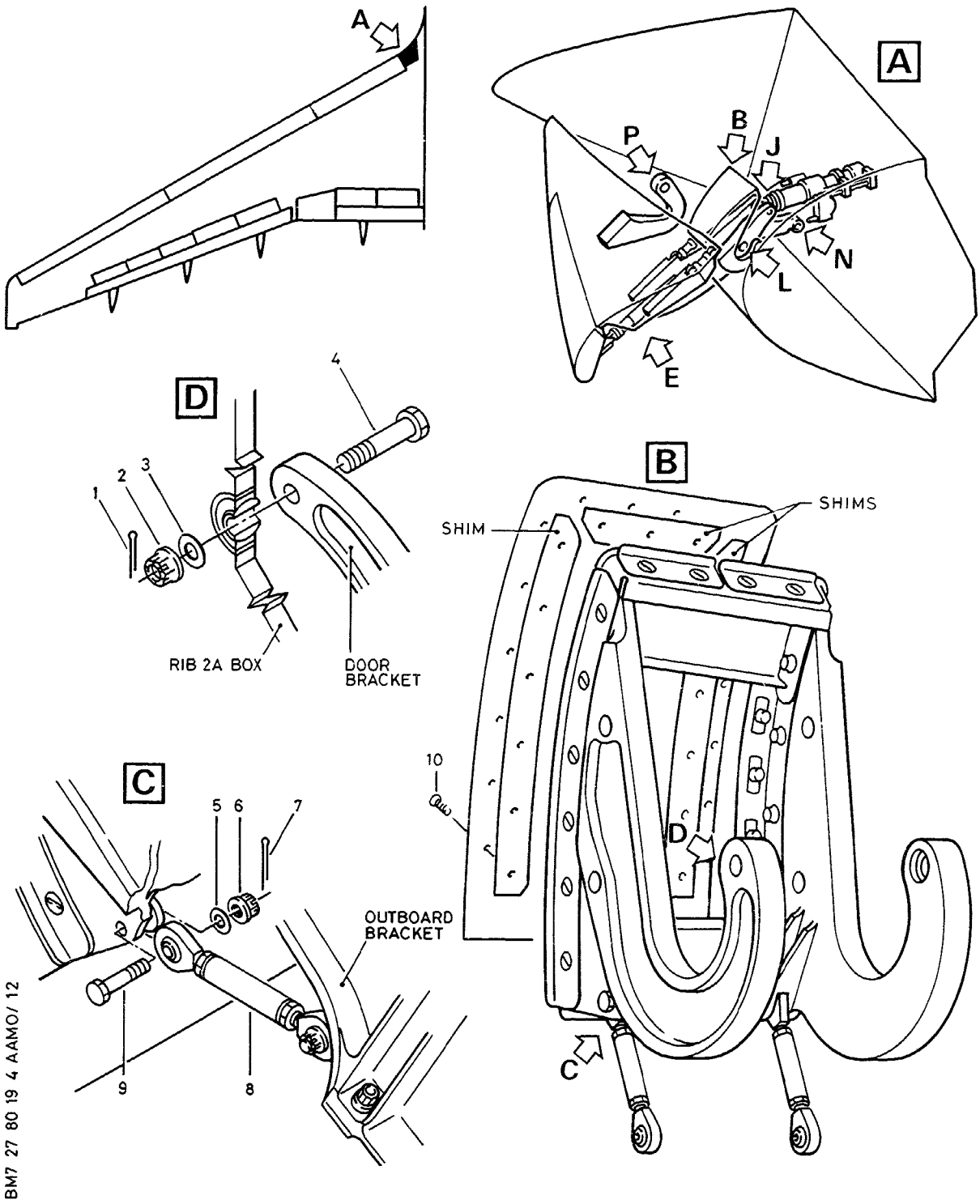
(e)Display the warning notices, prohibiting the use of the slats and the Krueger flap systems.
(f)Put the access platform in position below Zone 513 (613).
(g)Engage the rigging pin PN 98A27808011000 through the Rib 2B and the outboard bracket.

(2)Removal
(Ref. Fig. 401)
(Ref. Fig. 402)

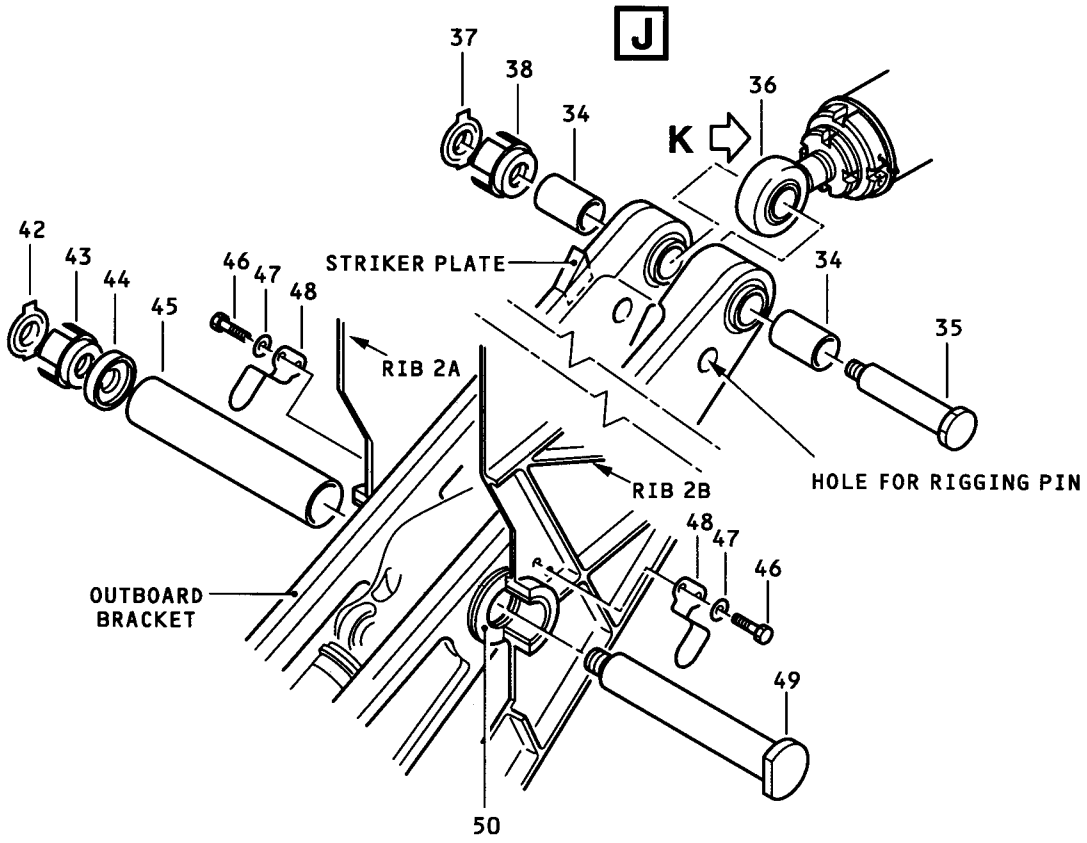
(a)Hold the Krueger flap, then use the removal tool PN SL90.314-0.8750 to remove the lockwasher (37) and use the wrench tool PN SL90.374-0.8750 to remove the nut (38) (Ref. 20-21-16, P. Block 1).
(b)Remove the bolt (35) from the outboard bracket and the actuator rod eye-end (36). Lower the Krueger flap and allow it to hang in approximately the mid-travel position. Remove and retain the sliding bushes (34).
(c)Manually move the Krueger flap to get access to the hinged door pivot-bolt (4) and bolt (9) positions.
(d)Remove the cotter-pins (7), the nuts (6), the washers (5) and the bolts (9) that attach the door links (8) to the outboard brackets. Discard the cotter-pins (7).
(e)Remove the cotter-pins (1), the nuts (2), the washers (3) and the bolts (4) that attach the door hinge assemblies to Ribs 2A and 2B. Discard the cotter-pins (1).
(f)Remove the hinged door.

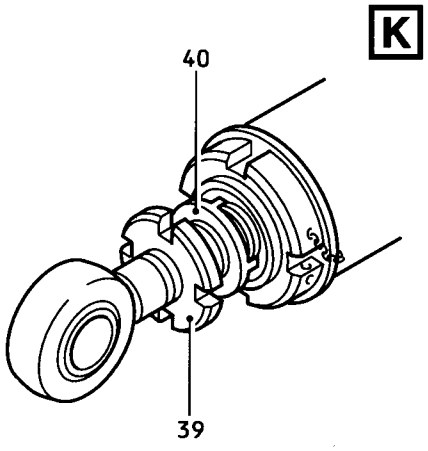
(3)Installation (Ref. Fig. 401, 402)
(Ref. Fig. 403)
(Ref. Fig. 404)

(a)Manually move the Krueger flap to get access to the hinged door pivot-bolt (4) and (9) positions. Apply a layer of grease (Material No. 04-004) to the hinged door pivot-bolts (4) and put the hinged door in position, between the Ribs 2A and 2B. Install the hinged door with the pivot-bolts (4), the washers (3) and the nuts (2). Safety with new cotter-pins (1). Make sure that the door moves freely about the hinge axis.
(b)Engage the eye-ends of the door link (8) onto the outboard bracket. Apply a layer of grease (Material No. 04-004) to the bolts (9). Install the bolts (9), the washers (5) and the nuts (6), to the outboard bracket



Hinged Door - Installation Details
Figure 401





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Krueger Flap and Folding Nose - Installation Details
Figure 402

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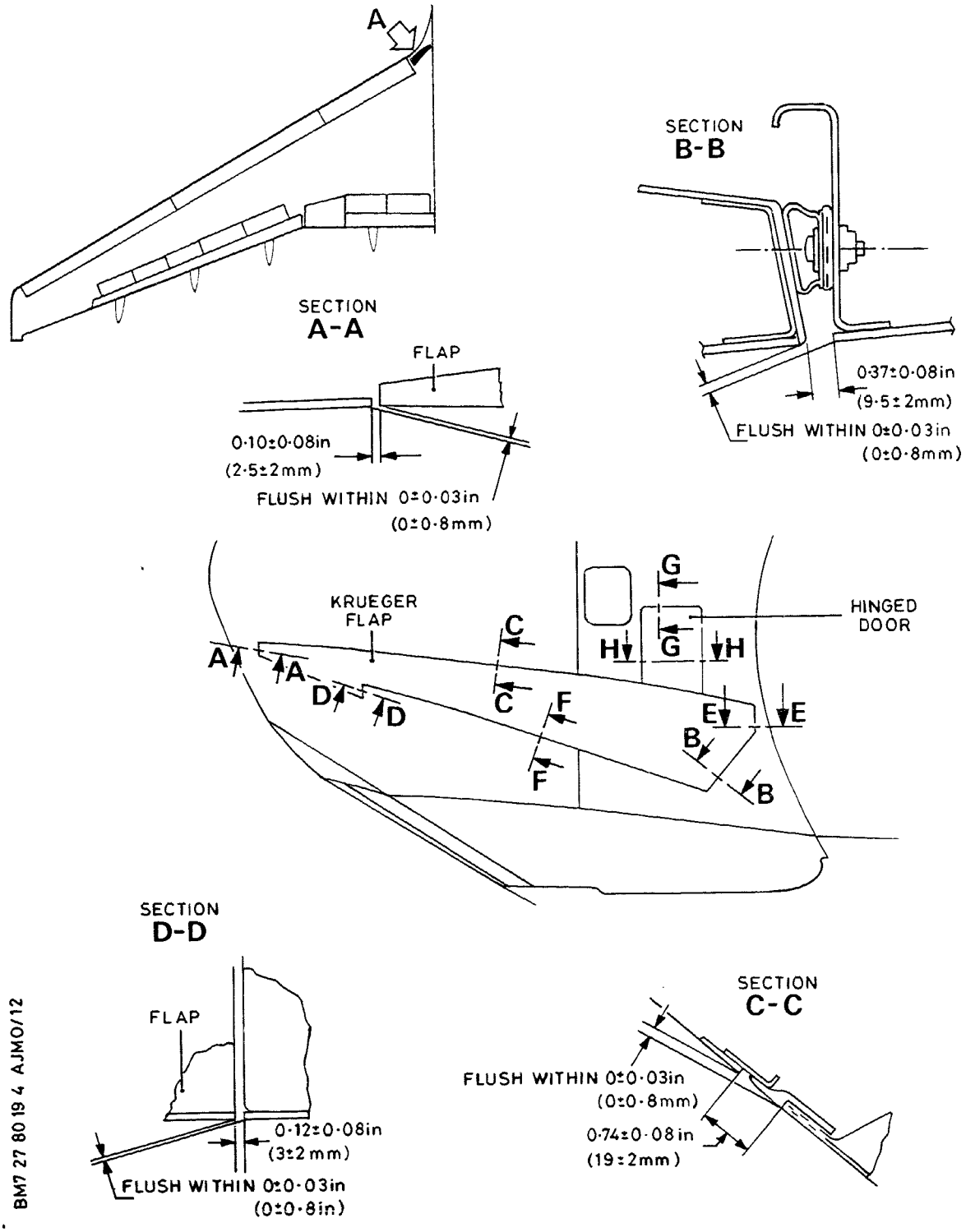
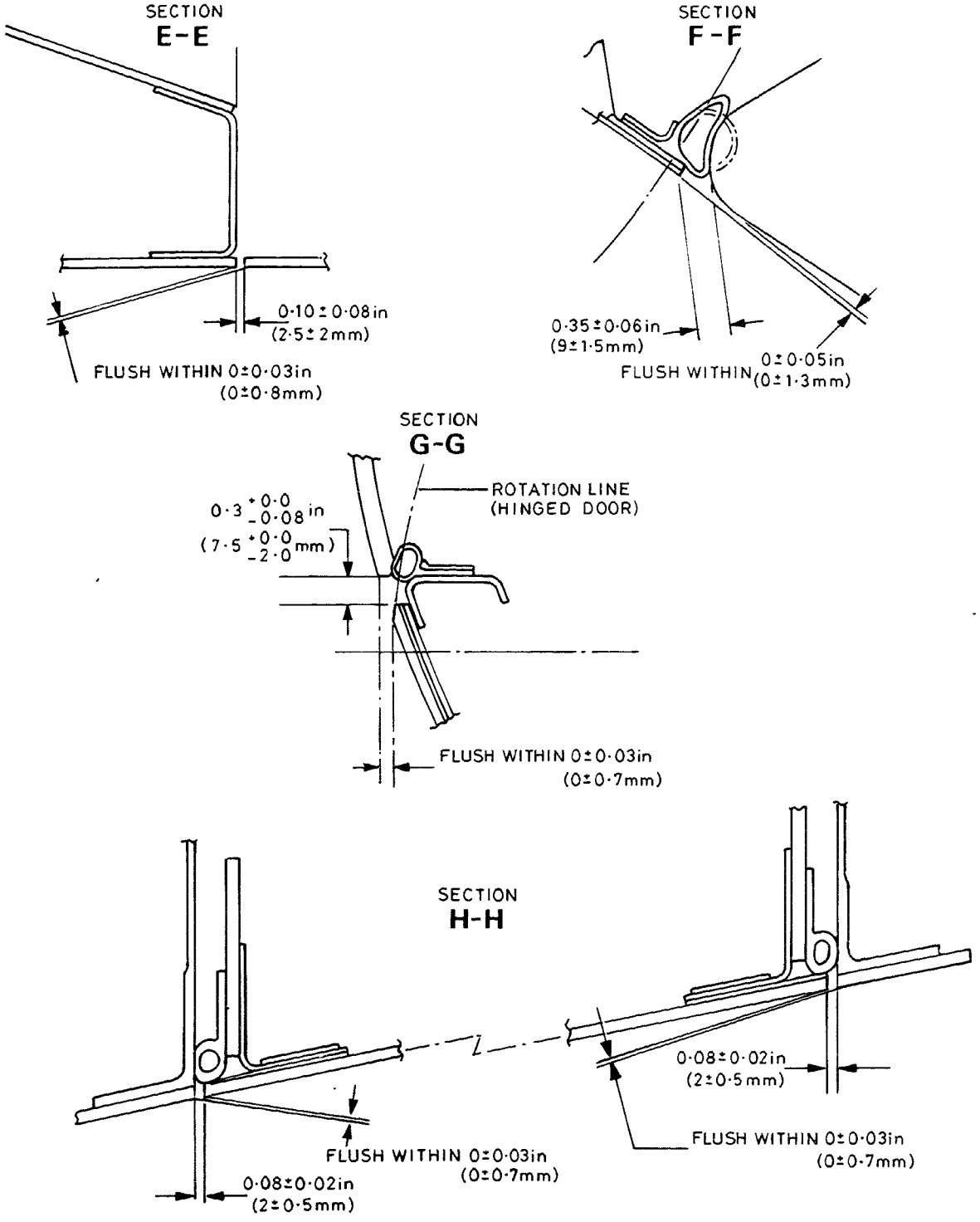


Krueger Flap and Doors - Gaps
Figure 403



Krueger Flap and Doors - Gaps
Figure 404

(c)TORQUE the nuts (6) to between 31 and 40 lbf.in (0.35 and 0.45 m.daN) and safety with new cotter-pins (7).
(d)Manually move the Krueger flap and align the actuator rod eye-end (36) with the outboard bracket. Apply a layer of grease (Material No. 04-004) to the sliding bushes (34) and the bolt (35). Install the sliding bushes (34) in the outboard bracket then install the bolt (35) through the outboard bracket and the actuator rod eye-end (36).
(e)Install the nut (38) and use the wrench tool PN SL90.374-0.8750 to TORQUE the nut (38) to between 75 and 90 lbf.ft (10.17 and 12.20 m.daN) (Ref. 20-21-16, P. Block 1).
(f)Install the lockwasher (37) then use the installation tool PN SL90.313-0.8750 to lock the lockwasher (37) (Ref. 20-21-16, P. Block 1).

WARNING : IF THE SELECTOR SOLENOID IS USED TO RETRACT THE KRUEGER FLAP, IT WILL CAUSE THE AILERON TO RISE BY 10 DEGREES.

(g)Make sure that the into and out-of-wind tolerances are correct (Ref. Fig. 403, 404). If necessary, remove the screws (10) and the door skin (for access). Adjust the shims as applicable, then install the door skin with the screws (10).

(4)Preparation for test
(a)Remove the safety clips and tags and close the SLATS and KRUEGER circuit breakers 4CV 335/R64, 8CV 333/T64, 9CV 335/R66, 7CV 333/T63, 3CV 335/R65, 45CV 333/T61 on panel 133VU.
(5)Test
(a)Do the test that follows:

ACTION	RESULT
1. On the flight compartment center-pedestal:	
- Put the slat and flap control-lever in position 15 (gate 2).	The Krueger flap, the folding nose and the hinged door operate and extend smoothly and lock in the extended position.
- Put the slat and flap control-lever in position 0 (gate 1).	The Krueger flap, the folding nose and the hinged door operate and retract smoothly and lock in the closed position, with the Krueger flap and the hinged door in wing alignment.

(6)Close-up
(a)Depressurize the Green hydraulic system (Ref. 29-21-00 or 29-10-00, P. Block 301).
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Remove the safety clips and tags and close the FLAPS circuit breakers

1CV 335/R61, 10CV 335/R67, 5CV 332/U61, 6CV 331/V61, 2CV 334/S62, 2CN 334/S65, ICN 334/S66.

(d)Remove the warning notices.

(e)Remove the access platform.

(f)Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.

R 3. Folding Nose

R A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Circuit Breaker Safety Clips and Tags
C.	Torque Wrench 12 to 22 lbf.ft (1.6 to 3.0 m.daN)
D.	Warning Notices Prohibiting Use of Slats and Krueger Flap Systems
E. SL90.313-0.4375	Installation Tool
F. SL90.314-0.4375	Removal Tool
G. SL90.374-0.4375	Wrench Tool
H. 98A27808011000	Rigging Pin - Krueger Flap
J.	Cotter Pins
K. Material No. 04-004	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 20-21-16, P. Block 1	STA LOK Nuts and Lockwashers
- 20-28-11, P. Block 1	Electrical Bonding
- 20-31-00, P. Block 1	List of Materials Required for Aircraft Service and Maintenance
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power
- 29-21-00, P. Block 301	Green Auxiliary Power

R B. Procedure

R (1)Job set-up
R (a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R (b)Pressurize the Green hydraulic system (Ref. 29-21-00 or 29-10-00, P. Block 301).

R WARNING : IF THE SELECTOR SOLENOID IS USED TO EXTEND THE KRUEGER FLAP IT WILL CAUSE THE AILERON TO DROOP BY 10 DEGREES.

R NOTE : If the position of the slats is 15 deg. or greater, the Krueger flaps will already be extended.

R (c)On the Krueger selector solenoid-valve (50CV), at STA 2612/FR47, push (in) the button II on the solenoid II to extend the Krueger flap.
R (d)Open, safety and tag the circuit breakers that follow:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26VAC/SYS2	4CV	335/R64
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/SLATS/SYS1	9CV	335/R66
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS1	7CV	333/T63
133VU	FLT CTL/SLATS/26VAC/SYS1	3CV	335/R65

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUEGER	45CV	333/T61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC LAND RECOVERY SUPPLY/FLAPS SYS1	10CV	335/R67
133VU	FLT CTL/FLAPS SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/FLAPS & SLATS POS/ECAM	2CN	334/S65
133VU	FLT CTL/FLAPS & SLATS POS/IND	1CN	334/S66

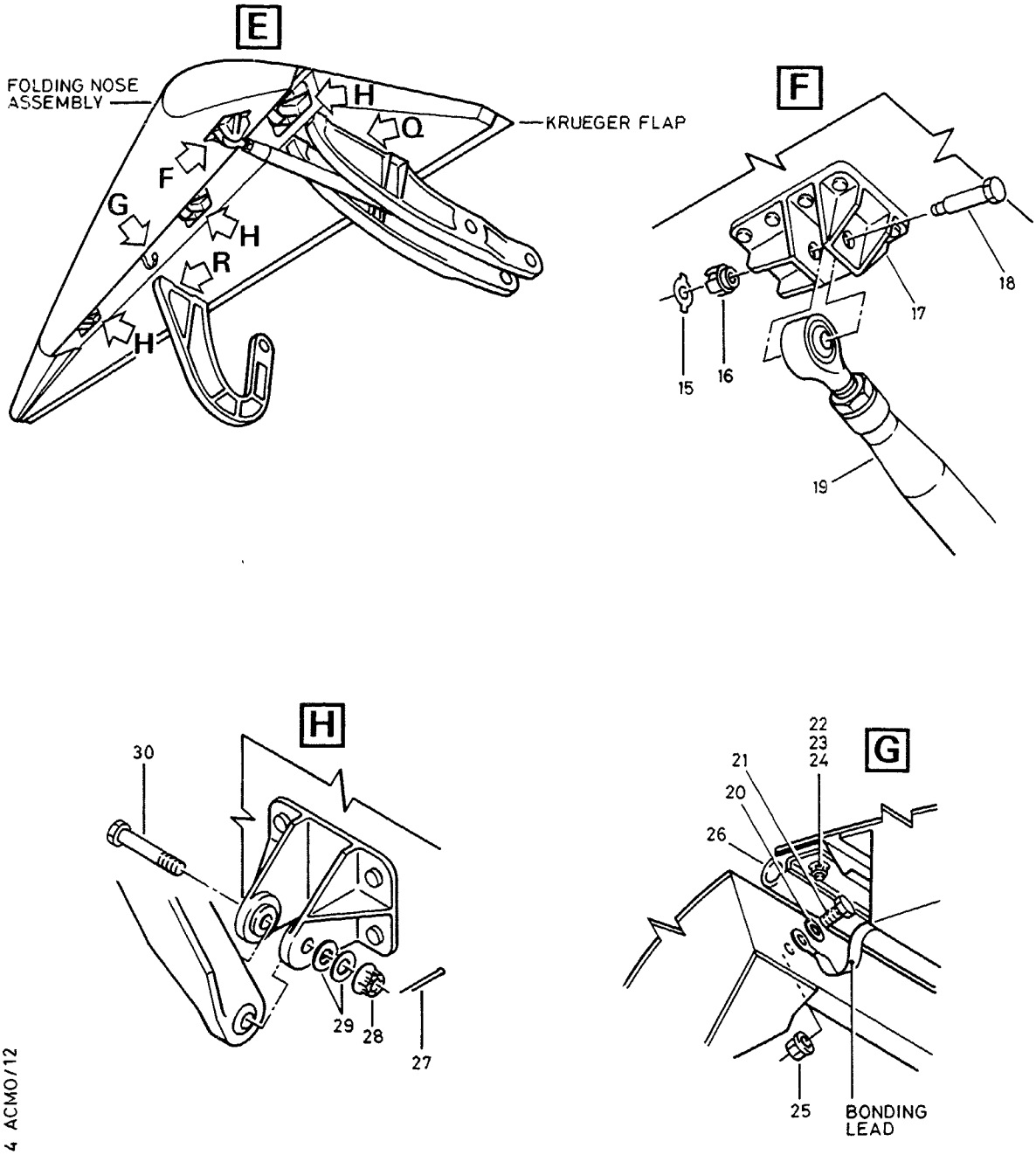
(e)Display the warning notices, prohibiting the use of the slats and the Krueger flap systems.
(f)Put the access platform in position below Zone 513 (613).
(g)Engage the rigging pin PN 98A27808011000 through the Rib 2B and the outboard bracket.

(2)Removal (Ref. Fig. 401)
(Ref. Fig. 405)
(a)During removal of the folding nose assembly, to prevent damage to the seal (26), remove the nuts (22), the bolts (23), the reinforcing strip (24) and the seal (26).
(b)Use the removal tool PN SL90.314-0.4375 to remove the lockwasher (15) and then use the wrench tool PN SL90.374-0.4375 to remove the nut (16).
(c)Hold the folding nose assembly and remove the bolt (18). Make sure that the flight control rod (19), of the folding nose, hangs clear of the control-rod attachment-bracket (17).
(d)Remove the nut (25), the washer (20) and the bolt (21), and disconnect the bonding lead from the folding nose structure.
(e)Hold the folding nose assembly and remove the cotter-pin (27), the nut (28), the washers (29) and the bolt (30), at all three hinge positions. Discard the cotter-pins (27).
(f)Remove the folding nose assembly.

(3)Installation (Ref. Fig. 401, 405)
(a)Put the hinge-lugs of the folding nose, in position in the forks of the Krueger flap. Temporarily install the bolts (30), in the outer hinges of the Krueger flap, with the washers (29) and the nuts (28).
(b)Make sure that the folding nose moves freely about the hinge axis.

NOTE : The maximum permitted misalignment of the nose hinge line at the center hinge station, is 1.0 mm (0.04 in), in any direction, with the bolts (30) fitted in the outer hinge(s).

(c)Temporarily install the bolt (30), in the center hinge with the washers (29) and the nut (28).
(d)Manually lift the folding nose to the normally extended position. Make sure that there is a gap of 1.2 ± 0.5 mm (0.048 ± 0.019 in) between the folding nose trailing-edge and the Krueger flap.
(e)Remove the nuts (28), the washers (29) and the bolts (30), from all three hinge positions.
(f)Install the seal (26) on the Krueger flap with the reinforcing strip



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Folding Nose - Installation Details
Figure 405

R

(24), the bolts (23) and the nuts (22).

(g) Apply a layer of grease (Material No. 04-004) to the bolts (30). Put the folding nose in position, to align with the Krueger flap and install the bolts (30), the washers (29) and the nuts (28), in all three hinge positions. Safety with new cotter-pins (27).

(h) Put the flight-control-rod (19) in position and aligned, in the control-rod attachment-bracket (17). Apply a layer of grease (Material No. 04-004) to the bolt (18) and install the bolt (18) through the control-rod attachment-bracket (17) and the flight control rod (19).

(j) Use the wrench tool PN SL90.374-0.4375 to install and TORQUE the nut (16) to between 12 and 22 lbf.ft (1.60 and 3.0 m.daN). Then use the installation tool PN SL90.313-0.4375 to lock the lockwasher (15) (Ref. 20-21-16, P. Block 1).

(k) Attach the bonding lead to the folding nose structure with the nut (25), the washer (20) and the bolt (21) (Ref. 20-28-11, P. Block 1).

WARNING : IF THE SELECTOR SOLENOID IS USED TO RETRACT THE KRUEGER FLAP, IT WILL CAUSE THE AILERON TO RISE BY 10 DEGREES.

(l) On the Krueger flap selector-solenoid I(50CV), at STA2612/FR 47, push (in) the button I and carefully retract the Krueger flap and the folding nose. Make sure that the clearance between the folding nose and the fixed structure of the Krueger box, is not less than 3.00 mm (0.118 in), during the retraction.

(4) Preparation for test

(a) Remove the safety clips and tags and close the SLATS and KRUEGER circuit breakers 4CV 335/R64, 8CV 333/T64, 9CV 335/R66, 7CV 333/T63, 3CV 335/R65, 45CV 333/T61.

(5) Test

(a) Do the test that follows:

ACTION	RESULT
1. On the flight compartment center-pedestal:	
- Put the slat and flap control-lever in position 15 (gate 2).	The Krueger flap, the folding nose and the hinged door operate and extend smoothly and lock in the extended position.
- Put the slat and flap control-lever in position 0 (gate 1).	The Krueger flap, the folding nose and the hinged door operate and retract smoothly and lock in the closed position, with the Krueger flap and the hinged door in wing alignment.

(6) Close-up

(a) Depressurize the Green hydraulic system (Ref. 29-21-00 or 29-10-00, P. Block 301).

R (b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R (c)Remove the safety clips and tags and close the FLAPS circuit breakers 1CV 335/R61, 1OCV 335/R67, 5CV 332/U61, 6CV 331/V61, 2CV 334/S62, 2CN 334/S65, ICN 334/S66.
R (d)Remove the warning notices.
R (e)Remove the access platform.
R (f)Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.

R 4. Krueger Flap and Folding Nose

R A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Circuit Breaker Safety Clips and Tags
C.	Torque Wrench 35 to 44 lbf.in. (0.4 to 0.5 m.daN)
D.	Torque Wrench 14.75 to 75.20 lbf.ft (2.0 to 10.2 m.daN)
E.	Warning Notices Prohibiting Use of Slats and Krueger Flap Systems
F. SL90.303-1.1250	Wrench Tool
G. SL90.309-1.1250	Installation Tool
H. SL90.310-1.1250	Removal Tool
J. SL90.313-0.7500	Installation Tool
K. SL90.313-0.8750	Installation Tool
L. SL90.314-0.7500	Removal Tool
M. SL90.314-0.8750	Removal Tool
N. SL90.374-0.7500	Wrench Tool
P. SL90.374-0.8750	Wrench Tool
Q. 98A27808011000	Rigging Pin - Krueger Flap
R. A0940000W2	Tool - Adjustment, Actuator Rod End
S.	Brush
T.	Lint-Free Cloth
U.	Cotter Pins
V.	Lockwire - Corrosion Resistant Steel, Dia. 0.032 in. (0.8 mm)
W	
X. Material No. 04-004	Common Greases (Ref. 20-31-00)
Y. Material No. 05-005	Special Materials (Ref. 20-31-00)
Z. Material No. 09-013	Sealants (Ref. 20-31-00)
AA. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 20-21-16, P. Block 1	STA LOK Nuts and Lockwashers
- 20-28-11, P. Block 1	Electrical Bonding
- 20-31-00, P. Block 1	List of Materials Required for Aircraft Service and Maintenance
- 24-41-00, P. Block 301	AC External Power Control
- 27-89-11, P. Block 401	Position Switch - Krueger Extend
- 29-10-00, P. Block 301	Main Hydraulic Power
- 29-21-00, P. Block 301	Green Auxiliary Power

R B. Procedure

R (1)Job set-up
R (a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R (b)Pressurize the Green hydraulic system (Ref. 29-21-00 or 29-10-00, P. Block 301).

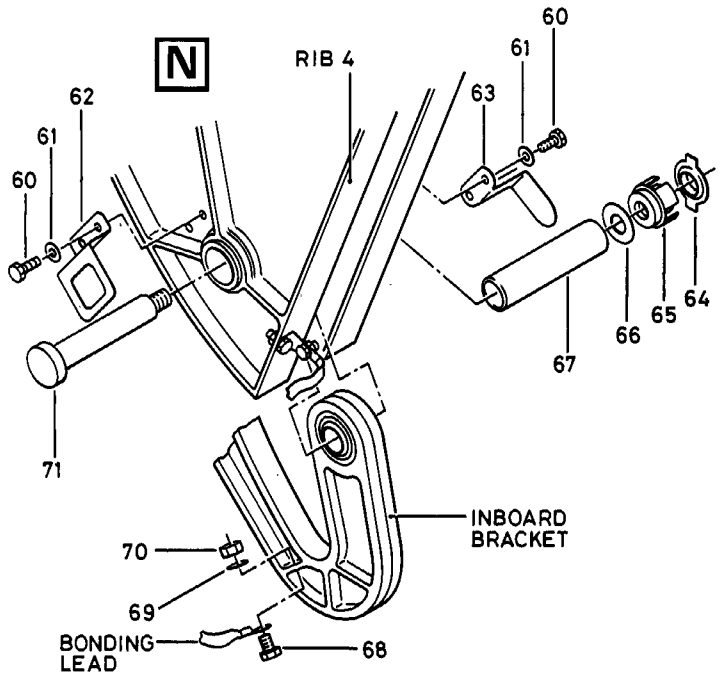
R WARNING : IF THE SELECTOR SOLENOID IS USED TO EXTEND THE KRUEGER FLAP
R IT WILL CAUSE THE AILERON TO DROOP BY 10 DEGREES.

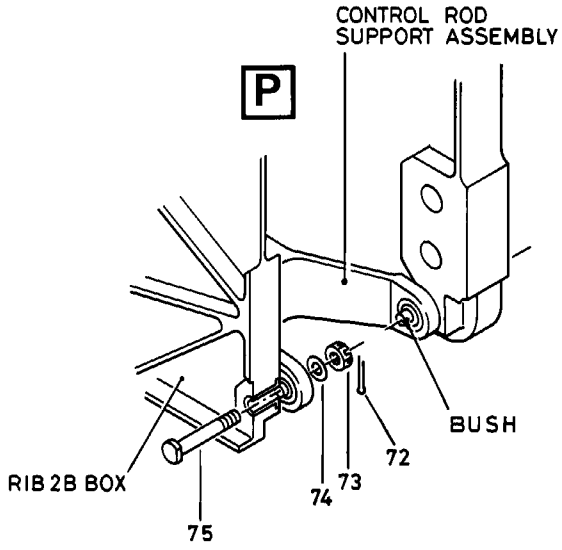
R NOTE : If the position of the slats is 15 deg. or greater, the Krueger
R flaps will already be extended.

R (c)On the Krueger selector solenoid-valve (50CV), at STA 2612/FR47, push
R (in) the button II on the solenoid II to extend the Krueger flap.
R (d)Open, safety and tag the circuit breakers that follow:

	PANEL	SERVICE	IDENT.	LOCATION
R	133VU	FLT CTL/SLATS/26VAC/SYS2	4CV	335/R64
R	133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS2	8CV	333/T64
R	133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/SLATS/SYS1	9CV	335/R66
R	133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS1	7CV	333/T63
R	133VU	FLT CTL/SLATS/26VAC/SYS1	3CV	335/R65
R	133VU	FLT CTL/KRUEGER	45CV	333/T61
R	133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
R	133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS SYS 2	6CV	331/V61
R	133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS SYS 1	5CV	332/U61
R	133VU	FLT CTL/SFCC LAND RECOVERY SUPPLY/FLAPS SYS1	10CV	335/R67
R	133VU	FLT CTL/FLAPS SYS 1/26VAC	1CV	335/R61
R	133VU	FLT CTL/FLAPS & SLATS POS/ECAM	2CN	334/S65
R	133VU	FLT CTL/FLAPS & SLATS POS/IND	1CN	334/S66

R (e)Display the warning notices, prohibiting the use of the slats and the
R Krueger flap systems.
R (f)Put the access platform in position below Zone 513 (613).
R (g)Engage the rigging pin PN 98A27808011000 through the Rib 2B and the
R outboard bracket.
R (2)Removal (Ref. Fig. 402)
R (Ref. Fig. 406)
R (a)Remove the hinged door (Ref. Para. 2.).
R (b)Remove the nut (70), the washer (69) and the bolt (68) and disconnect
R the bonding lead from the inboard hinge bracket.
R (c)Remove the Krueger-extend position-switch (Ref. 27-89-11,
R P. Block 401).
R (d)Remove the bolts (46), the washers (47) and the cover plates (48) from
R the Ribs 2A and 2B.
R (e)Remove the bolts (60), the washers (61) and the cover plates (62) and
R (63) from the Rib 4.
R (f)Use the removal tool PN SL90.310-1.1250 to remove the lockwasher (42)
R from the bolt (49), at the outboard hinge. Then use the wrench tool
R PN SL90.303-1.1250 to loosen the nut (43) (Ref. 20-21-16, P. Block 1).
R (g)Use the removal tool PN SL90.314-0.7500 to remove the lockwasher (64)
R from the bolt (71), at the outboard hinge. Then use the wrench tool
R PN SL90.374-0.7500 to loosen the nut (65) (Ref. 20-21-16, P. Block 1).
R (h)Remove the cotter-pins (72), the nuts (73), the washers (74) and the
R bolts (75) from the control-rod support assembly. Discard the
R cotter-pins (72).





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Krueger Flap and Folding Nose - Installation Details
Figure 406

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(j)Hold the Krueger flap and use the removal tool PN SL90.314-0.8750 to remove the lockwasher (37) from the bolt (35) of the outboard bracket. Then use the notched wrench PN SL90.374-0.8750 to remove the nut (38) (Ref. 20-21-16, P. Block 1).

(k)Remove the bolt (35) from the outboard bracket and the actuator-rod eye-end (36). Remove and retain the sliding bushes (34).

(l)Remove the nut (43) from the hinge bolt (49), at Rib 2A and remove the washer (44).

(m)Remove the nut (65) from the hinge bolt (71), at Rib 4 and remove the washer (66).

(n)Remove the bolts (49) and (71) and the two fail safe bushes (45) and (67). Retain the two fail safe bushes (45) and (67).

(p)Remove and retain the laminated washers (50) and record their position and dimension.

(q)Remove the Krueger flap and folding nose assembly from the aircraft.

(3)Installation (Ref. Fig. 402)
(Ref. Fig. 407)

(a)Put the Krueger flap in position on the wing.

(b)Apply a layer of grease (Material No. 04-004) to the fail safe bush (67) and the bolt (71). Install the fail safe bush (67) and the bolt (71) through the Rib 4 and the inboard bracket of the Krueger flap. Install the washer (66), the nut (65) and the lockwasher (64). Do not lock at this stage.

(c)Install the fail safe bush (45) and the bolt (49) through the Ribs 2A and 2B, and the outboard bracket of the Krueger-flap.

(d)If a replacement Krueger flap is being fitted, center the flap as follows:

1 Measure the combined clearance between the Ribs 2A and 2B and the outboard bracket assembly.

2 Adjust the laminated washers (50), to take up the clearance. Make sure that the laminated washers (50) measure to within ± 1.5 mm (0.060 in) of each other.

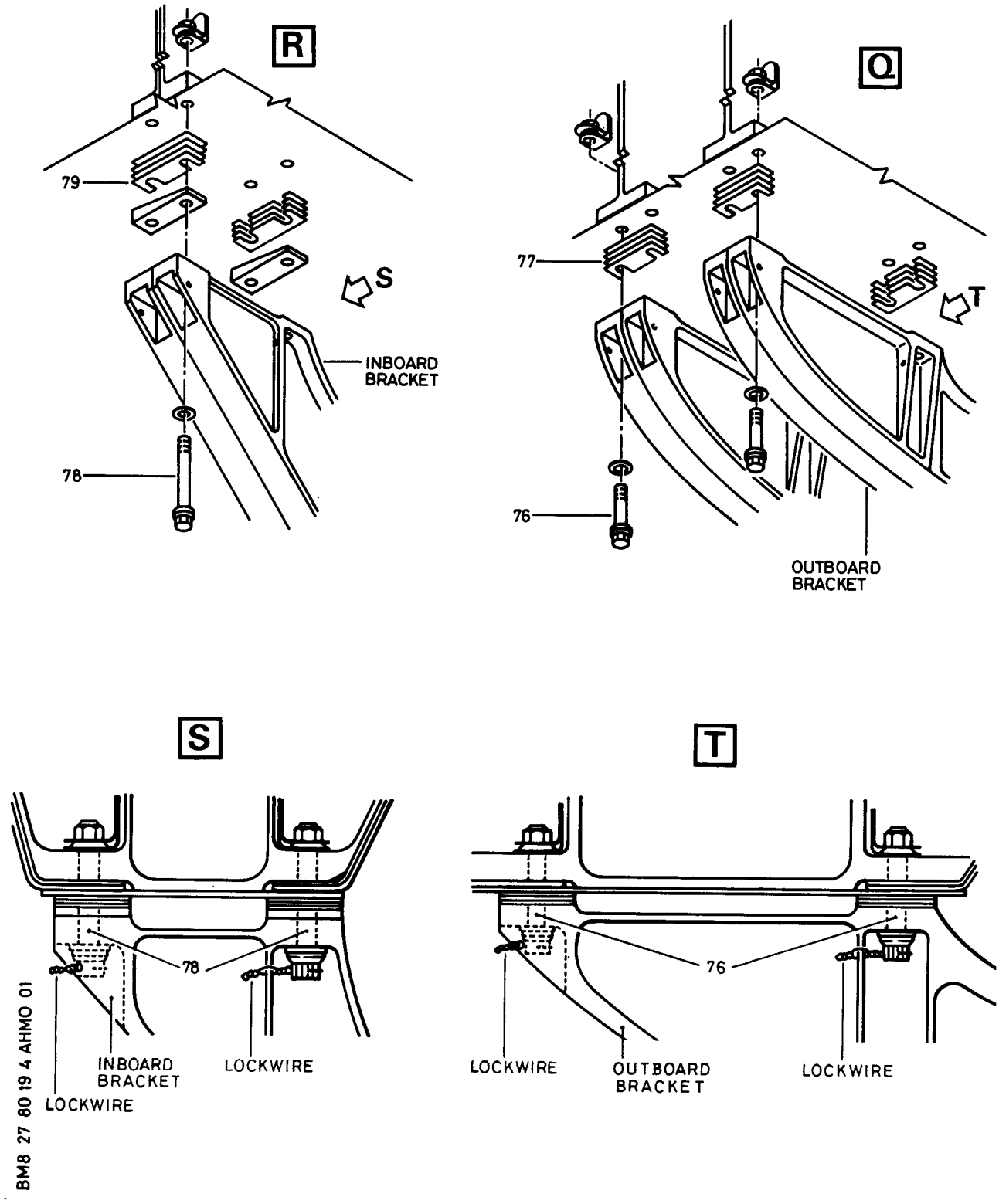
(e)Remove the fail safe bush (45) and the bolt (49), from the Ribs 2A and 2B. Apply a layer of grease (Material No. 04-004) to the fail safe bush (45) and the bolt (49). Put the applicable laminated washer (50) in position and install the fail safe bush (45) and the bolt (49). Apply a layer of special material (Material No. 05-005) to the washer (44). Install the washer (44), the nut (43) and the lockwasher (42) but, do not lock at this stage.

(f)Apply a layer of special material (Material No. 05-005) to the bushes that are loosely installed on the control-rod support-assembly. Then apply a layer of grease (Material No. 04-004) to the bolts (75).

(g)Install the bushes and the bolts (75), that have been treated, in the Ribs 2A and 2B and the control-rod support-assembly, with the washers (74) and the nuts (73). TORQUE the nuts (73) to between 62 and 71 lbf.in (0.7 and 0.8 m.daN) and safety with new cotter-pins (72).

(h)Remove the rigging pin PN 98A27808011000 from Rib 2B and the outboard bracket. Manually move the Krueger flap over the full travel range, to make sure that the flap functions freely and without obstruction.

(j)Fit the rigging pin PN 98A27808011000 through the Rib 2B and the outboard bracket (Krueger flap fully extended).



Krueger Flap and Folding Nose - Installation Details
Figure 407

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R (k)Apply a layer of grease (Material No. 04-004) to the sliding bushes (34) and the bolt (35). Put the sliding bushes (34) in position, inside of each axle bearing, at Rib 2A and Rib 2B.
R (l)Make sure that the Krueger flap actuator is still fully retracted then align the actuator rod eye-end (36) with the outboard bracket. Install the bolt (35). If the bolt (35) cannot be fitted, adjust the actuator rod eye-end (36), as follows:
R 1 Cut, remove and discard the lockwire from the locknut (39). Use the tool PN A0940000W2 to loosen the locknut (39). Pull the lockwasher (40) clear and turn the actuator rod eye-end (36) thru steps of 180 deg. until the correct alignment is made.
R 2 If the 180 deg. progressive steps prove to be too large for easy installation of the bolt (35). Hold the actuator rod eye-end (36) tightly and turn the actuator rod thru 90 deg. to give a further adjustment of + 0.2 mm (0.008 in).
R (m)Engage the lockwasher (40) and turn the locknut (39) until it is finger tight.
R (n)Apply a layer of grease (Material No. 04-004) to the bolt (35). Install the bolt (35) through the outboard bracket and the actuator rod eye-end (36) then install the nut (38) and the lockwasher (37), but do not lock at this stage.
R (p)Remove the rigging pin PN 98A27808011000 from the Rib 2B and the outboard bracket.
R (q)Close the circuit breaker 45CV.

R WARNING : IF THE SELECTOR SOLENOID IS USED TO RETRACT THE KRUEGER FLAP, IT WILL CAUSE THE AILERON TO RISE BY 10 DEGREES.

R (r)On the Krueger flap selector-solenoid I(50CV), at STA2612/FR 47, push (in) the button I and carefully retract the Krueger flap. Make sure that the clearance between the folding nose and the fixed structure of the Krueger box, is not less than 3.00 mm (0.118 in), during the retraction.
R (s)Make sure that the Krueger flap is aligned with the wing and is within the into and out-of-wind tolerances (Ref. Fig. 403, 404).
R (t)Make sure that no contact occurs at the actuator, the mechanism, or the Krueger flap.
R (u)If the tolerances are not correct, adjust the Krueger flap as follows:
R 1 Close the circuit breaker 45CV.
R 2 Fully extend the Krueger flaps (Ref. Para. 3. A. (3)).
R 3 Open, safety and tag the circuit breakers 45CV.
R 4 Cut, remove and discard the lockwire. Loosen the bolts (76) and (78) at the inboard and outboard brackets and carefully remove the shims (77) and (79). Adjust the shims (76) and (78) until, with the Krueger flap fully retracted, the tolerances are met.
R 5 TORQUE the bolts (76) and (78) to 2 m.daN (14.75 lbf. ft.).
R 6 Safety the bolts (76) and (78) to the inboard and outboard bracket, with lockwire.
R (v)Make sure there is continuous contact between the Krueger flap trailing-edge seal and the fixed structure of the Krueger box, with the Krueger flap in the fully extended position. Make sure that the

R seal deflection is within 0 to 3 mm (0 to 0.118 in).
R (w)TORQUE the locknut (39), at the actuator rod eye-end (36), to between
R 73.7 and 75.2 lbf.ft. (10 and 10.2 m.daN) and safety the locknut (39)
R with lockwire.
R (x)Use the wrench tool PN SL90.374-0.8750 to TORQUE the nut (38) to
R between 55 and 69 lbf.ft (7.46 and 9.36 m.daN). Then use the
R installation tool PN SL90.313-0.8750 to lock the lockwasher (37) (Ref.
R 20-21-16, P. Block 1).
R (y)Use the wrench tool PN SL90.303-1.1250 to TORQUE the nut (43), at
R Rib 2A, to between 105 and 127 lbf.ft (14.20 and 17.20 m.daN). Then
R use the installation tool PN SL90.309-1.1250 to lock the lockwasher
R (42) (Ref. 20-21-16, P. Block 1).
R (z)Use the wrench tool PN SL90.374-0.7500 to TORQUE the nut (65), at
R Rib 4, to between 35 and 48 lbf.ft (4.75 and 6.51 m.daN). Then use
R the installation tool PN SL90.313-0.7500 to lock the lockwasher (64)
R (Ref. 20-21-16, P. Block 1).
R (aa)Seal the heads of the assembled hinge bolts (49), (75) and the bolt
R (46), and the nut (43), as follows:
R 1 Use cleaning agent (Material No. 11-004) with a brush and a clean
R lint-free cloth, to thoroughly clean around the items that follow:
R - each bolt (75)
R - the adjacent structure on Ribs 2A and 2B.
R 2 Apply a fillet of sealant (Material No. 09-013) to form a cap around
R the head of each bolt (75) and on the adjacent structure on Ribs 2A
R and 2B.
R 3 Use cleaning agent (Material No. 11-004) with a brush and a clean
R lint-free cloth, to thoroughly clean around the assembled items that
R follow:
R - the bolt (49)
R - the nut (43)
R - the washer (44)
R - the lockwasher (42)
R - the adjacent structure on the Ribs 2A and 2B.
R 4 Apply a fillet of sealant (Material No. 09-013) to form a cap around
R the head of the bolt (49), the nut (43), the washer (44) and the
R lockwasher (42) and on the adjacent structure at Ribs 2A and 2B.
R 5 Use cleaning agent (Material No. 11-004) with a brush and a clean
R lint-free cloth, to thoroughly clean around the area of the assembled
R lockwasher (64), at Rib 4. Then apply a fillet of the sealant
R (Material No. 09-013), to form a cap around the lockwasher (64), the
R nut (65), the washer (66) and on the adjacent structure at Rib 4.
R (bb)Install the cover plates (48) to the Ribs 2A and 2B with the washers
R (47) and the bolts (46). TORQUE the bolts (46) to between 35 and 44
R lbf.in (0.4 and 0.5 m.daN).
R (cc)Install the cover plates (62) and (63) at Rib 4, with the washers (61)
R and the bolts (60). TORQUE the bolts (60) to between 35 and 44 lbf.in
R (0.4 and 0.5 m.daN).
R (dd)Attach the bonding lead to the inboard hinge bracket with the bolt
R (68), the washer (69) and the nut (70) (Ref. 20-28-11, P. Block 1).
R (ee)Install the Krueger-extend position-switch (Ref. 27-89-11,
R P. Block 401).

R (ff)Install the hinged door (Ref. Para. 2).
R (4)Preparation for test
R (a)Remove the safety clips and tags and close the SLATS and KRUEGER circuit breakers 4CV 335/R64, 8CV 333/T64, 9CV 335/R66, 7CV 333/T63, 3CV 335/R65, 45CV 333/T61.
R (5)Test
R (a)Do the test that follows:

ACTION	RESULT
1. On the flight compartment center-pedestal:	
- Put the slat and flap control-lever in position 15 (gate 2).	The Krueger flap, the folding nose and the hinged door operate and extend smoothly and lock in the extended position.
- Put the slat and flap control-lever in position 0 (gate 1).	The Krueger flap, the folding nose and the hinged door operate and retract smoothly and lock in the closed position, with the Krueger flap and the hinged door in wing alignment.

R (5)Close-up
R (a)Depressurize the Green hydraulic system (Ref. 29-21-00 or 29-10-00, P. Block 301).
R (b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R (c)Remove the safety clips and tags and close the FLAPS circuit breakers 1CV 335/R61, 10CV 335/R67, 5CV 332/U61, 6CV 331/V61, 2CV 334/S62, 2CN 334/S65, 1CN 334/S66.
R (d)Remove the warning notices.
R (e)Remove the access platform.
R (f)Make sure that the work area is clean and clear of tools and miscellaneous items of equipment.

R 5. Flight Control Rod

R A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Circuit Breaker Safety Clips and Tags
C.	Torque Wrench 1.4 to 3.0 m.daN (10.3 to 22.0 lbf.ft)
D.	Shim, 2.0 mm (0.08 in) Thick
E. SL90.313-0.4375	Installation Tool
F. SL90.314-0.4375	Removal Tool
G. SL90.374-0.4375	Wrench Tool
H.	Lint-Free Cloth
J	Tie-Wrap or equivalent (quantity 2)
K. Material No. 04-004	Common Greases (Ref. 20-31-00)
L. Material No. 09-016	Sealants (Ref. 20-31-00)
M. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 20-21-16, P. Block 1	STA LOK Nuts and Lockwashers
- 20-31-00, P. Block 1	List of Materials Required for Aircraft Service and Maintenance
- 27-87-00, P. Block 501	Krueger Flap Control
- 29-10-00, P. Block 301	Main Hydraulic Power
- 29-21-00, P. Block 301	Green Auxiliary Power

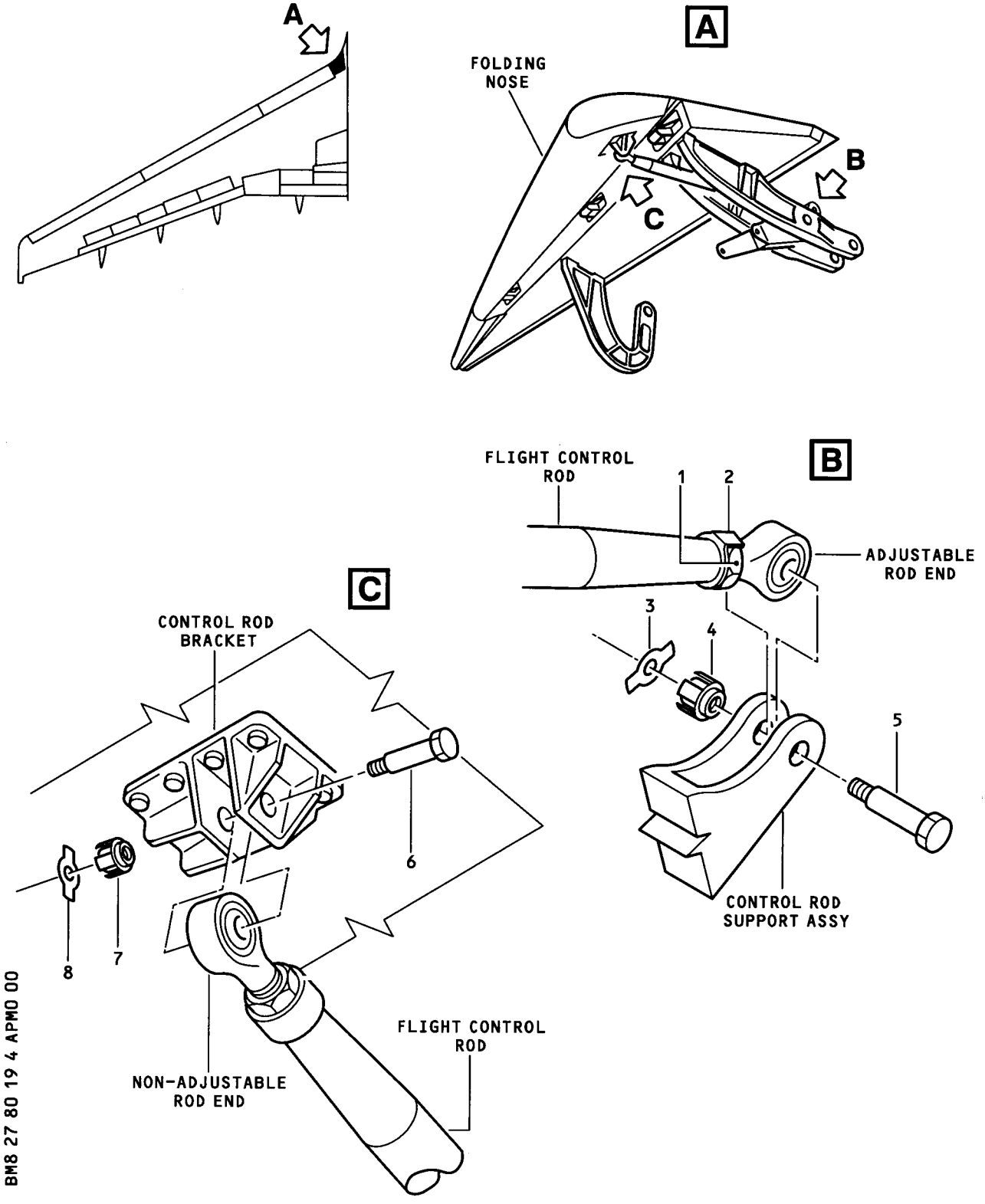
R B. Procedure

(1)Job set-up
(a)Open, safety and tag these circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUEGER	45CV	333/T61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS2	8CV	333/T64
133VU	FLT CTL/FLAPS SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SLATS/26VAC/SYS2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/SLATS/SYS1	9CV	335/R66

(b)Put the access platform in position below Zone 513 (613).
(c)Remove the access panel 513PL (613PR).
(2)Removal
(Ref. Fig. 408)

(a)Use the removal tool PN SL90.314-0.4375 to remove the lockwasher (3) (Ref. 20-21-16, P. Block 1).
(b)Use the wrench tool PN SL90.374-0.4375 to remove the nut (4) (Ref. 20-21-16, P. Block 301).



Flight Control Rod Installation
Figure 408

R

R (c)Remove the bolt (5) from the control rod support-assembly.
R (d)Use a tie-wrap to hold the flight control rod against the control rod support-assembly.
R (e)Pressurize the Green hydraulic system (Ref. 29-10-00 or 29-21-00, P. Block 301).
R (f)On panel 133VU, remove the safety clip and tag and close the circuit breaker 45CV.

R WARNING : IF THE SELECTOR SOLENOID IS USED TO EXTEND THE KRUEGER FLAP IT WILL CAUSE THE AILERON TO DROOP BY 10 DEGREES.

R CAUTION : MAKE SURE THE FLIGHT CONTROL ROD AND THE TIE-WRAP WILL NOT CONTACT THE FOLDING DOOR WHEN THE KRUEGER FLAP EXTENDS. DAMAGE COULD OCCUR IF THEY CONTACT THE FOLDING DOOR DURING THE EXTENSION.

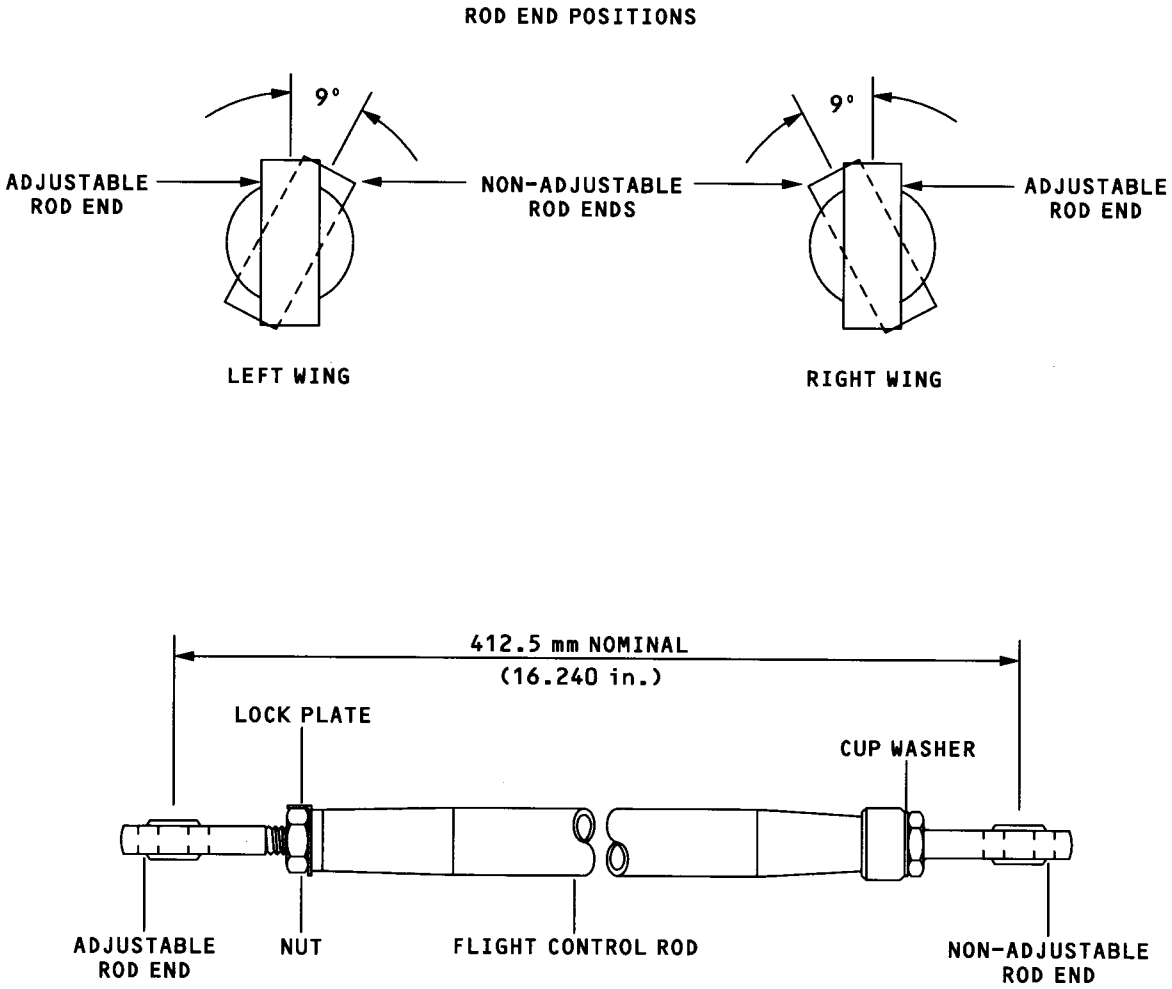
R (g)Push (in) the LH manual pushbutton (solenoid II) on the Krueger flap selector-solenoid valve at STA 2612/FR47 and fully extend the Krueger flaps.
R (h)On panel 133VU, open, safety and tag the circuit breaker 45CV.
R (j)Depressurize the Green hydraulic system (Ref. 29-10-00 or 29-21-00, P. Block 301).
R (k)Cut and remove the tie-wrap from the flight control rod/control rod support assembly interface.
R (l)Use the removal tool PN SL90.314-0.4375 to remove the lockwasher (8) (Ref. 20-21-16, P. Block 1).
R (m)Use the wrench tool PN SL90.374-0.4375 to remove the nut (7) (Ref. 20-21-16, P. Block 301).
R (n)Remove the bolt (6) and the flight control rod from the control rod bracket.
R (3)Preparation for installation (Ref. Fig. 408) (Ref. Fig. 409)

R CAUTION : DO NOT CLEAN THE ROD END BEARING SURFACES BECAUSE THIS WILL REMOVE THE GREASE.

R (a)Use the lint-free cloth and the cleaning agent (Material No. 11-004) to clean the control rod bracket, the control rod support-assembly and the bolts (5) and (6).

R CAUTION : MAKE SURE THAT THE ANGULAR POSITION OF THE ROD ENDS IS CORRECT BEFORE YOU INSTALL THE FLIGHT CONTROL ROD. THE ANGULAR POSITION OF THE ROD ENDS IS IMPORTANT.

R (b)If you are to install a new flight-control rod:
R 1 Make sure the angular position of the rod ends is correct.
R 2 Measure the distance between the rod end centers. If necessary, adjust the length of the flight control rod to get the nominal dimension given. If you adjust the length, keep the angular position of the rod ends correct and do not lock the lock plate (2).
R (c)If you are to install the flight control rod you removed, examine the



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Flight Control-Rod Dimensions
Figure 409

R

R bearing in each of the rod ends. The bearings must rotate freely in
R their housings. If a bearing is seized or sticking, you must replace
R the complete flight-control rod and adjust it as detailed in step (b).

R (4)Installation (Ref. Fig. 408)
R (a)Lubricate the bolt (6) with the grease (Material No. 04-004).
R (b)Put the flight control rod in position on the control rod bracket.
R Make sure the lock plate (2) is positioned so that you can get to the
R locking tab through the access panel 513PL (613PR).
R (c)Attach the flight control rod to the control rod bracket with the
R bolt (6) and the nut (7). Use the wrench tool PN SL90.374-0.4375 to
R TORQUE the nut (7) to 1.6 to 3.0 m.daN (12 to 22 lbf.ft) (Ref.
R 20-21-16, P, Block 1).
R (d)Install the lockwasher (8) with the installation tool
R PN SL90.313-0.4375 (Ref. 20-21-16, P. Block 1).
R (e)Apply the sealant (Material No. 09-016) to the head of the bolt (6) and
R to the nut (7).
R (f)Use a tie-wrap to hold the flight control rod against the control rod
R support-assembly.
R (g)Pressurize the Green hydraulic system (Ref. 29-10-00 or 29-21-00,
R P. Block 301).
R (h)On panel 133VU, remove the safety clip and tag and close the circuit
R breaker 45CV.

R WARNING : IF YOU USE THE SELECTOR SOLENOID TO RETRACT THE KRUEGER
R FLAP IT WILL CAUSE THE AILERON TO RISE BY 10 DEGREES.

R CAUTION : MAKE SURE THE FLIGHT CONTROL ROD AND THE TIE-WRAP WILL NOT
R CONTACT THE FOLDING DOOR WHEN THE KRUEGER FLAP RETRACTS.
R DAMAGE COULD OCCUR IF THEY CONTACT THE FOLDING DOOR DURING THE
R RETRACTION.

R (j)Push (in) the RH manual pushbutton (Solenoid I) on the Krueger flap
R selector-solenoid valve at STA2612/FR 47, and fully retract the Krueger
R flaps.
R (k)On panel 133VU, open, safety and tag the circuit breaker 45CV.
R (l)Depressurize the Green hydraulic system (Ref. 29-10-00 or 29-21-00,
R P. Block 301).
R (m)Cut and remove the tie-wrap from the flight control rod/control rod
R support-assembly interface.
R (n)Lubricate the bolt (5) with the grease (Material No. 04-004).
R (p)Put the flight control rod in position on the control rod support-
R assembly.
R (q)Measure the distance the rod end must move to be correctly aligned with
R the control rod support-assembly. The distance must be a minimum of
R 1.5 mm (0.06 in). If the distance is less:
R 1 Loosen the lock nut (1).
R 2 Adjust the length of the flight control rod to get the correct
R distance. Do not tighten the lock nut (1).

R NOTE : With the Krueger flap retracted and the flight control rod

R disconnected, the folding nose is in contact with the Krueger
R box. The movement that is necessary to align the flight control
R rod with the control rod support-assembly sets the clearance
R between the folding nose and the Krueger box.

R (r)Attach the flight control rod to the control rod support-assembly with
R the bolt (5) and the nut (4). Use the wrench tool PN SL90.374-0.4375
R to TORQUE the nut (4) to 1.6 to 3.0 m.daN (12 to 22 lbf.ft) (Ref.
R 20-21-16, P, Block 1).
R (s)If you adjusted the length of the flight control rod:
R 1 Install a 2 mm (0.08 in) shim between the rod end and the inboard lug
R of the control rod support-assembly.
R 2 TORQUE the lock nut (1) to 1.4 to 2.1 mdaN (10.3 to 15.5 lbf.ft).
R 3 Remove the shim from the control rod support-assembly.
R (t)Make sure the flight control rod is free to turn about the centerline.
R The flight control rod must turn approximately 4.5 degrees, which
R equals approximately 0.8 mm (0.031 in) measured at the outer surface of
R the flight control rod.
R (u)Pressurize the Green hydraulic system (Ref. 29-10-00 or 29-21-00,
R P, Block 301).
R (v)On panel 133VU, remove the safety clip and tag and close the circuit
R breaker 45CV.

R WARNING : IF THE SELECTOR SOLENOID IS USED TO EXTEND THE KRUEGER
R FLAP IT WILL CAUSE THE AILERON TO DROOP BY 10 DEGREES.

R (w)Push (in) the LH manual pushbutton (solenoid II) on the Krueger flap
R selector-solenoid valve at STA 2612/FR47, and fully extend the Krueger
R flaps.
R (x)On panel 133VU, open, safety and tag the circuit breaker 45CV.
R (y)Depressurize the Green hydraulic system (Ref. 29-10-00 or 29-21-00,
R P, Block 301).
R (z)Make sure the flight control rod is free to turn about the centerline.
R The flight control rod must turn approximately 4.5 degrees, which
R equals approximately 0.8 mm (0.031 in) measured at the outer surface of
R the flight control rod.
R (aa)If you adjusted the flight control rod, safety the nut (1) with the
R lock plate (2).
R (ab)Install the lockwasher (3) with the installation tool
R PN SL90.313-0.4375 (Ref. 20-21-16, P, Block 1).
R (ac)Apply the sealant (Material No. 09-016) to the head of the bolt (5) and
R to the nut (4).
R (ac)Remove the safety clips and tags and close the SLATS and KRUEGER
R circuit breakers on panel 133VU, lines 333 and 335.

R (5)Test
R (a)Do an operational test of the Krueger flaps (Ref. 27-87-00, P, Block
R 501). Make sure the flight control rod does not catch on the control
R rod bracket or the control rod support-assembly.

R (6)Close-Up

R (a)Install the access panel 513PL (613PR).
R (b)Remove the access platform.
R (c)Make sure that the work area is clean and clear of tools and
R miscellaneous items of equipment.

MECHANICAL AND ELECTRICAL CONTROL (SLATS) - DESCRIPTION AND OPERATION

1. General

Operation of the slats is controlled from the flight compartment by a mechanical control system, comprising a control lever and a command sensor unit (CSU).

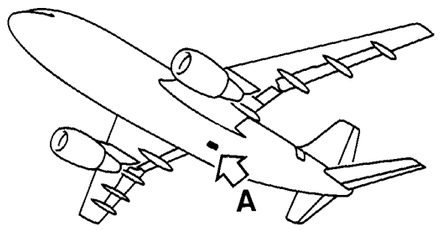
This mechanical control arrangement provides position demand signals for an electrical control loop, comprising two slat flap control computers (SFCC) and a feedback position pick-off unit (FPPU). The electrical control loop generates commands for the power control unit (PCU) valve blocks, which control the mechanical drive to the slat control surfaces.

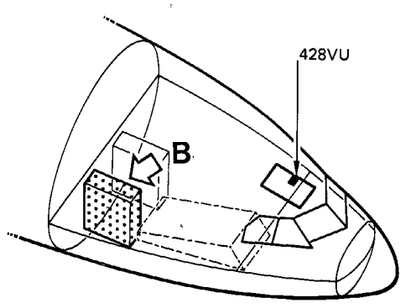
2. Component Location

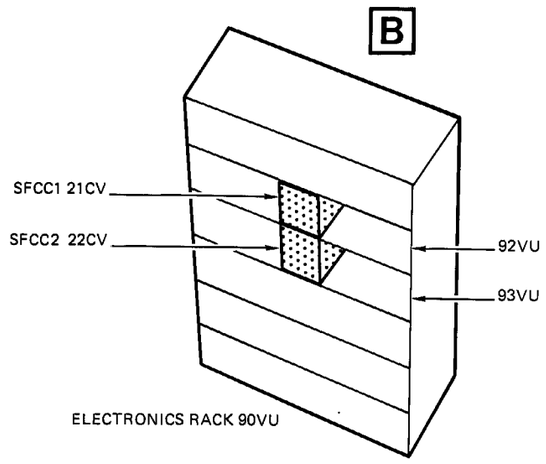
(Ref. Fig. 001)

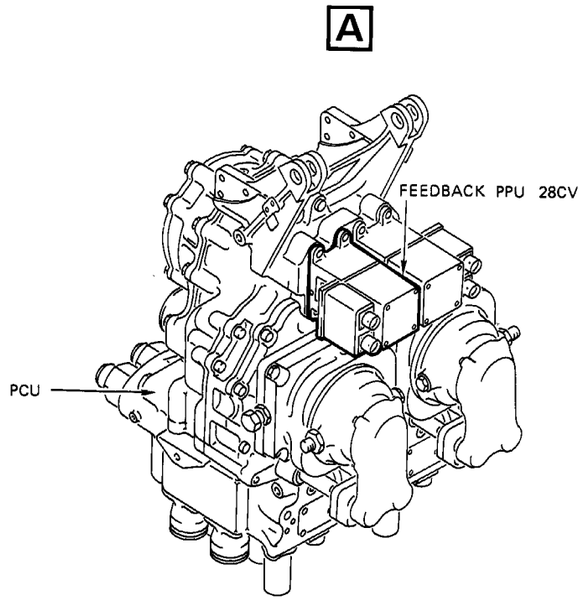
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
	LEVER ASSEMBLY-CONTROL	9VU	211		27-51-11
	ROD-PUSH-PULL		211	121BL 211CZ	
19CV	FAULT ANNUNCIATOR (SLAT SYS 1 ! 2)	428VU	211		
21CV	COMPUTER, SLAT/FLAP CONTROL, 1	92VU	122	121BL 211CZ	27-51-18
22CV	COMPUTER, SLAT/FLAP CONTROL, 2	93VU	122	121BL 211CZ	27-51-18
25CV	PCU VALVE BLOCK-BLUE		148		27-84-33
	SOLENOID VALVE-EXTEND		148		27-84-33
	SOLENOID VALVE-RETRACT		148		27-84-33
	SOLENOID VALVE-ENABLE		148		27-84-33
	SOLENOID VALVE-HIGH SPEED		148		27-84-33
	PRESSURE SWITCH-SUPPLY		148		27-84-33
	PRESSURE SWITCH-HIGH SPEED		148		27-84-33
	PRESSURE SWITCH-DRIVE		148		27-84-33
26CV	PCU VALVE BLOCK-GREEN		148		27-84-33
	SOLENOID VALVE-EXTEND		148		27-84-33
	SOLENOID VALVE-RETRACT		148		27-84-33
	SOLENOID VALVE-ENABLE		148		27-84-33
	SOLENOID VALVE-HIGH SPEED		148		27-84-33
	PRESSURE SWITCH-SUPPLY		148		27-84-33
	PRESSURE SWITCH-HIGH SPEED		148		27-84-33
	PRESSURE SWITCH-DRIVE		148		27-84-33
28CV	POSITION PICK-OFF UNIT-FEEDBACK		148		27-81-19
51CV	COMMAND SENSOR UNIT		121	121BL 211CZ	27-51-11
52CV	INDICATOR MAINTENANCE, SFCC 1	471VU	212		
53CV	INDICATOR MAINTENANCE, SFCC 2	471VU	212		
90CV	RELAY-COMPUTER REMOVED (SLAT SFCC1)	90VU	122	121BL 211CZ	

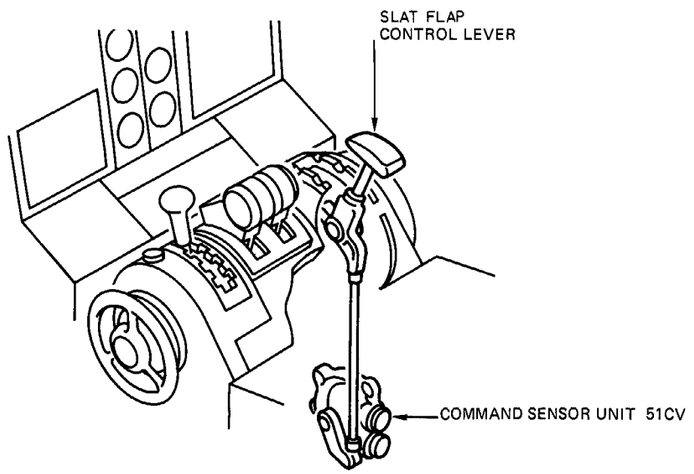
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
91CV	RELAY-COMPUTER REMOVED (FLAP SFCC1)	90VU	122	121BL 211CZ	
92CV	RELAY-COMPUTER REMOVED (SLAT SFCC2)	90VU	122	121BL 211CZ	
93CV	RELAY-COMPUTER REMOVED (FLAP SFCC2)	90VU	122	121BL 211CZ	

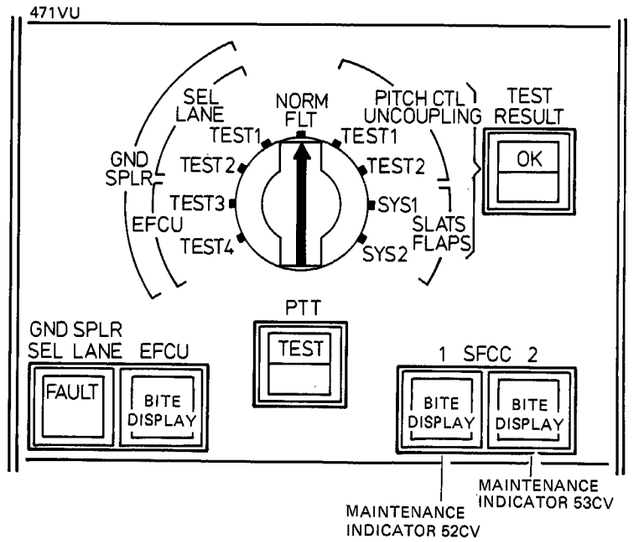


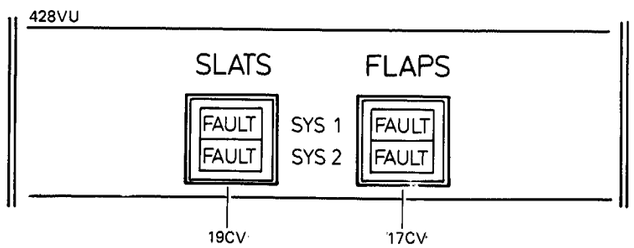












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Component Location
Figure 001

EFFECTIVITY: ALL

PIA

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3. Description

A. Slat positions are selected by the five position control lever located on the center pedestal.

B. A push-pull rod transmits commands from the control lever to the CSU situated in the electronics rack. Four dual-ganged switches in the CSU transmit command signals to the SFCC.

C. The SFCC generate the appropriate commands for the PCU valve blocks. The commands are computed from signals supplied by the CSU and FPPU.

D. A dual FAULT annunciator (19CV) provides the status of slat system 1 and 2.

4. Component Description

A. Slat Flap Control Lever
(Ref. Fig. 002)

(1) The slat flap control lever enables the position of all flap and slat control surfaces to be selected from the flight compartment center pedestal. The control lever, coupled to the control sensor unit through a push-pull rod and lever link assembly, and operates within a quadrant arrangement.

(2) A gated guide ramp guides the control lever through the different flap and slat select positions. A detent mechanism in the handle retains the control lever in the selected position.

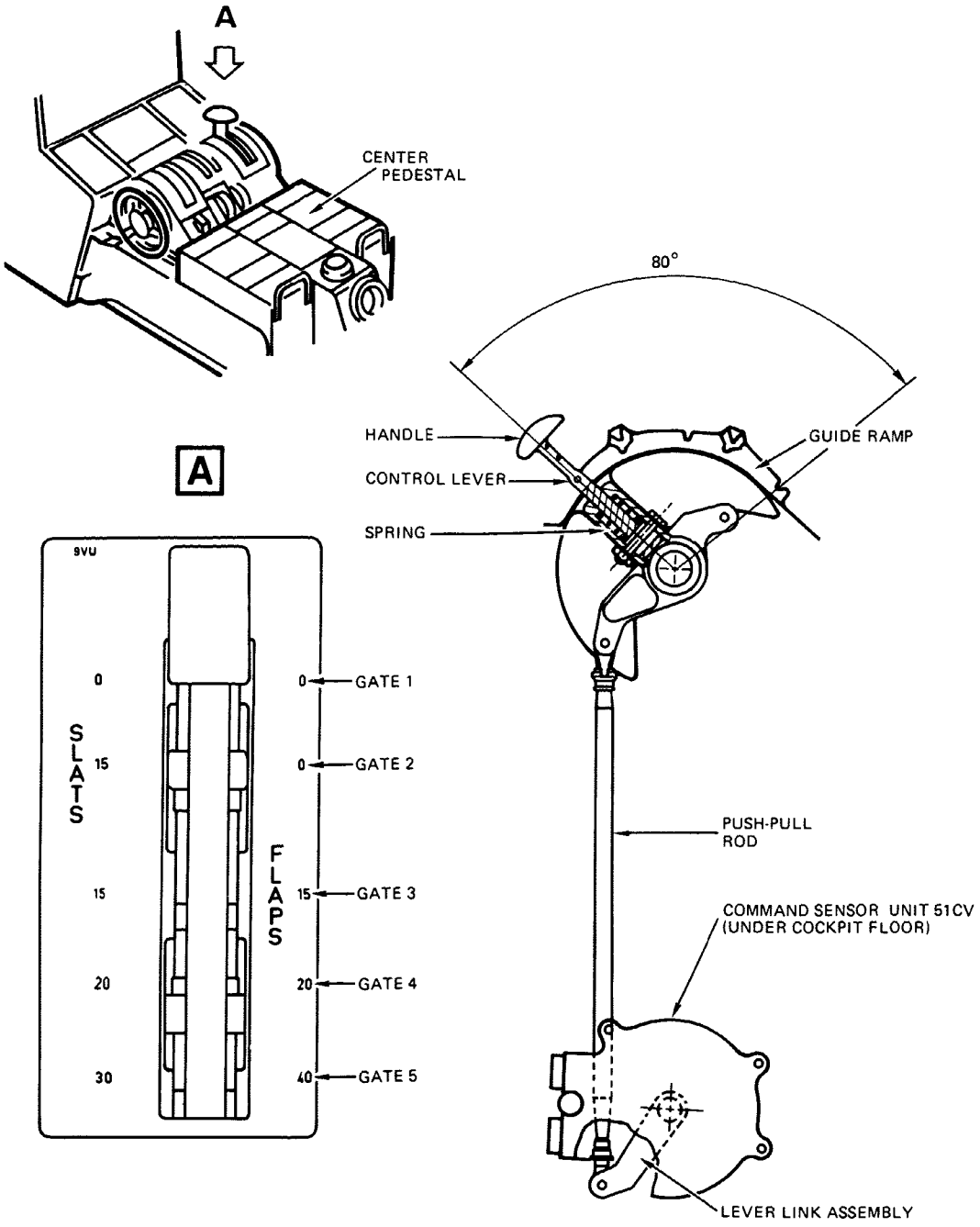
(3) Two baulks on the guide ramp, at gate 2 (FLAPS 0, SLATS 15) and at gate 4 (FLAPS 20, SLATS 20) prevent the control lever being moved through the full range in one movement. The five slat select positions are:

CONTROL LEVER		OUTER SLATS		INNER SLATS	
GATE	LEGEND	IN FLIGHT (deg)	ON GROUND (deg)	IN FLIGHT (deg)	ON GROUND (deg)
1	0	0	0	0	0
2	15	16	17	15	16
3	15	16	17	15	16
4	20	20	21	19	20
5	30	24	24	23	24

NOTE : To simplify operational procedures, the slat angle legends on the control lever have been rounded off to the nearest 5 degrees.

B. Slat Flap Control Computers (21CV, 22CV)
A full description of the SFCC is given in 27-51-00.

C. Outputs to Other Systems
Both SFCC1 and SFCC2 provide discrete and ARINC 429 outputs to other systems (Ref. 27-80-00, Interfaces).



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Slat Flap Control Lever
Figure 002

D. Command Sensor Unit (51CV)

A full description of the CSU is given in 27-51-00.

(1)Control Lever Command Translation

(Ref. Fig. 003)

(Ref. Fig. 004)

When the slat flap control lever is moved to the required position, the push-pull rod rotates the CSU input shaft. Rotation of the shaft causes a drive gear to rotate the CSU rotary switch wipers which make contact with the relevant wafer segments. The wafer segments provide "2-out-of-5" coded signals which represent slat position demand inputs to the SFCC.

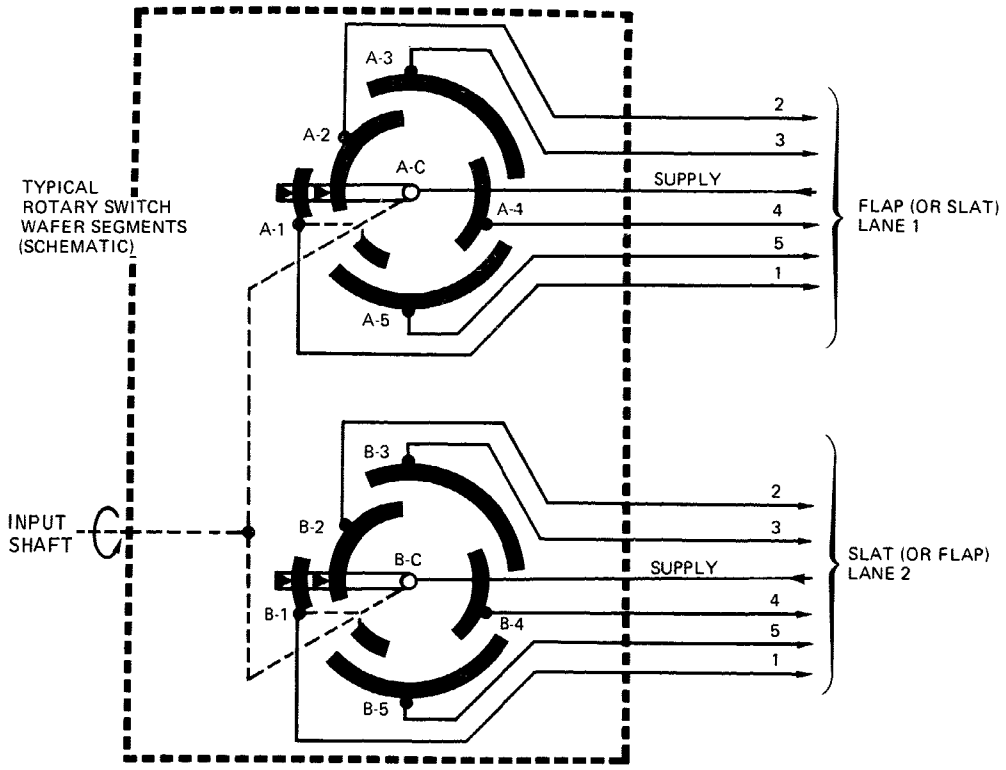
SWITCH CODING TABLE

CONTROL LEVER		SWITCH WAFER SEGMENT CODING				
GATE	LEGEND	1	2	3	4	5
1	0	1	1	0	0	0
2	15	0	1	1	0	0
3	15	0	0	1	1	0
4	20	0	0	0	1	1
5	30	1	0	0	0	1

(1)Switching

Each dual ganged switch provides a dedicated slat/flap command output.

	CSU SWITCH	SFCC LANE	SFCC CHANNEL
SYSTEM 1 (Connector A)	1	SLAT	1
		FLAP	2
	2	SLAT	2
		FLAP	1
SYSTEM 2 (Connector B)	3	SLAT	1
		FLAP	2
	4	SLAT	2
		FLAP	1



GATE	1	2	3	4	5
TRACK 1					
TRACK 2					
TRACK 3					
TRACK 4					
TRACK 5					
SLAT	0	15	15	20	30

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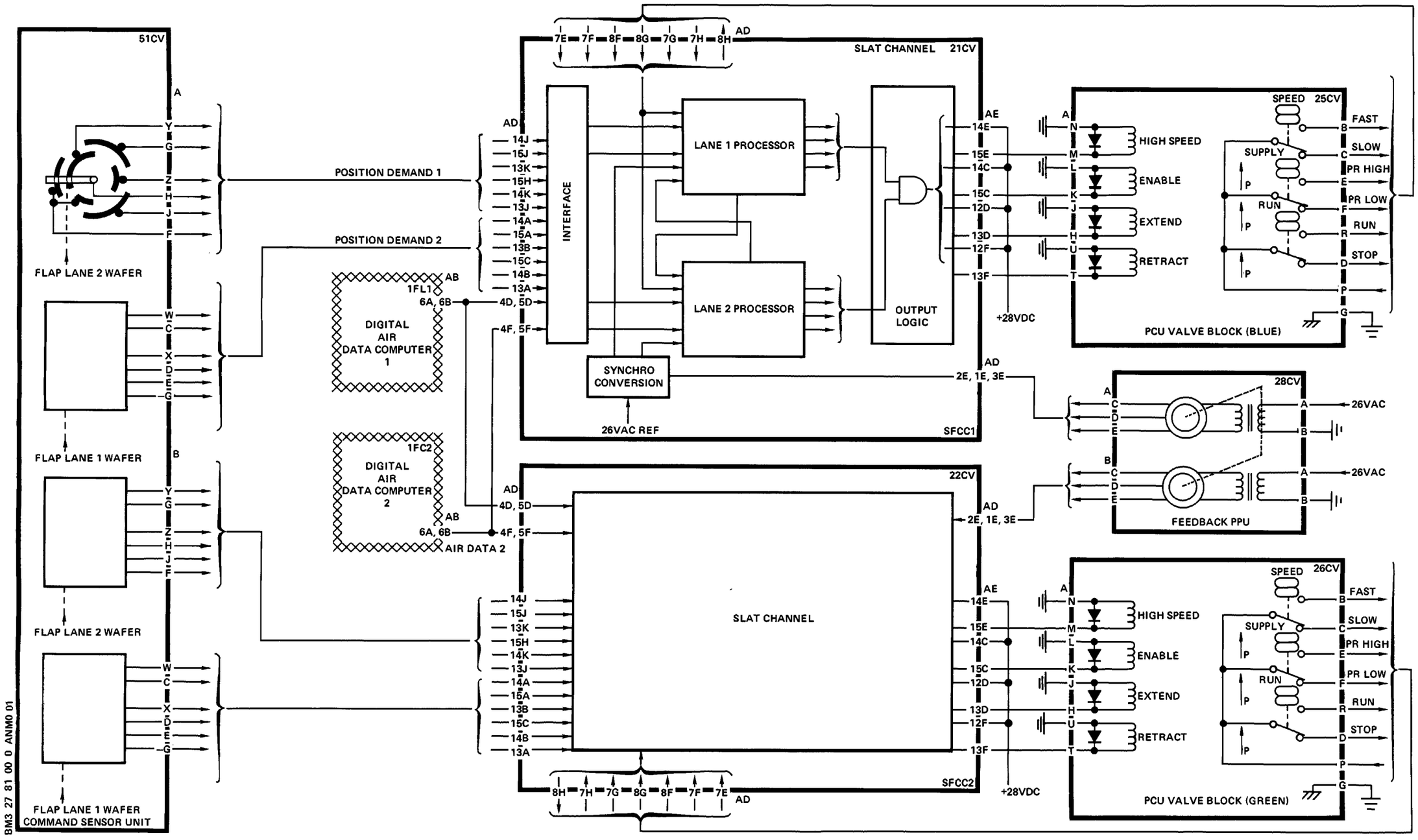
CSU Switching - Schematic
Figure 003



Electrical Control - Schematic Diagram
Figure 004

(2)Switch pattern
The CSU switching pattern is such that when the control lever is being moved from one position to another, the output to the SFCC will not change to the new command until the lever is in the new position. To ensure that the switching pattern is correct, a minimum and maximum CSU-position output range is established for each position.

E. Valve Blocks (25CV, 26CV)
(Ref. Fig. 005)
(1)Two valve blocks are mounted on the underside of the PCU. Each valve block is provided with four solenoid valves, the enable valve, two directional valves (extend and retract) and a high speed valve. There are also two hydraulic controlled valves, the main control valve and the speed change valve (Ref. 27-84-00). Valve block 1 receives hydraulic pressure from the BLUE system and valve block 2 receives hydraulic pressure from the GREEN system. The enable valve directs the incoming pressure to the two directional valves. The directional valves control the position of the main control valve. The high speed solenoid valve controls the position of the speed change valve. Three pressure switches monitor the valve positions.
(2)A full description of the solenoid valves is given in 27-54-00.
(3)A full description of the pressure switches is given in 27-51-00.

F. Feedback Position Pick-off Unit (28CV)
(Ref. Fig. 006)
(1)The FPPU, mounted at the rear of the PCU contains two size 11, brushless, transformer-coupled synchro transmitters, which connect electrically to SFCC 1 and 2. The synchros are positioned by the PCU intermediate gearbox (Ref. 27-54-00). Synchro rotation is less than 360 degrees at full slat travel.
(2)The FPPU input shaft is provided with a self engaging locking device which allows removal and installation without disturbing synchro rotor/stator alignment.
(3)Electrical connections are made by two multi-way connections.

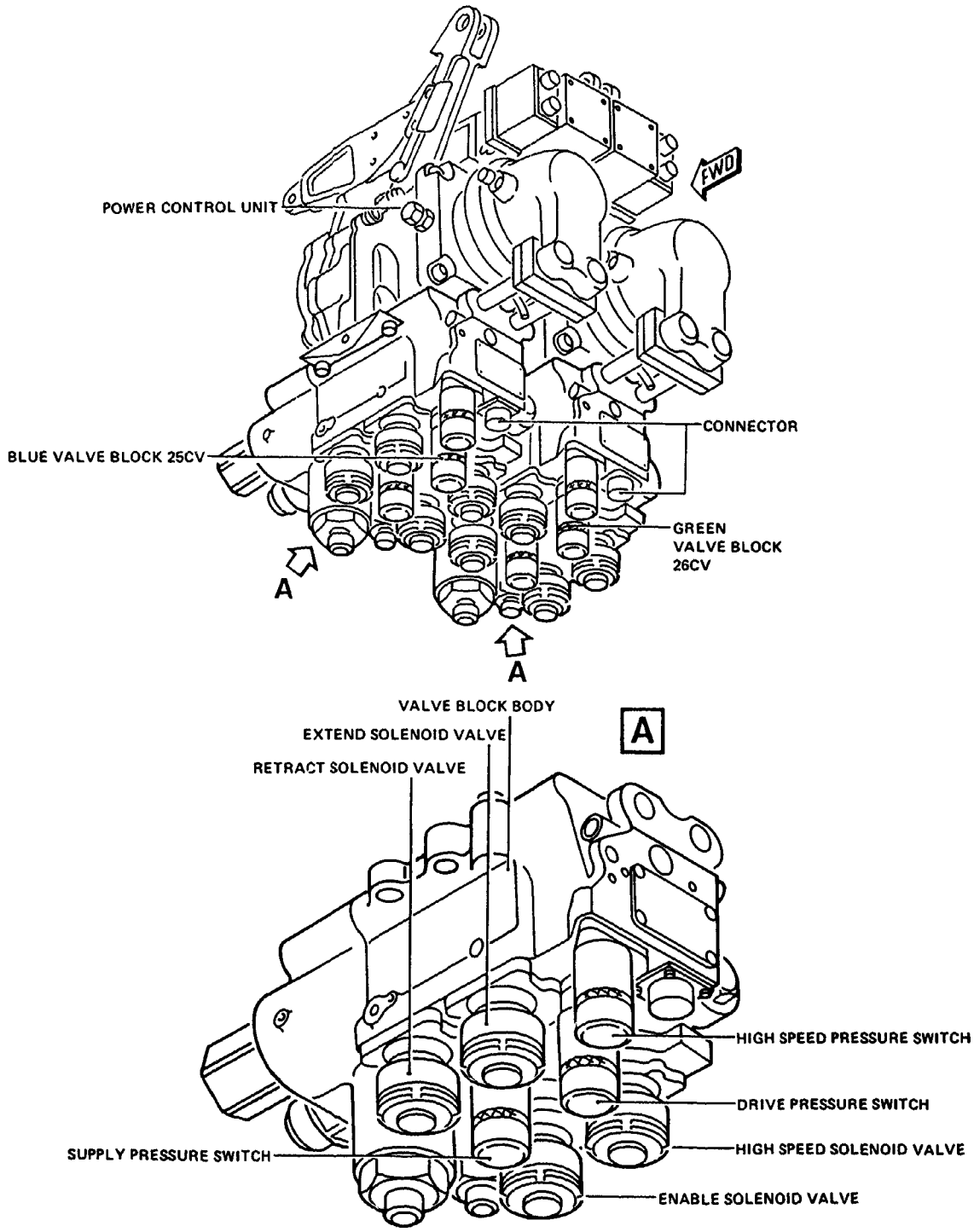
G. Not applicable.

H. Computer Removed Relays

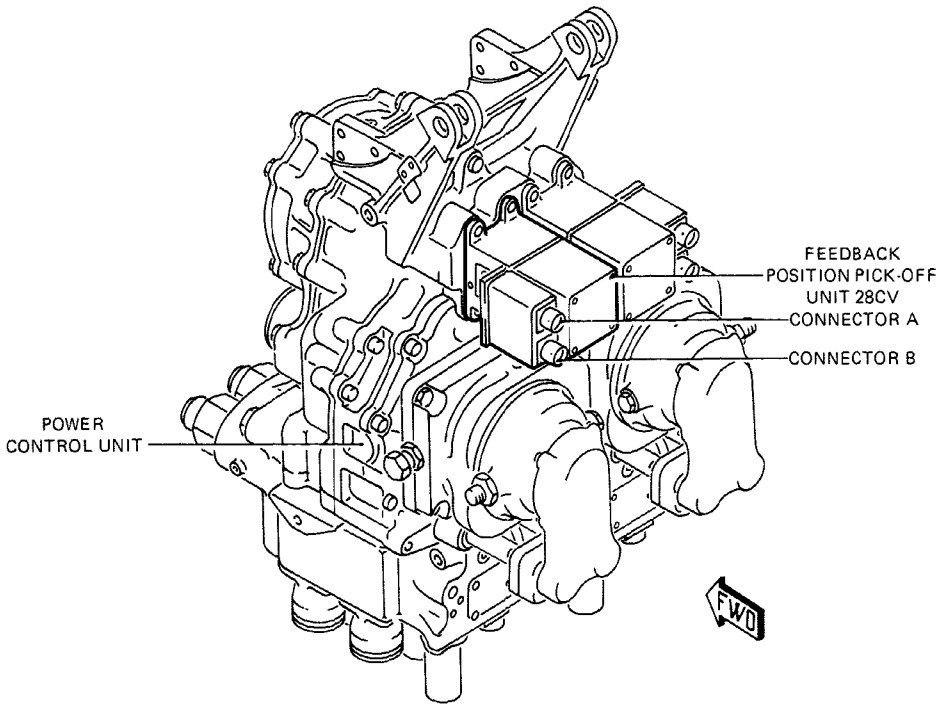
SFCC	SLAT CHANNEL RELAYS	FLAP CHANNEL RELAYS
1	90CV	91CV
2	92CV	93CV

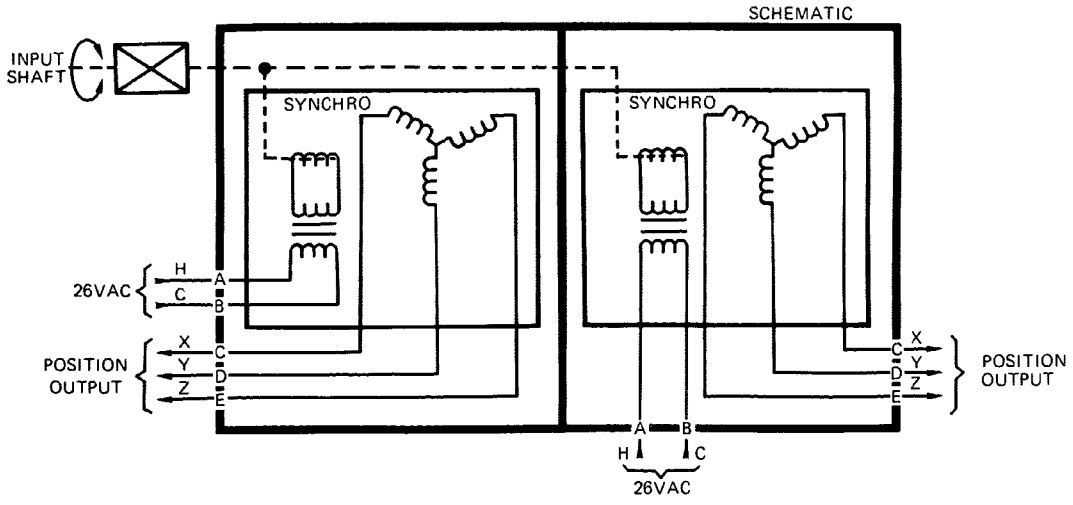
If a computer is removed the two associated relays are de-energized and the SLAT and FLAP FAULT annunciators come on.

I. System FAULT annunciator
(Ref. Fig. 007)
The system FAULT annunciator is a dual annunciator and is located on the overhead panel (428VU). The upper annunciator comes on to indicate



Valve Block
Figure 005





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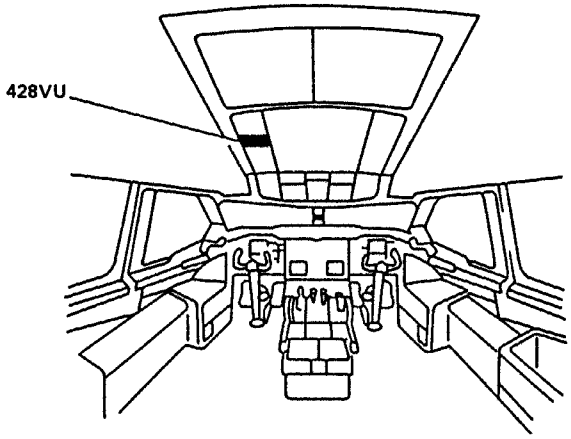
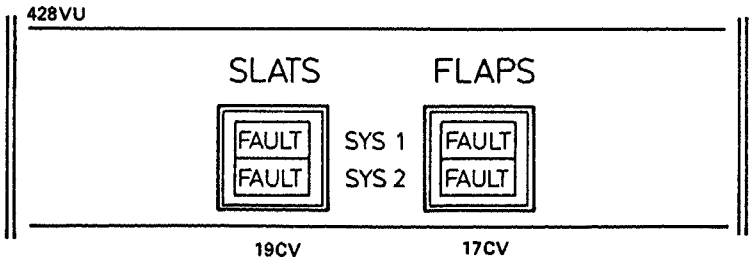
Feedback Position Pick-Off Unit
Figure 006





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Fault Annunciator
Figure 007

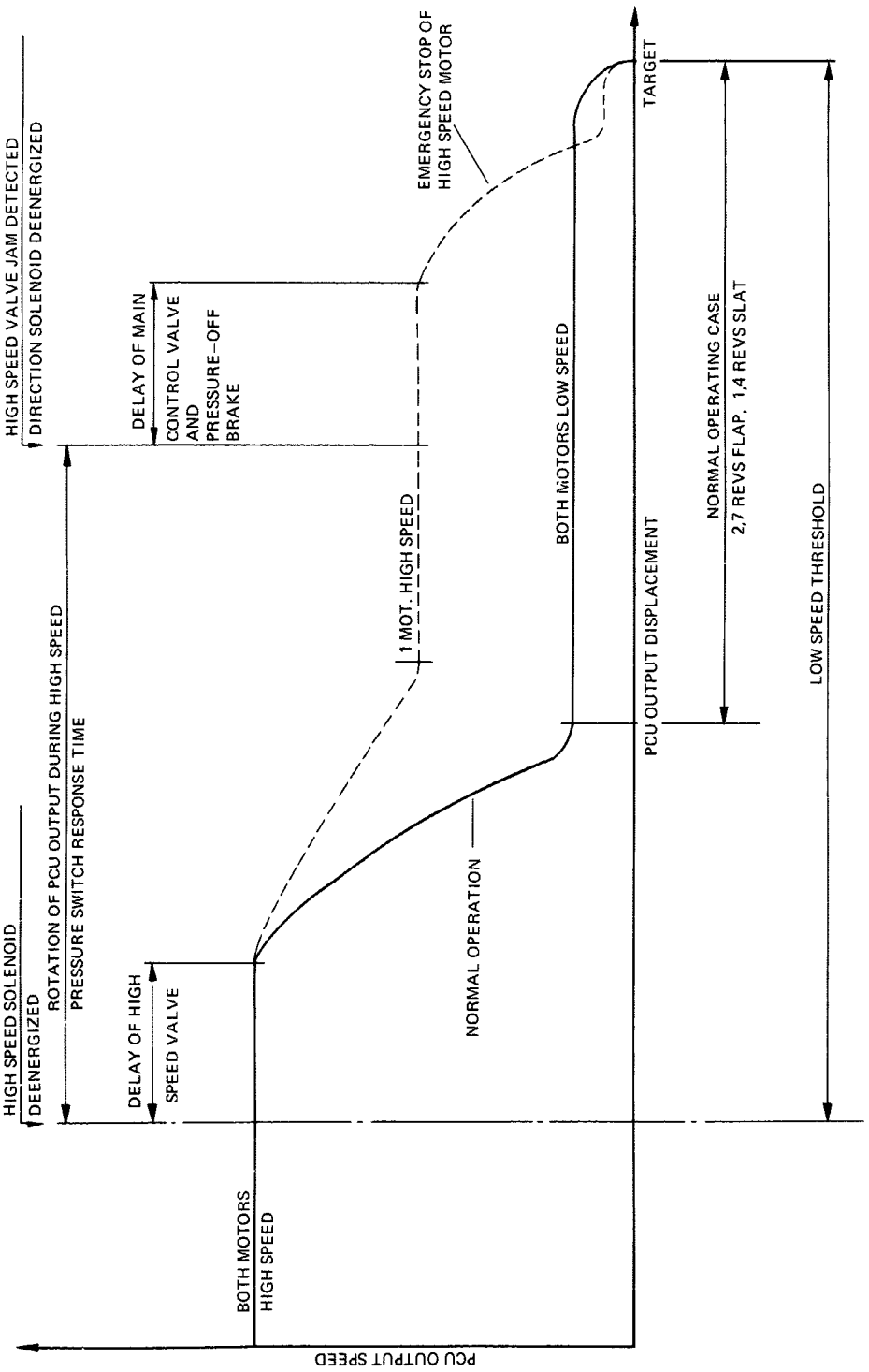
a fault in SLATS, SYS 1 and the lower annunciator comes on to indicate a fault in SLATS, SYS 2.

J. BITE DISPLAY Maintenance Indicators (52CV, 53CV)
A full description of the BITE DISPLAY maintenance indicators is given in 27-51-00.

5. Operation

A. Generation of Electrical Drive Commands (Ref. Fig. 004)
(Ref. Fig. 008)
(Ref. Fig. 009)
(1) In each SFCC slat channel, the position input demands from two separate switch wafers are applied to lane 1 and 2 processors. The lane processors compare the position demands to ensure the integrity of the demand. If the demand signals are valid they are compared with the actual slat position signal provided by the FPPU 28 CV located on the slat PCU. If there is a difference between the demanded position and the actual slat position, and no fault exists, each lane processor generates drive commands.
(2) Drive commands from lane processors 1 and 2 are combined using AND logic to ensure that drive commands are only transmitted to the PCU valve block if both lane processores drive commands are only transmitted if both lane processors generate identical commands.

B. Valve Block Electrical Control (Ref. Fig. 004)
(1) Drive commands from SFCC 1 are applied to the high-speed, enable, and extend or retract solenoid valves on the BLUE system PCU valve block and from SFCC 2 to the corresponding solenoid valves on the GREEN system PCU valve block.
(2) The SFCC drive command energizes the enable valve and one of the directional valves (extend or retract). The pressure-off brakes in the slat PCU are released and the hydraulic motors drive the transmission system in the slow speed mode (Ref. 27-84-00). After 200m seconds the high speed solenoid valve is energized opening the speed-change valve and the motors run at high speed.
NOTE : The 200m seconds time delay ensure that the pressure-off brakes are fully released. This reduces brake wear.
The slats continue to move at high speed until the low speed threshold is met. This point is defined as "the point at which to close the high speed valve". When this point is reached, the high speed solenoid valve is de-energized and the system moves into the slow speed mode (approximately 10% of high speed). The slats continue to move in slow speed until the target position threshold is met. This point is defined as "the point before the target point at which to close the the directional valve". When this point is reached the directional and enable solenoid valves are de-energized. The pressure-off brakes in the slat PCU are applied and the system is stopped.
(3) The movement that takes place between the target position threshold and the target point is that movement due to system inertial lag, i.e. the time taken from initiating the command to stop and the



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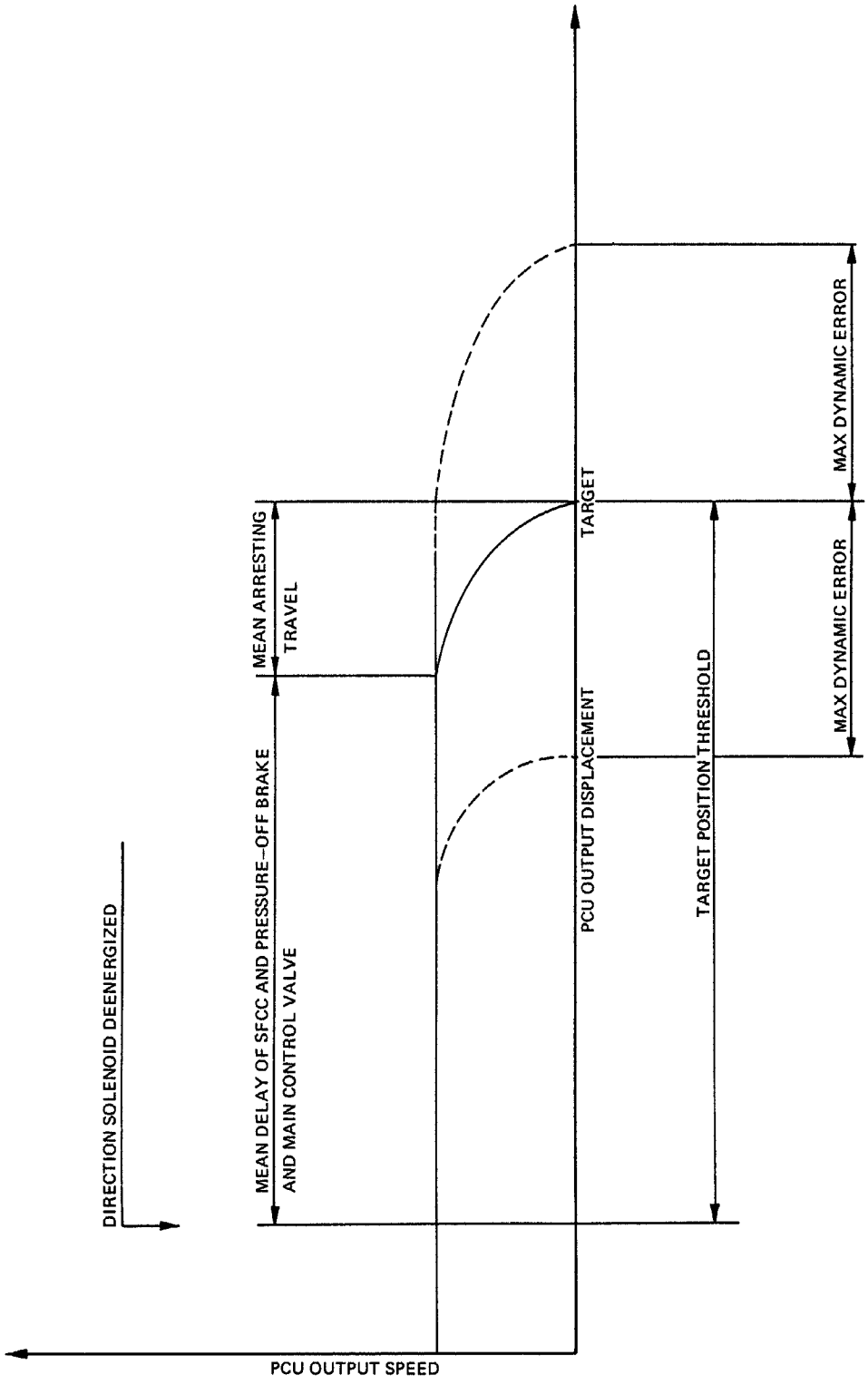
Low Speed Threshold Graph
Figure 008



Target Position Threshold Graph
Figure 009

time it takes to de-energize the enable and directional solenoid valves and for the pressure-off brakes to bring the system to a complete stop.

The valve block operation is monitored by the three pressure switches:

- the supply pressure switch monitors the enable solenoid valve position,
- the drive pressure switch monitors the main control valve position,
- the high speed pressure switch monitors the speed change valve position.

(4) The SFCC compares the input from the pressure switches with the valve position command discrete and initiates fault action (Ref. table 2) if:

- low pressure is indicated when a valve is commanded opens
- high pressure is indicated when a valve is commanded to close.

C. Slat Alpha-lock (Ref. Fig. 004)

(1) SFCC 1 and 2 each receive ARINC 429 format digital data from Air Data Computers 1 and 2. The slat channel of each SFCC extracts corrected angle of attack information for monitoring by lane processors 1 and 2. The lane processors compare the two independent values and select the higher value for use in alpha-lock computations.

(2) If aircraft angle of attack is greater than 9 degrees and the control lever is moved from SLATS position 15, 20 or 30 to position 0, the enable valve command to the PCU is inhibited, thus preventing slat retraction from 15 deg to 0 deg. The alpha-lock function is reset when corrected angle of attack reduces below 8 degrees.

(3) Air data computers 1 and 2 automatically set the corrected angle of attack value to 0 degrees when calibrated airspeed reduces to below 60 knots. This action automatically inhibits the alpha-lock on the ground. The alpha-lock function is inhibited by lane processors 1 and 2 when corrected angle of attack increases to more than 9 degrees after slat movement from 15 deg to 0 deg has started.

(4) When the alpha-lock function is operative, alpha-lock discretes are applied to the slat flap position indicator by SFCC 1 and 2. Within the indicator, the signals are combined using OR logic to trigger a 2 Hz flasher. This flasher controls the ALPHA-LOCK indicator light.

R D. Monitoring and Fault Warning

R Control functions are monitored by comparison and credibility checks to ensure correct operation of the system. Detection of any failure that cannot be corrected de-energizes all control valve solenoids on the associated PCU.

The SFCC monitors the following functions:

- SFCC internal power
- SFCC synchro excitation
- SFCC lane cross
- Enable valve position and system pressure
- Main control valve position
- High speed valve position
- Command sensor unit
- System jam detection
- Half speed detection
- Asymmetry

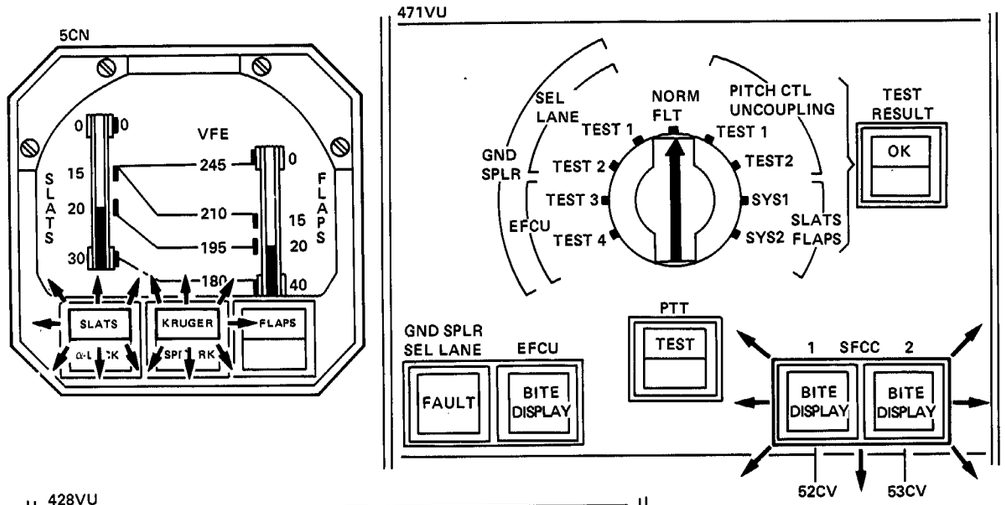
- Runaway
R - Kruger flap position (27-89-00)
- ARINC 429 input
R The fault action comprises
R - Motor stop
R - FAULT indication (19CV on overhead panel) comes on (but does not
R latch)
R - BITE DISPLAY (maintenance panel) latches on
R - FLT CTL plus message comes on on left ECAM display
R - SFCC failure code, latches on.
R - SLAT annunciator comes on.
R

(Ref. Fig. 010)

FAULT ACTION TABLE

MONITOR/FAULT	ASSOCIATED MOTOR	FAULT 19CV	BITE DISPLAY	FLT CTL	SFCC CODE	SYSTEM STATUS
1. CSU (FAIL) (PATTERN)	STOP	ON	ON	ON	ON	1/2 speed
2. SYNCHRO VOLTS (low with 28V valid)	STOP	ON	-	ON	ON	1/2 speed
3. LANE CROSS MONITOR (any detected fault)	STOP	ON	ON	ON	ON	1/2 speed
4. ENABLE VALVE						
a. (high pressure with 'low' command)	STOP	ON	ON	ON	ON	1/2 speed
b. (low pressure with 'high commanded)	STOP	ON	-	ON	-	1/2 speed
5. MAIN CONTROL VALVE (not in commanded position)	STOP	ON	ON	ON	ON	1/2 speed
6. HIGH SPEED VALVE						
a. (Valve closed	-	-	ON	-	ON	Approx.

MONITOR/FAULT	ASSOCIATED MOTOR	FAULT 19CV	BITE DISPLAY	FLT CTL	SFCC CODE	SYSTEM STATUS
with 'open' command)						60% high speed.
b. (Valve open with 'close command)	STOP	ON	ON	ON	ON	1/2 speed



FAULT CONDITION	FAILURE INDICATIONS									REMARKS
	SFCC FAIL INDICATORS (21CV/22CV)					FAULT ANNUN-CIATOR (19CV)	MAINTENANCE INDICATOR (52CV/53CV)	ECAM	SLAT/FLAP POSITION INDICATOR (5CN)	
	1	2	3	4	5					
LH EXTEND SWITCH	0	0	0	0	1	–	BITE DISPLAY	FLT CTL	KRUGER	KRUEGER FLAP FAULTS REFER 27–89–00
LH RETRACT SWITCH	0	0	0	1	0	–	BITE DISPLAY	FLT CTL	KRUGER	
RH EXTEND SWITCH	0	0	0	1	1	–	BITE DISPLAY	FLT CTL	KRUGER	
RH RETRACT SWITCH	0	0	1	0	0	–	BITE DISPLAY	FLT CTL	KRUGER	
–	0	0	1	0	1	–	–	–	–	SFCC FAILURE CODES NOT ALLOCATED
–	0	0	1	1	0	–	–	–	–	
–	0	0	1	1	1	–	–	–	–	
–	0	1	0	0	0	–	–	–	–	
SLAT ASYMMETRY	0	1	0	0	1	FAULT	BITE DISPLAY	FLT CTL	SLATS	REFER 27–86–00
RUNAWAY	0	1	0	1	0	FAULT	BITE DISPLAY	FLT CTL	SLATS	
HIGH SPEED PRESSURE SWITCH CONTACT FAULT	0	1	0	1	1	*	BITE DISPLAY	*	–	* "FAULT" AND "FLT CTL" INDICATIONS PRESENT IF SWITCH FAILURE PREVENTS PCU MOTOR OPERATION
DRIVE PRESSURE SWITCH CONTACT FAULT	0	1	1	0	0	*	BITE DISPLAY	*	–	
MAIN CONTROL VALVE FAILURE	0	1	1	0	1	FAULT	BITE DISPLAY	FLT CTL	–	–
HIGH SPEED VALVE FAILURE	0	1	1	1	0	*	BITE DISPLAY	*	–	"FAULT" AND "FLT CTL" INDICATIONS PRESENT IF VALVE HIGH SPEED POSITION WITH LOW SPEED SELECTED
SYSTEM JAM (NO SLAT MOVEMENT)	0	1	1	1	1	FAULT	BITE DISPLAY	FLT CTL	–	* SLATS IF WTB ARM FROM OTHER CHANNEL IS PRESENT
LH ASYMMETRY PPU	1	0	0	0	0	FAULT	BITE DISPLAY	FLT CTL	*	
RH ASYMMETRY PPU	1	0	0	0	1	FAULT	BITE DISPLAY	FLT CTL	*	
FEEDBACK PPU	1	0	0	1	0	FAULT	BITE DISPLAY	FLT CTL	*	
CSU SWITCH PATTERN	1	0	0	1	1	FAULT	BITE DISPLAY	FLT CTL	–	10 SECOND DELAY BEFORE WARNINGS GENERATED
ENABLE VALVE JAMMED OPEN	1	0	1	0	0	FAULT	BITE DISPLAY	FLT CTL	–	–
SUPPLY PRESSURE SWITCH CONTACT FAULT	1	0	1	0	1	*	BITE DISPLAY	*	–	* "FAULT" AND "FLT CTL" INDICATIONS PRESENT IF SWITCH FAILURE PREVENTS PCU MOTOR OPERATION
HALF SPEED OPERATION (MOTOR JAM)	1	0	1	1	0	–	BITE DISPLAY	–	–	–
LOSS OF ALPHA DATA FROM ADC 1	1	0	1	1	1	–	BITE DISPLAY	–	–	ALPHA–LOCK FUNCTION INHIBITED NOT ARINC DATA (LABEL 271+206) RECEIVED FOR MORE THAN 10 SEC. DURING FLIGHT
LOSS OF ALPHA DATA FROM ADC 2	1	1	0	0	0	–	BITE DISPLAY	–	–	
LOSS OF WING–TIP BRAKE POWER	1	1	0	0	1	–	BITE DISPLAY	–	–	REFER 27–86–00
LOSS OF LH WING–TIP BRAKE	1	1	0	1	0	–	BITE DISPLAY	–	–	
LOSS OF RH WING–TIP BRAKE	1	1	0	1	1	–	BITE DISPLAY	–	–	
–	1	1	1	0	0	–	–	–	–	SFCC FAILURE CODES NOT ALLOCATED
–	1	1	1	0	1	–	–	–	–	
–	1	1	0	1	0	–	–	–	–	
SFCC FAILURE	1	1	1	1	1	FAULT	BITE DISPLAY	FLT CTL	–	–
LOW HYDRAULIC PRESSURE (SUPPLY PRESSURE SWITCH IN LOW POSITION WHEN ENABLE VALVE COMMANDED OPEN)	0	0	0	0	0	FAULT	–	FLT CTL	–	NO SFCC FAILURE CODE MOTOR INHIBITED BUT ENABLE VALVE REMAINS OPEN (REFER 27–84–00)
26VAC OR 28VDC POWER SUPPLY FAILURE	0	0	0	0	0	FAULT	–	FLT CTL	–	NO SFCC FAILURE CODE

NOTE: FOR WARNING CRT PAGE DISPLAYS, REFER 31–51–00 (OR ECAM DATA BOOK 31–52–00)

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Continuous Monitoring -
Failure Modes and Fault Indications
Figure 010

MONITOR/FAULT	ASSOCIATED MOTOR	FAULT 19CV	BITE DISPLAY	FLT CTL	SFCC CODE	SYSTEM STATUS
7. HALF SPEED (when both motors high speed commanded)	-	-	ON	-	ON	1/2 speed
8. SYSTEM JAM	STOP (Both motors)	ON/ON	ON/ON	ON	ON	STOPPED
9. ASYMMETRY OVERSPEED OR RUNAWAY	STOP Both	ON/ON	ON/ON	ON	ON	STOPPED
10. ARINC429 INPUT (Data invalid - no data)	-	-	ON	-	ON	-

NOTES

Fault 1 - 10-second delay before pattern warning
- If pattern becomes valid, system reverts to normal

Fault 2 - System monitor inoperative
- If fault clears, system reverts to normal

Fault 3 - System inhibited for rest of flight.

Fault 4a - Will reset on receipt of new CSU command.
b - If low pressure fault clears, system reverts to normal

Fault 5 - Will reset on 'power up'.

Fault 6a - None
b - 60% of high speed if one motor operating normally.
- Will reset on 'power up'.

Fault 7 - Only monitored in flight.
- System continues to operate unless fault detected by another monitor
- Half speed monitor only when both motors high speed commanded

Fault 8 - Motors stop after 4 seconds
- If opposite selection is made on the lever, system will attempt to drive. Refer to text.

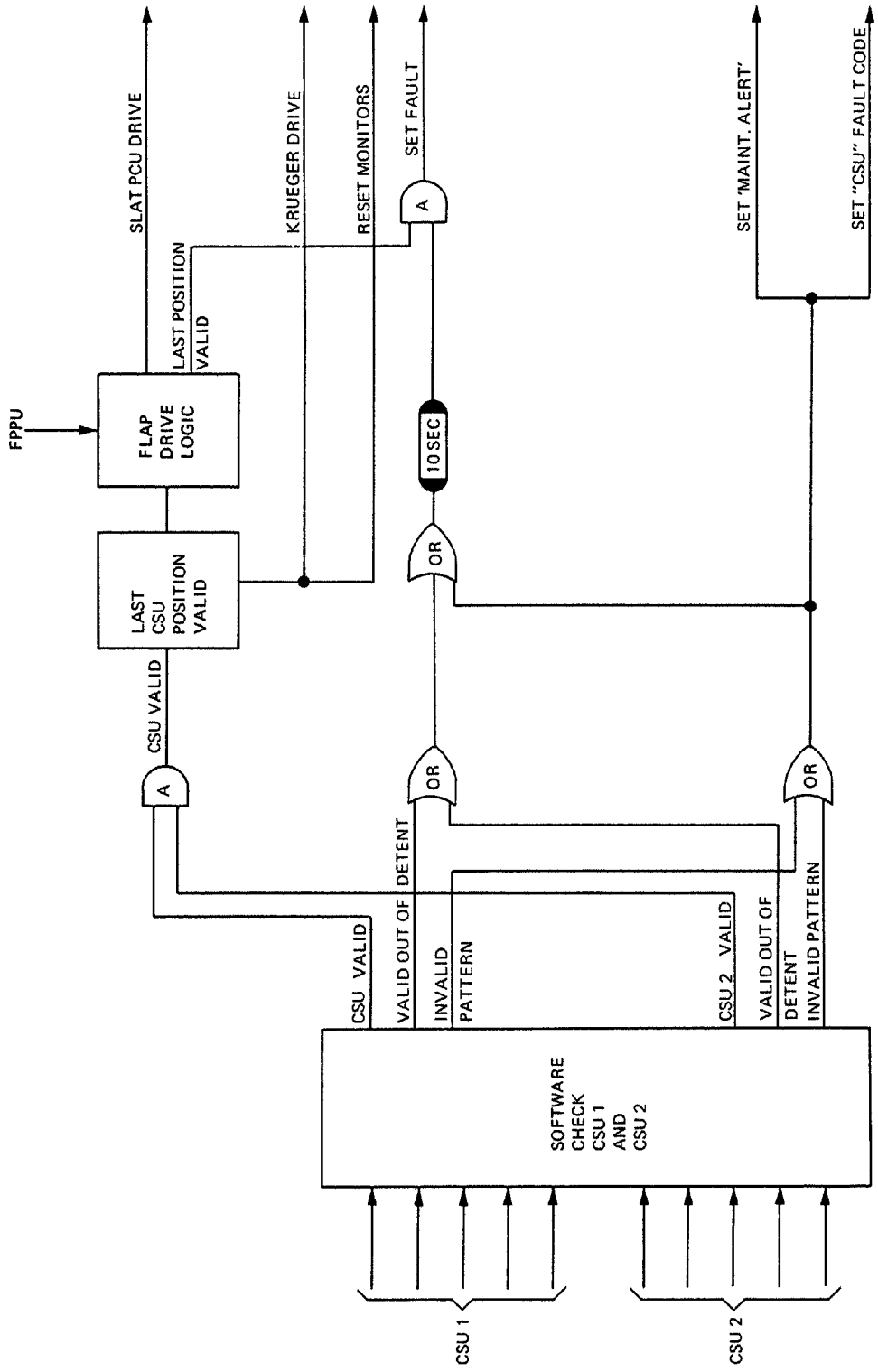
Fault 9 - System inhibited for the rest of the flight
- System torque limiter lockout indicator will require check

Fault 10 - Only operative in flight.
- If due to data invalid, or no data and alpha-lock is inhibited
- If only one input is invalid or no data after 10 seconds, alpha-lock is not inhibited

(1)SFCC Internal Power Monitor
If the internal power is low when the 28 V DC is valid, fault action is taken.
(2)SFCC Synchro Excitation Monitor
Fault action is initiated if the 26 V AC synchro power is low when the 28 V DC is valid.
(3)SFCC lane cross monitor
The lane cross monitor receives, from the other lane:
- four solenoid valve discretes
- two krueger position discretes
- CSU input.

If there is a discrepancy between the self generated discretes and the discretes received from the other lane for the valve solenoids or the krueger position, an SFCC failure is interpreted and fault action is taken.
If a discrepancy exists between the input from the CSU and the CSU input from the other lane, a faulty CSU is interpreted and fault action is taken.
The lane monitor also compares the CSU input to both lanes. If a discrepancy exists CSU failure is interpeted and fault action is initiated.
NOTE : The lane cross monitor does not monitor the CSU-pattern.
(4)Enable Valve Position and System Pressure Monitor
The monitor is fed a pressure discrete from the supply pressure switch.
Fault action is initiated if:
- Low pressure is indicated when the enable valve is commanded open
- High pressure is indicated when the enable valve is commanded closed.

If the monitor detects low pressure, the system jam detection monitor is inhibited.
(5)Main Control Valve Position Monitoring
The drive pressure switch provides a main control valve position discrete. Fault action is initiated if the main control valve is not in the commanded position or if the pressure switch is faulty.
(6)High Speed Valve Position Monitoring
The high speed pressure switch provides a high speed valve position discrete. Fault action is initiated if the high speed valve is not in the commanded position or if the pressure switch is faulty.
(7)CSU Pattern Validity Monitor
(Ref. Fig. 011)
The CSU pattern is monitored in both lanes. If the CSU pattern is invalid after a 10 second period all drive commands to the flap, slat and Kruger control valves are inhibited, fault indications are generated and the last commanded position is maintained. The uncommanded movement monitor is disabled.
If a new valid command is received the system returns to normal and the following monitors are reset:
- CSU pattern
- Lane cross monitoring
- System jam detect
- Position pick-off monitor
- Kruger position



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CSU Monitor
Figure 011

- ARINC 429 input.

(8)System Jam Detect Monitor
(Ref. Fig. 012)

(9)Half speed detection monitor
(Ref. Fig. 013)
Half speed is defined as "slower movement of the surfaces than the probable minimum combined speed of two motors".
The monitor only functions when high speed has been commanded.
If a half speed fault is detected the BITE DISPLAY annunciator, on the FLIGHT CONTROLS section of maintenance panel 471VU comes on and a
R half speed fault code is stored in the SFCC. The half speed monitor
R is inhibited if the other system has been closed down.

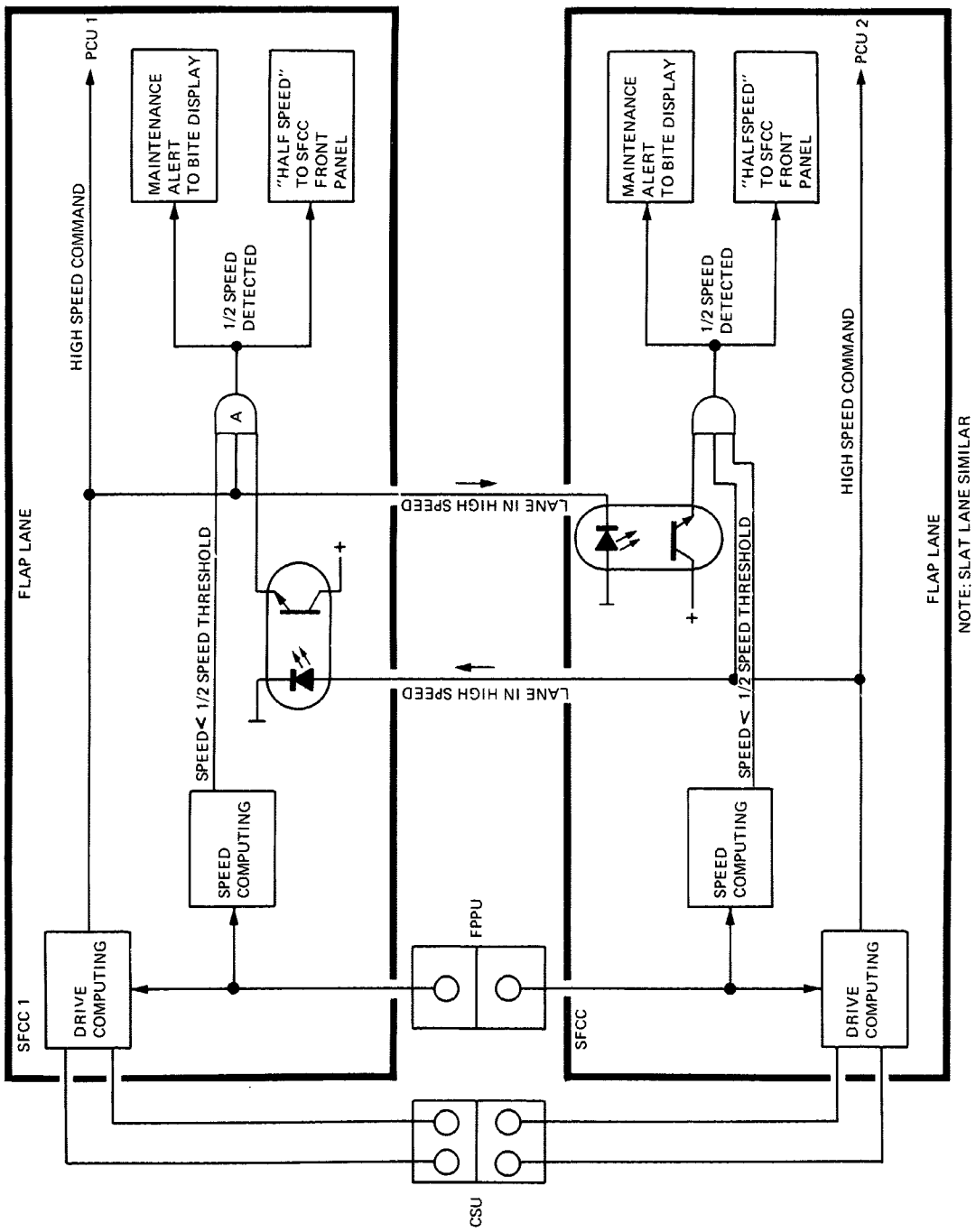
(10)Asymmetry Monitoring
(Ref. Fig. 014)
Asymmetry is defined as:
- a position difference between only one APPU and the FPPU synchro
R ≥3.955° synchro angle (3.933 torque shaft revs. approx.) at APPU together with a position difference between both APPU synchros of ≥0.879° synchro angle (0.874 torque shaft revs. approx.) or
- an overspeed of either APPU synchro of ≥12 bits per 37.5 msec., which is equal to 1.055° per 37.5 msec. torque shaft revs.

Asymmetry is monitored by the PPU monitor in each slat channel. If asymmetry is detected in both channels an "arm" signal is exchanged between channels. On receipt of the arm signal fault action is initiated, the slat channel in each SFCC is inhibited for the rest of the flight.
If a monitor detects asymmetry but does not receive an arm signal from the other channel a PPU failure is assumed.

(11)Runaway monitoring
Slat runaway is interpreted if:
- there exists a position difference between only one APPU synchro and the FPPU synchro ≥2.007° synchro angle (1.996 torque shaft revs. approx.) at APPU together with a position difference between both APPU synchros of <0.879° synchro angle (0.874 torque shaft revs. approx.) or
- a position difference at both APPU relative to the FPPU synchro of ≥2.007° synchro angle (1.996 torque shaft revs. approx.) at APPU or
- an overspeed of both APPU synchros of ≥12 bits per 37.5 msec., which is equal to 1.055° per 37.5 msec. torque shaft revs., or
- uncommanded movement.

The uncommanded movement monitor detects the following faults:
- overtravel of the feedback PPU synchro with respect to the CSU command position if ≥1.6° (1.59 FPPU input shaft revs.)
- movement in the wrong direction at the feedback PPU when a drive command is present
- movement away from the stopped position at the feedback PPU when there is no drive command present.

If slat runaway is detected in both slat channels an arm signal is exchanged. On receipt of the arm signal, fault action is initiated, and the slat channel in each computer is inhibited for the rest of the



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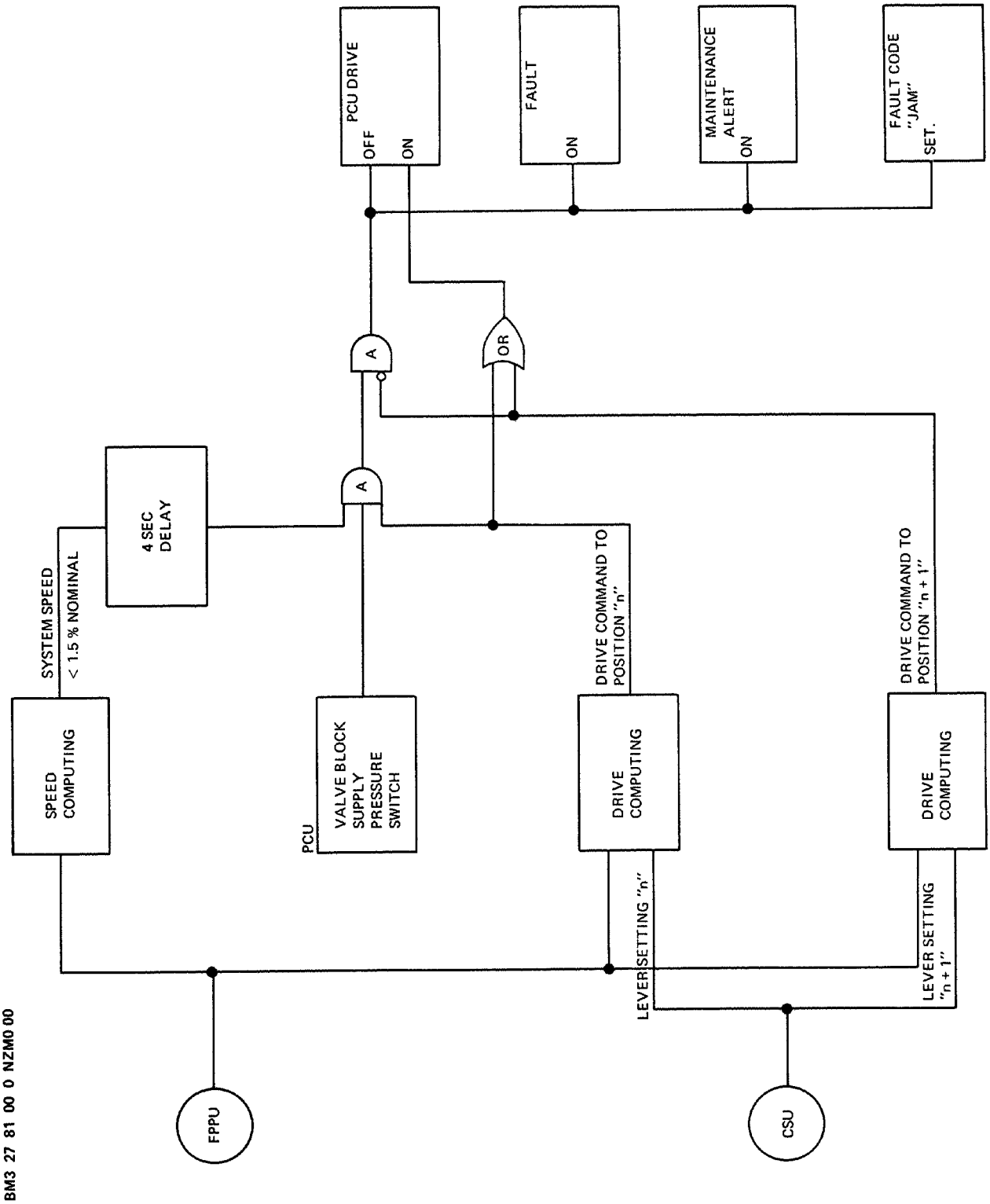
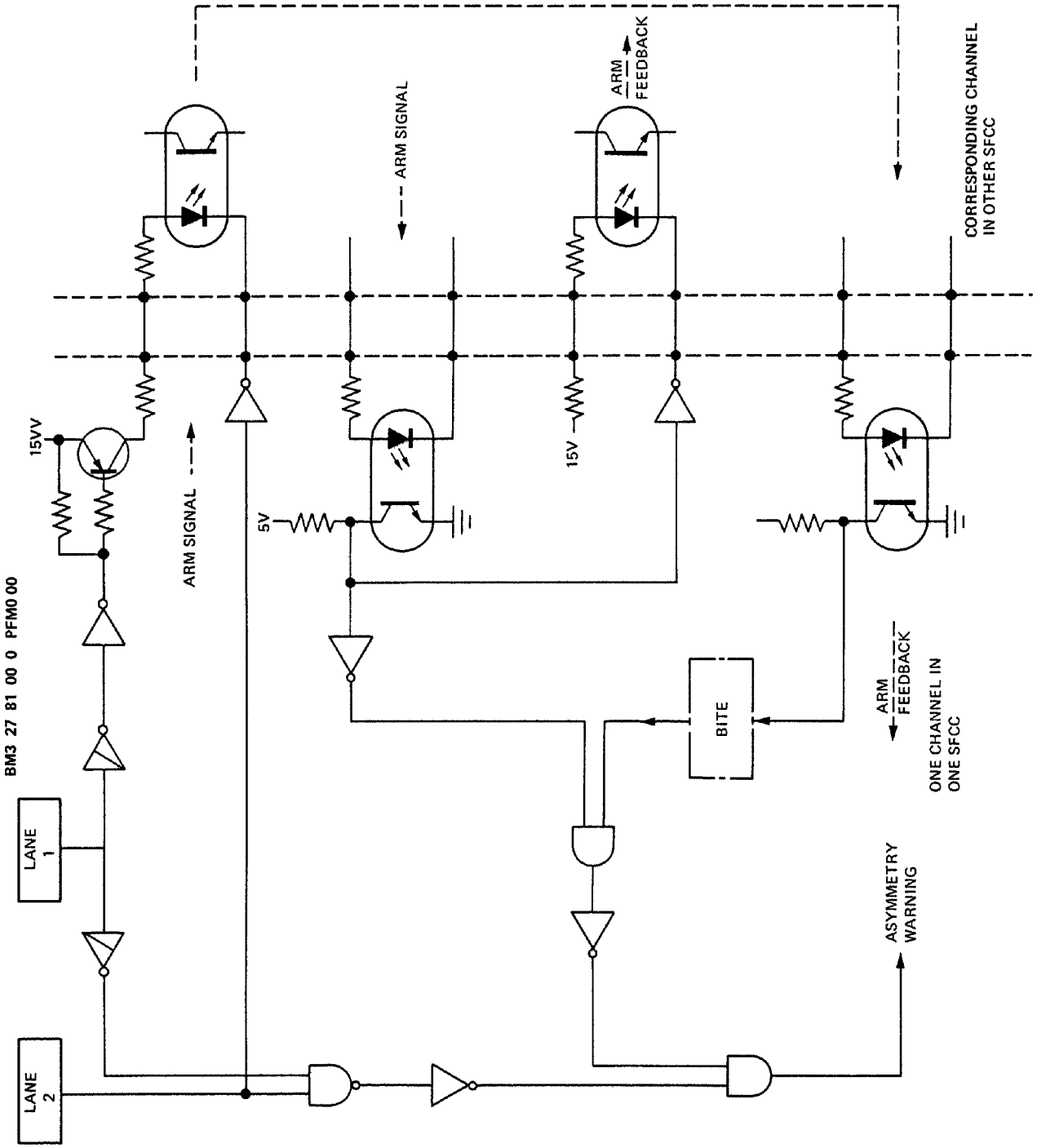
System Jam Detection
Figure 012



Half Speed Detection
Figure 013



Asymmetry Monitor
Figure 014

flight.
If a monitor detects slat runaway but does not receive an arm signal from the other channel a PPU failure is assumed.

(12)Position pick-off monitoring
If only one channel detects asymmetry or runaway, a PPU failure is assumed. When this occurs, the associated motor is stopped, fault action is initiated, and the appropriate PPU fault code is displayed on the SFCC front panel. A WTB "arm" discrete is transmitted to the other channel and the system operates at half speed.

R (13)Kruger Flap monitoring
R The Kruger is monitored by the slat channel and compares command with position as indicated by position switches. A fault warning is generated if the position and command differ. After a new command a 10 second delay is introduced before the warning is given (refer to 27-89-00).

R (14)ARINC 429 input monitoring
R Each channel of the SFCC receives two ARINC 429 inputs from the airdata computers (ADC)
R - computed airspeed (CAS) Label 206 Octal
R - corrected angle of attack (CAOA) Label 241 Octal.
R Each channel receives data from both ADC 1 and ADC 2. The monitor checks parity of the data. If only one set of data is valid this data is used by both channels. If the data from both ADC 1 and ADC 2 is invalid fault action is initiated.
R If during flight no data is received for a period exceeding 10 seconds, fault action is initiated.
R Data from the two ARINC 429 sources is used in the slat channel computing to inhibit retraction of slat surfaces below seventeen degrees if a high angle of attack is detected. This function is provided as long as valid air data information is available from one ARINC 429 source.

R (15)Fault Action
R (a)If a fault condition is detected which prevents motor operation, lane processors 1 and 2 take appropriate action to arrest slat movement and inhibit subsequent operation. If a fault condition is detected which does not prevent motor operation, slat operation is not inhibited.
R (b)Two relay in each computer system, 90CV and 91CV (SFCC1), 92CV and 93CV (SFCC2) provide slat and flap FAULT warnings if a computer is removed.
R (c)The SFCC also generate fault and warning discretes for the ECAM system, slat flap position indicator and SLATS SYS 1 and SYS 2 control switches.
R Detected faults attributed to the slat drive system are defined by the five fail indicators on the SFCC 1 and 2 front panels. When these indicators are set, fault indication discretes are fed to the appropriate BITE DISPLAY maintenance indicator (52CV - SFCC 1, 53CV - SFCC 2) on panel 471VU.
R (d)Fault discretes fed to the ECAM system define the nature of the fault and display the appropriate text page on the warning CRT.

R E. Test

(Ref. Fig. 015)
(1)A full description of the Monitor Control, BITE Test and Fault Indication is given in 27-51-00.

R F. Power Supplies
(Ref. Fig. 016)
(1)During normal operation, electrical power is derived from the following busbars:
- 28 V DC bus 101 PP (SFCC 1, PCU valve block, BLUE)
- 28 V DC bus 110 PP (SFCC 2, PCU valve block, GREEN)
- 26 V AC bus 131 XP (SFCC 1, feedback PPU)
- 26 V AC bus 431 XP (SFCC 2, feedback PPU)

(2)Bus 110 PP consumers are shed if smoke is detected in the flight compartment or main electronic bay (smoke emergency configuration). To allow the flaps and slats to be extended for landing, the dc supply for SFCC 1 and the BLUE valve block is routed through contacts on power transfer relay, 32XC. This relay is energized when the LAND RECOVERY pushbutton on panel 428VU is pressed (ON selected). The normally open contacts provide an alternative 28 V DC power supply from bus 305 PP. Buses 101 PP and 131 XP are also shed in the smoke emergency configuration but no alternative supplies are provided for recovery. Thus when the LAND RECOVERY pushbutton is pressed, the slat system operates through SFCC 1 only, providing slat drive at halfspeed.
(3)Power for the wing-tip brake latches in SFCC 1 and 2 is derived from the primary 28 V DC inputs to the system. The 26 V AC supplies for the asymmetry PPU (Ref. 27-86-00) are derived from the primary 26 V AC inputs to ensure correct co-phasing of the position synchro signals.

G. Folding Nose
(Ref. Fig. 017)
(1)A folding nose section is provided on the inner slat to obtain clearance between the slat leading edge and the engine pylon with the slat in the extended position.
(2)Operation of the folding nose is governed by a double-acting spring strut which is attached at its forward end to the folding nose and at its rear end to the aircraft structure by means of a gimbal arrangement.
(3)On extension of the slats, the spring strut extends until it reaches the limit of its travel. The slat continues moving, causing the spring strut to rotate the folding nose rearwards under the slat.
(4)On slat retraction, the spring strut prevents the folding nose from moving back with the slat until it has rotated forward into its normal position, whereupon slat movement overcomes the spring strut pressure and causes the spring strut to compress, allowing the folding nose to retract with the slat.

H. Leading Edge Shutters
(Ref. Fig. 018)
(Ref. Fig. 019)
(Ref. Fig. 020)
(1)At all slat track and screwjack locations the wing is equipped with

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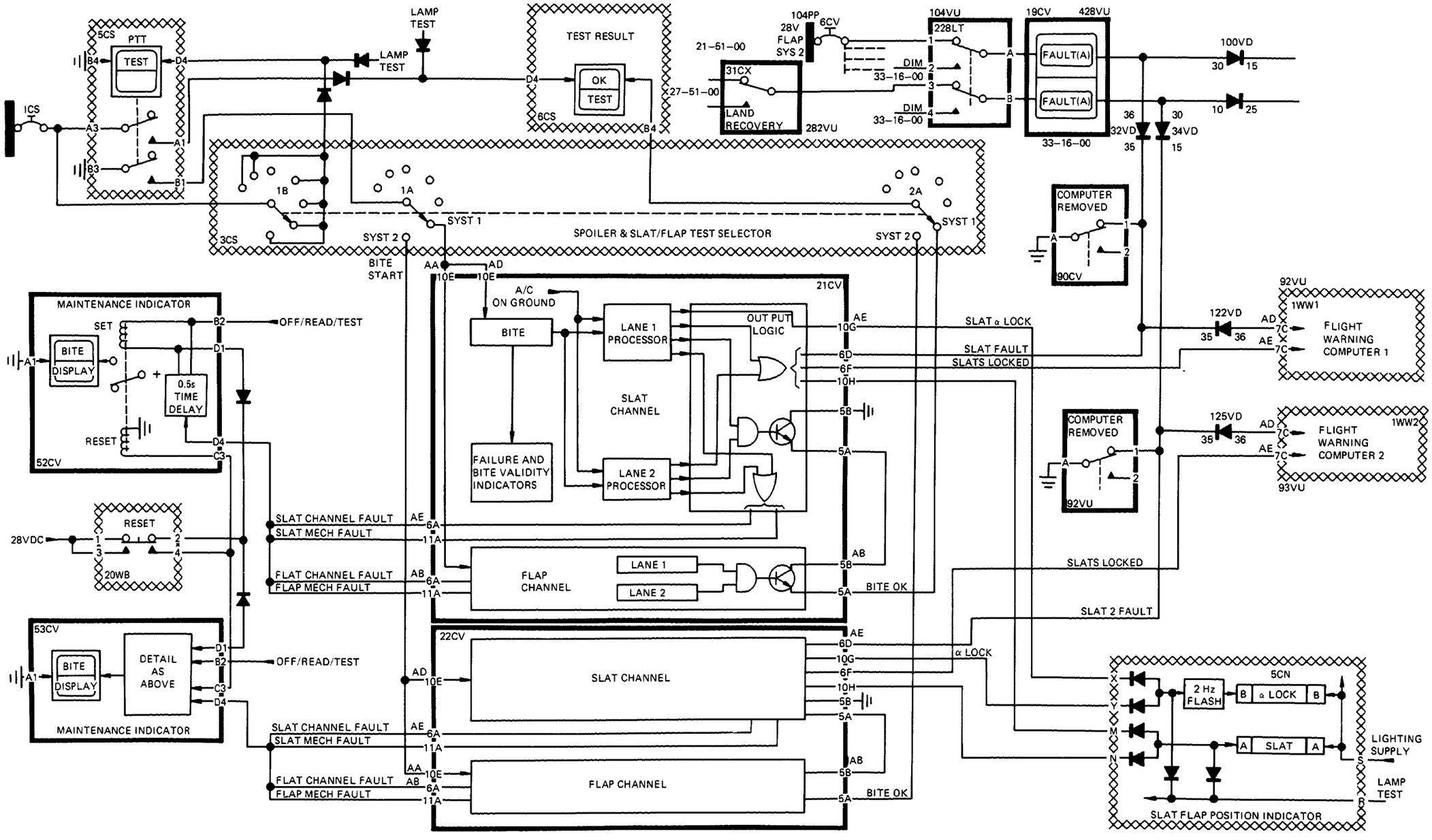
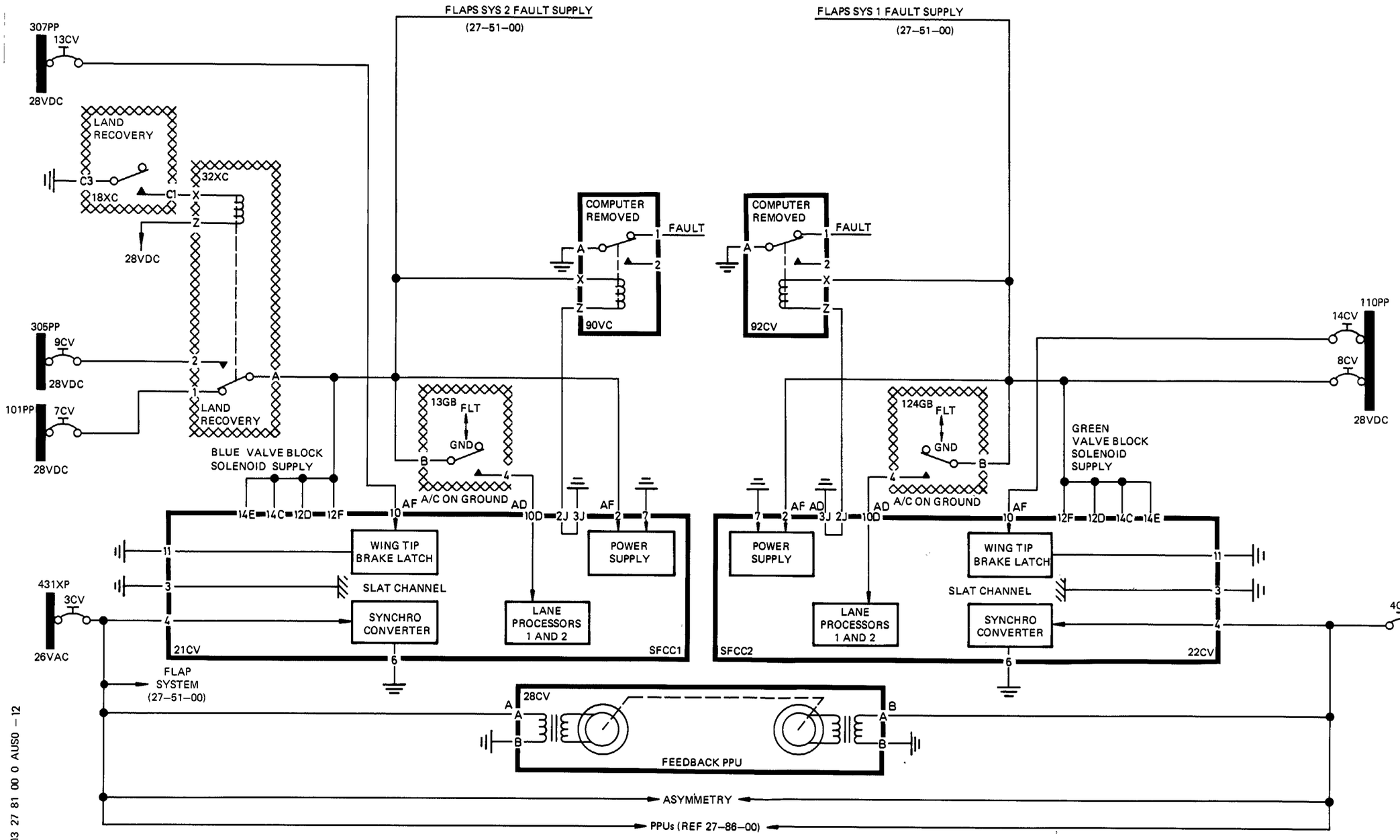


BITE and Fault Indication - Schematic Diagram
Figure 015



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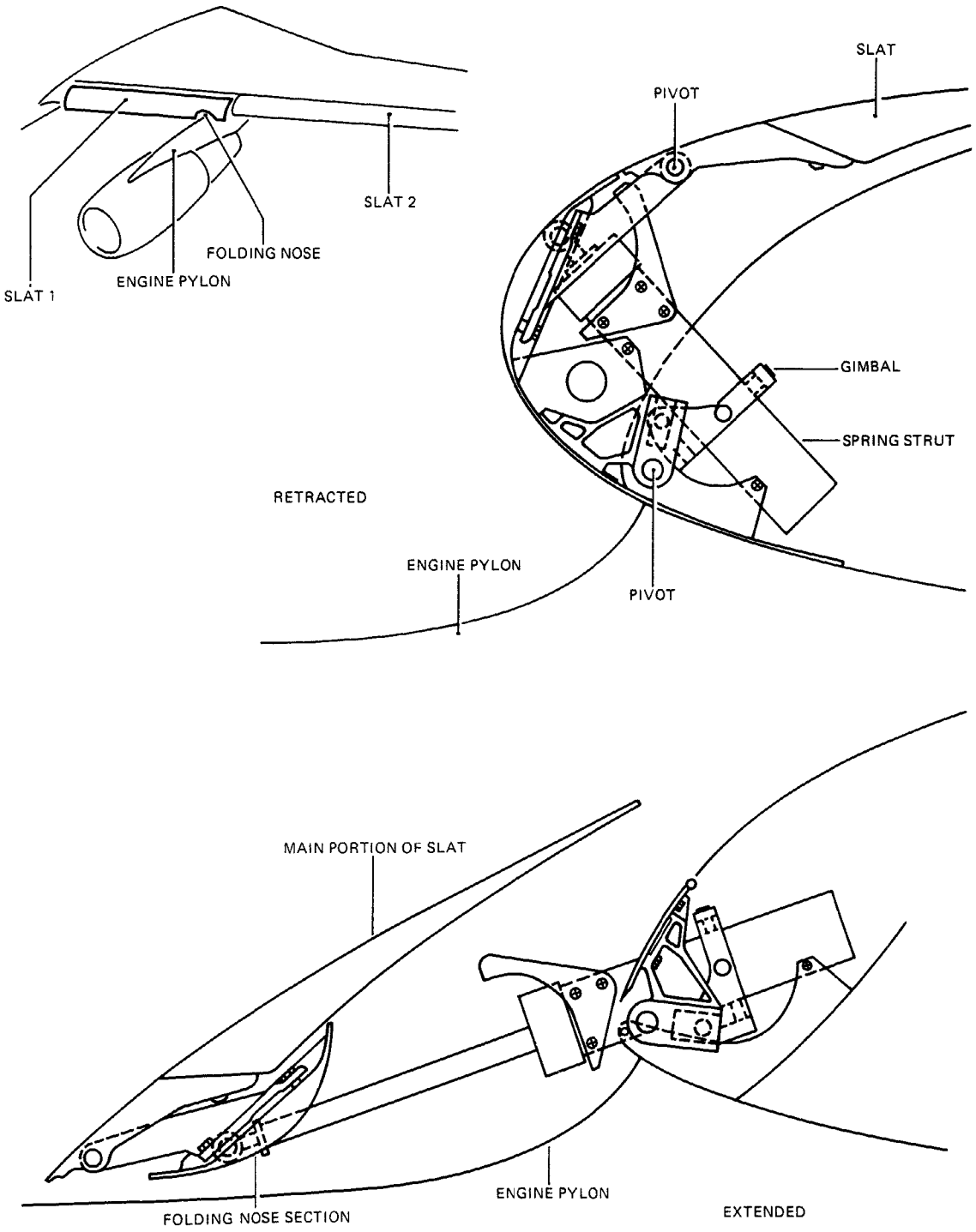
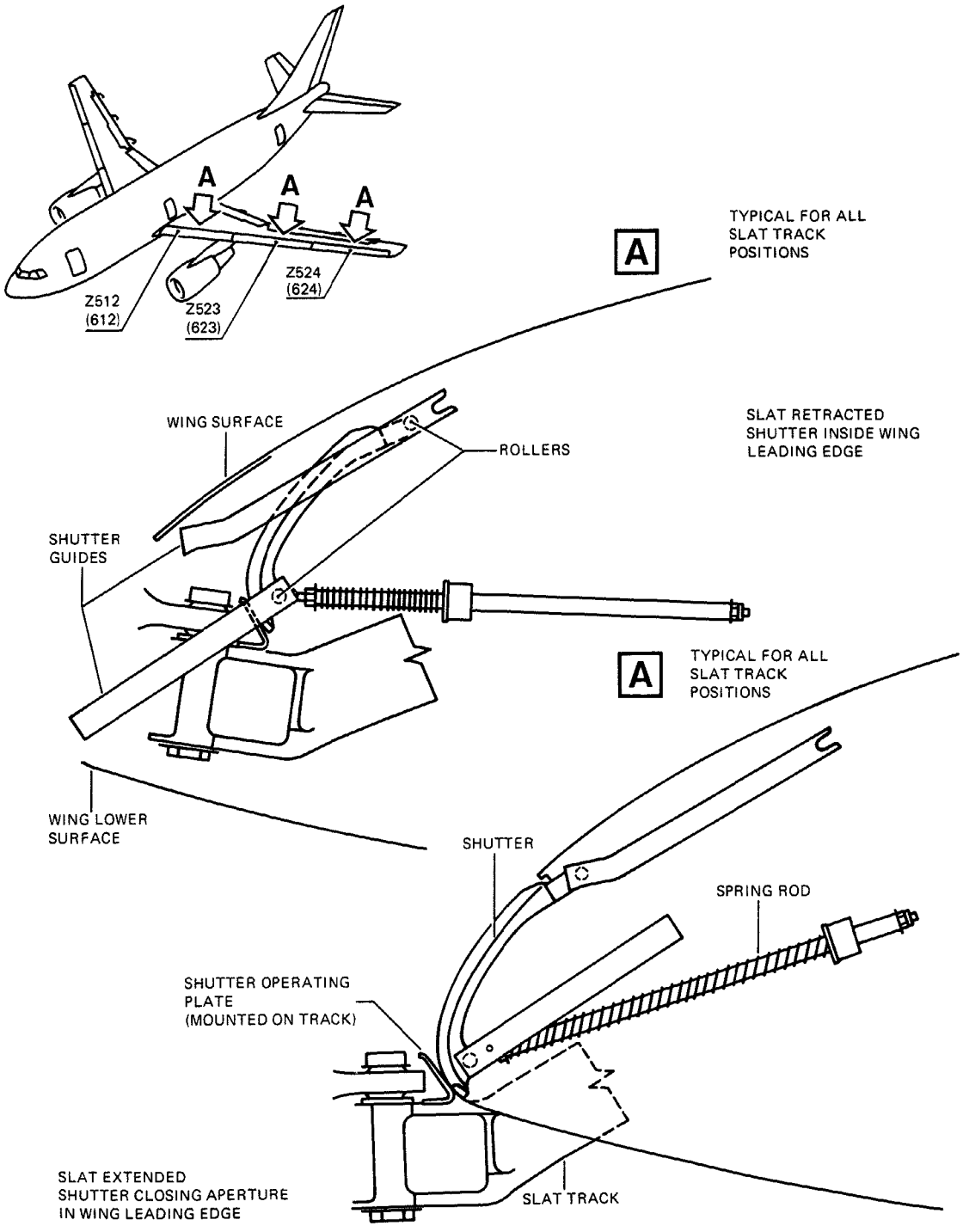
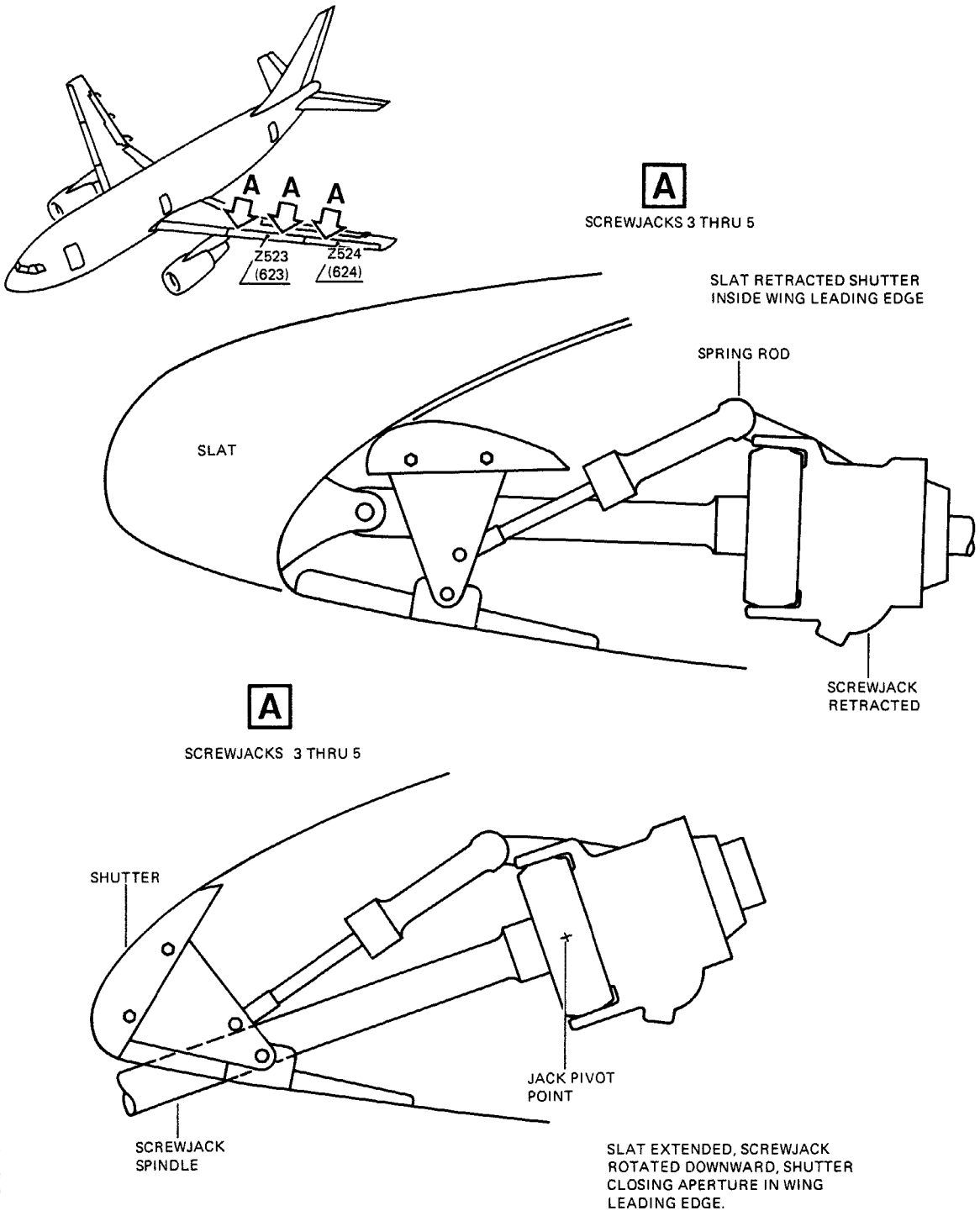
Power Supply Distribution - Schematic Diagram
Figure 016



Folding Nose
Figure 017



Slat Track Shutters
Figure 018



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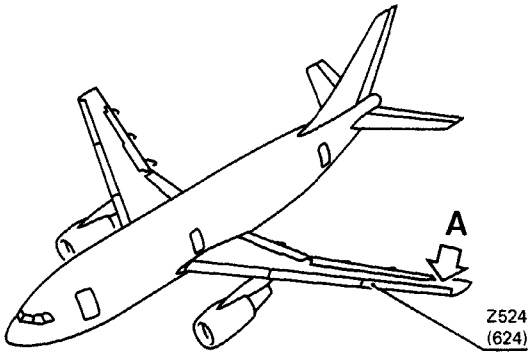
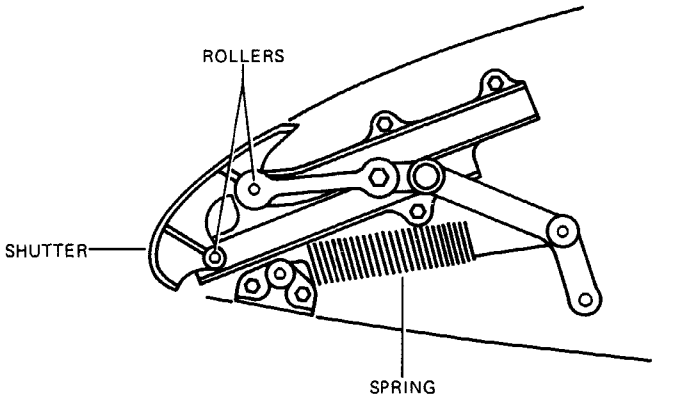
Slat Screwjack Shutters
Figure 019

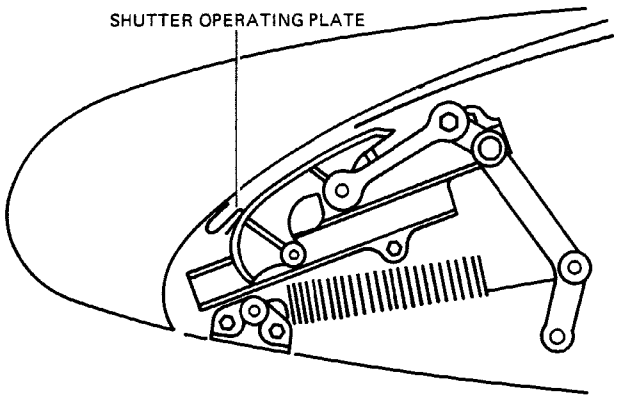


A
SCREWJACK 6 ONLY



SLAT EXTENDED SHUTTER
CLOSING APERTURE IN WING

A
SCREWJACK 6 ONLY



SLAT RETRACTED, SHUTTER INSIDE WING,
HELD AGAINST SPRING PRESSURE BY
OPERATING PLATE ON REAR OF SLAT

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Slat Screwjack 6 Shutter
Figure 020

shutters which close the apertures left in the wing leading edge on slat extension.

(2)The slat track shutters are mounted on rollers in guide tracks on the structure either side of the slat tracks in the wing.
Operation of the track shutters is effected by a plate affixed to the slat track, which when the slat is retracted pushes the shutter into the wing and along its guide tracks against the spring pressure of two spring rods.
On slat extension the track extends, taking the operating plate with it and allowing the shutter to move along its guide tracks under the influence of the spring rods until it reaches a position where it closes the aperture in the wing leading edge.

(3)The slat screwjack shutters are of two kinds;

NOTE : Screwjacks 1 and 2 have no shutters as they are connected directly to the slat tracks and operate thru the track apertures.

(a)Screwjacks 3 thru 5 employ shutters mounted on a pivot and actuated by a spring strut affixed to the screwjack body. On slat extension the screwjack rotates downward due to the geometry of the slat tracks. This movement is transmitted by the spring strut to the shutter mounting which pivots about its lower end positioning the shutter in the aperture.
On retraction the reverse process occurs.

(b)The shutter at screwjack 6 is mounted on rollers running in guide tracks on the wing structure and is actuated by a plate affixed to the rear face of the slat. On slat retraction the plate comes into contact with the shutter, pushing it into the wing along its guide tracks against the resistance of two springs. On extension the slat moves outward allowing the springs to drive the shutter along its guide tracks until it closes the aperture in the wing leading edge.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Slats Alpha Lock Function Test

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Safety Barriers
(2)	Circuit Breaker Safety Clips and Tags

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power

B. Procedure

(Ref. Fig. 501)

(1)Job Set-Up

(a)Position safety barriers.

(b)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM/STICK SHAKER/CAPT.	12FU1	109/A9
21VU	ECAM/STICK SHAKER/F/O	12FU2	109/A10

(c)Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM/FLT WARN MONITOR	24WW	108/B7
21VU	ADS/ADC ! ALPHA PROBES/TEST/CTL	57FL	105/E6
21VU	ADS/ADC ! ALPHA PROBES/TEST/PWR	28FL	105/E7
21VU	ADS/ADC2/26VAC	8FL2	105/E9
21VU	ADS/ADC2/115VAC	9FL2	105/E10
22VU	MIN EQPT BAY SUPPLY/ADS/ADC1/115VAC	9FL1	208/B19

PANEL	SERVICE	IDENT.	LOCATION
22VU	MIN EQPT BAY SUPPLY/ADS/ADC1/26VAC	8FL1	208/B20
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/FLAPS ! SLATS/POS/ECAM	2CN	334/S65
133VU	FLT CTL/FLAPS ! SLATS/POS/IND	1CN	334/S66
133VU	FLT CTL/SLATS/26VAC/SYS2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SLATS/WTB 2	14CV	336/Q64
133VU	FLT CTL/SLATS/WTB 1	13CV	336/Q65
133VU	HYDRAULIC/L/G PROX DET ! RELAYS/SYS2/ FLT/GND	1GB	331/V52
133VU	HYDRAULIC/L/G PROX DET ! RELAYS/SYS1/ FLT/GND	119GB	332/U52

(d)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(e)Make certain that electronics racks ventilation is correct.

(f)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).

R (g)ON SERVO CTL section of panel 428VU, press and release G pushbutton
R switch (OFF legend comes on) to isolate servocontrol system.

(2)Test

WARNING : BEFORE OPERATING SLATS, MAKE CERTAIN THAT THE TRAVEL RANGE OF THE SURFACES IS CLEAR.

CAUTION : WHEN ALPHA PROBE TEST IS SELECTED ON PANEL 470VU THE PROBE ASSOCIATED WITH THE PUSHBUTTON OPERATED IS DRIVEN TO AN ANGLE EQUIVALENT TO +39° ANGLE OF ATTACK. BEFORE MAKING A "TEST" SELECTION ENSURE THAT PROBES ARE NOT OBSTRUCTED.

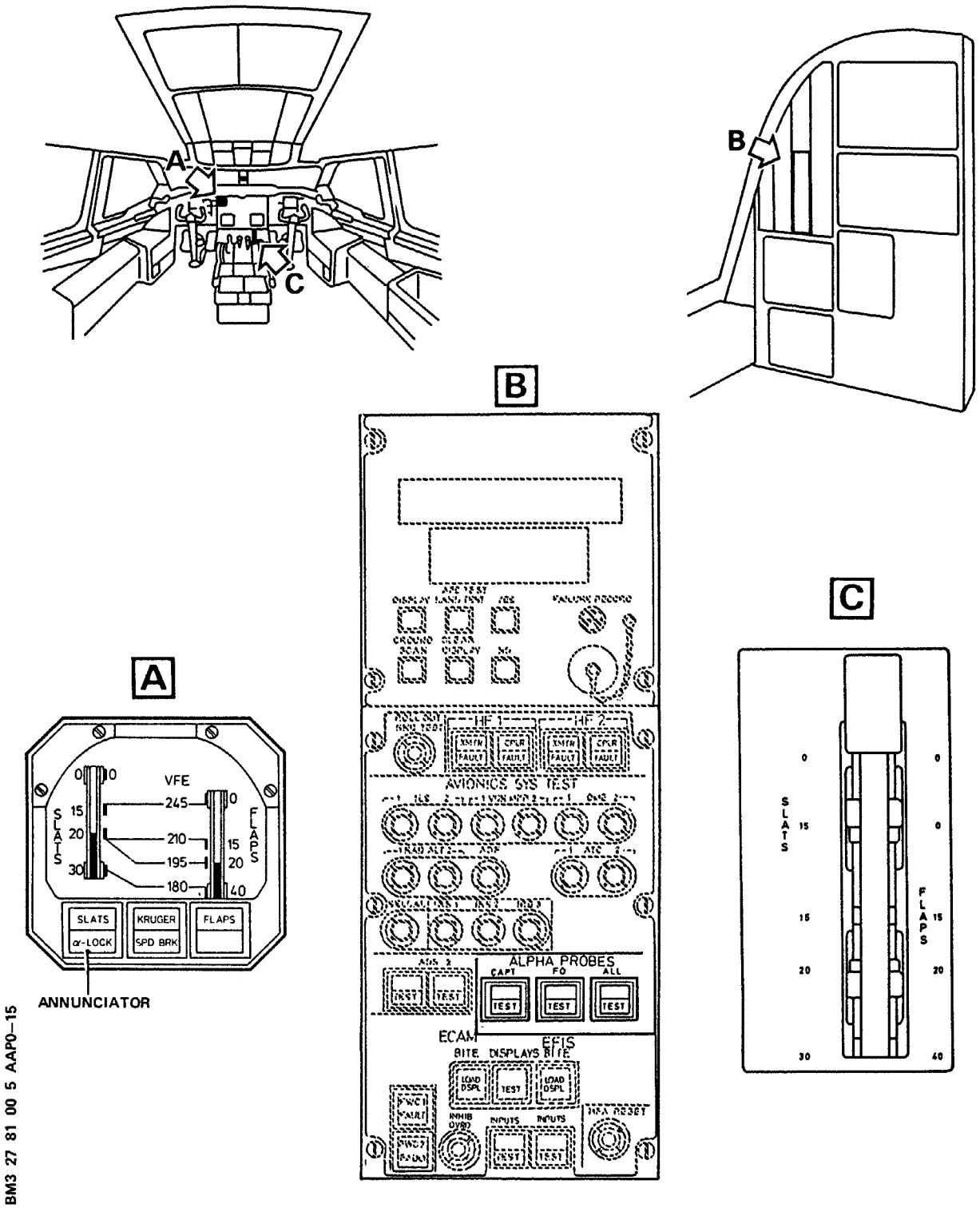
NOTE : As only GREEN hydraulic system is used, slats will operate at approximately half normal speed.

NOTE : A Krueger fault will not affect operation of the slats.
A slat fault affecting both slat systems will cause the krueger to remain in the last commanded position.
A slat fault affecting only one slat system will not affect krueger operation as commands are still generated by the "good" slat system.

ACTION	RESULT
1. On center pedestal, move SLAT/FLAP lever to position 2.	- Slats extend to 15° position - Kruger extends.
2. On maintenance panel 470VU press ALPHA PROBE-CAPT-TEST pushbutton switch.	- TEST legend comes on - Audible warning "Cricket" sounds.
3. On center pedestal, move SLAT/FLAP	- Slats do not move

ACTION	RESULT
lever to position 1.	- Kruger does not move - Alpha-lock annunciator on slat/flap position indicator flashes.
4. On maintenance panel 47OVU press and release ALPHA PROBE-CAPT-TEST pushbutton switch.	- TEST legend goes out - Alpha-lock annunciator goes out (after 10 secs.) - Slats retract - Kruger retracts.
5. On center pedestal, move SLAT/FLAP lever to position 2.	- Slat extend to 15° position Kruger extends.
6. On maintenance panel 47OVU press ALPHA PROBE-F/O-TEST pushbutton switch.	- TEST legend comes on - Audible warning "Cricket" sounds
7. On center pedestal, move SLAT/FLAP lever to position 1.	- Slats do not move - Kruger does not move - Alpha-lock annunciator on slat/flap position indicator flashes.
8. On maintenance panel 47OVU press and release ALPHA-PROBE-F/O-TEST pushbutton switch.	- TEST legend goes out - Alpha-lock annunciator goes out (after 10 secs.) - Slats retract. - Kruger retracts.

(3)Close-Up
(a)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
R (b)On SERVO CTL section of panel 428VU, press G pushbutton switch (OFF legend goes out).
(c)Remove safety clips and tags and close circuit breakers 12FU1, 12FU2.
(d)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(e)Remove safety barriers.



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Slat/Alpha Lock Indicators
Figure 501

FEEDBACK POSITION PICK-OFF UNIT (28CV) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS, OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

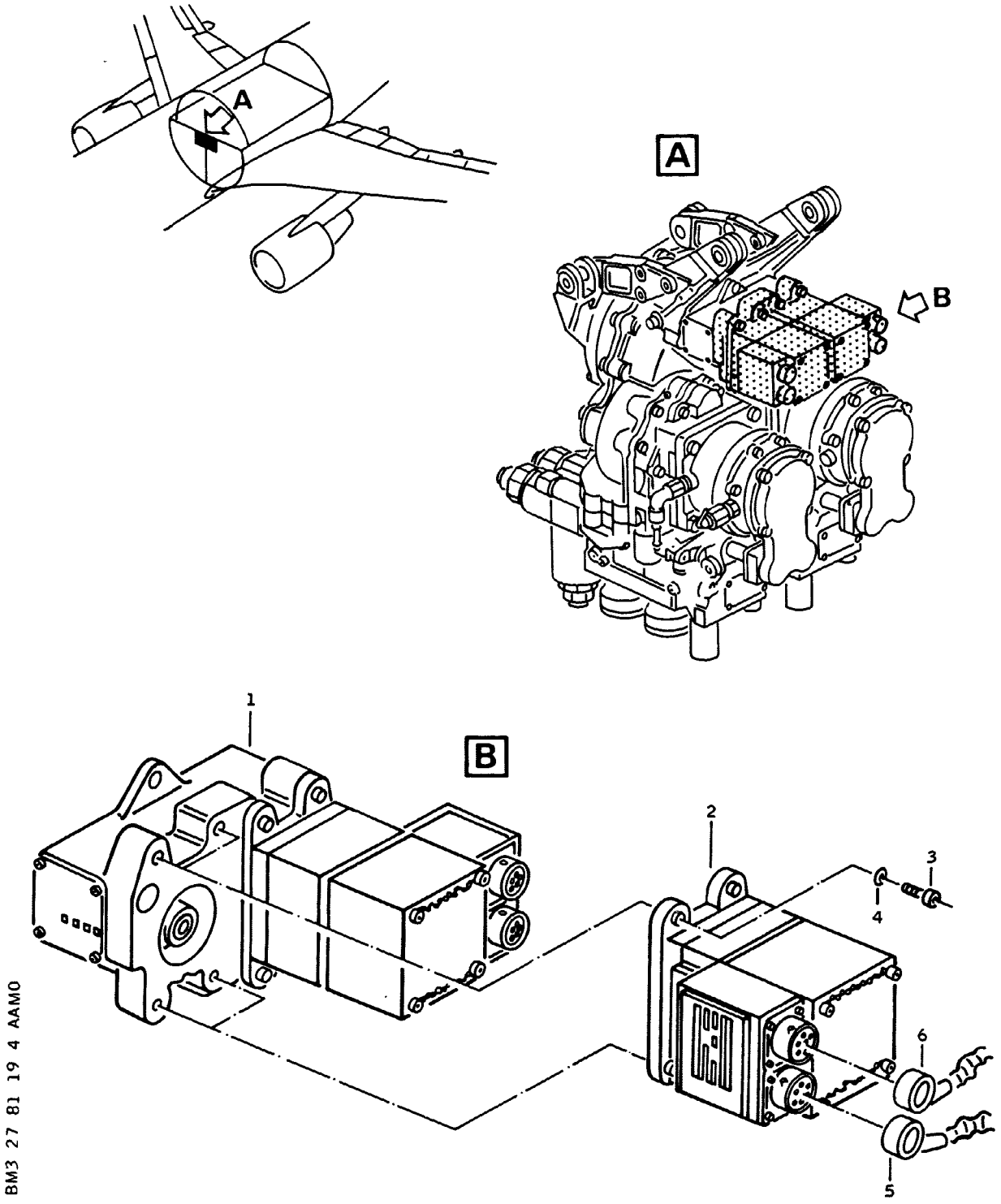
1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.6 m (8 ft. 8 in.)
B.	Torque Wrench, 8.7 to 9.57 Nm (6.4 to 7.0 lbf.ft.)
C.	Ohmmeter 0 to 20 milliohms
D.	Warning Notice - Prohibiting Pressurization of Hydraulic Systems
E.	Safety Barriers
F. Material No. 05-002	Special Materials (Ref. 20-31-00)
G. Material No. 05-054	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)

NOTE : The following procedure describes removal and installation of Feedback Position Pick-off Unit (FPPU) set at mechanical and electrical zero, this being the condition new FPPUs are in when delivered. Removal/installation of FPPUs is possible with the system at positions other than zero, due to the FPPUs self-locking facility, provided that the same FPPU is refitted and no movement of the system transmission has occurred between removal and installation of FPPU.



Feedback Position Pick-off Unit
Figure 401

A. Job Set-Up
(1)Position safety barriers.
(2)Open main gear main doors (Ref. 32-12-11, P. Block 301).
(3)Position access platform.
(4)Make certain that slats are in retracted position (Ref. 27-80-00, P. Block 301).
(5)Display a warning notice prohibiting pressurization of the hydraulic systems.
(6)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

CAUTION : FEEDBACK POSITION PICK-OFF UNIT MUST NOT BE REMOVED IF PRESSURE OFF BRAKES HAVE BEEN REMOVED FROM POWER CONTROL UNIT.

B. Removal
(1)Disconnect electrical connectors (5),(6).
(2)Remove screws (3) and washers (4).
(3)Carefully remove feedback position pick-off unit (2) from gearbox (1).
(4)Fit blanking caps to electrical plugs, receptacles and exposed holes.
(5)Fit a red tie wrap behind the locking plate to prevent retraction of locking plate.

C. Preparation for Installation
(1)Prepare a small quantity of a mixture comprising 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. 05-054).
NOTE : Proportions quoted are by weight.
(2)Apply a quantity of a mixture prepared above to area free of anodic finish on FPPU and intermediate gearbox mating surfaces.

D. Installation
CAUTION : A NEW FPPU IS DELIVERED, LOCKED IN THE MECHANICAL AND ELECTRICAL ZERO POSITION. THE SYSTEM MUST ALSO BE IN ITS ZERO POSITION BEFORE THE FPPU IS INSTALLED.
(1)Remove blanking caps and red tie wrap.
(2)Position feedback position pick-off unit (2) to intermediate gearbox.
NOTE : Fitting the FPPU requires the simultaneous alignment of the housing keyway, the drive shaft splines, the locating dowel and the securing screw holes, but not more than moderate hand pressure should be required. A slight additional pressure is required to depress the FPPU locking plate and engage the drive fully.
(3)Coat screw threads with anti-corrosion compound (Material No. 05-002).

(4)Install screws (3) and washers (4). TORQUE screws to between 8.7 and 9.57 Nm (6.4 and 7.0 lbf.ft.).
(5)Measure electrical resistance between FPPU and main bonding point of PCU. Resistance must not exceed 20 milliohms.
(6)Connect electrical connectors (5),(6).

E. Test
(1)Remove safety clips and tags and close circuit breakers 3CV, 4CV, 7CV, 8CV and 9CV.
(2)Remove warning notice prohibiting pressurization of the hydraulic systems.
(3)Carry out operational test of slat system (Ref. 27-84-00, P. Block 501).

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(4)Remove safety barriers.

FOLDING NOSE - LH, RH - REMOVAL/INSTALLATION

WARNING: LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE CERTAIN TRAVEL RANGES ARE CLEAR.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 3 m (10 ft)
B.	Circuit Breaker Safety Clips and Tags
C. Material No. 09-013	Sealants (Ref. 20-31-00)
D. Material No. 09-015	Sealants (Ref. 20-31-00)
E.	Lockwire, Corrosion Resistant Steel, Dia 0.8 mm (0.032 in)
Referenced Procedures	
- 21-20-00, P. Block 301	Distribution
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting
- 27-81-34, P. Block 401	Spring Rod
- 29-10-00, P. Block 301	Main Hydraulic Power

2. Procedure

(Ref. Fig. 401)
(Ref. Fig. 402)

A. Job Set-Up
(1)Position access platform.
(2)Draw a temporary rigging line on slat in alignment with lower edge of folding nose, as shown in the Figure.
(3)Draw a temporary line on slat rubbing strip at the point where the slat trailing edge meets the rubbing strip.
(4)Partially extend slats (gate 2) (Ref. 27-80-00, P. Block 301).
(5)Open, safety and tag the following circuit breakers:

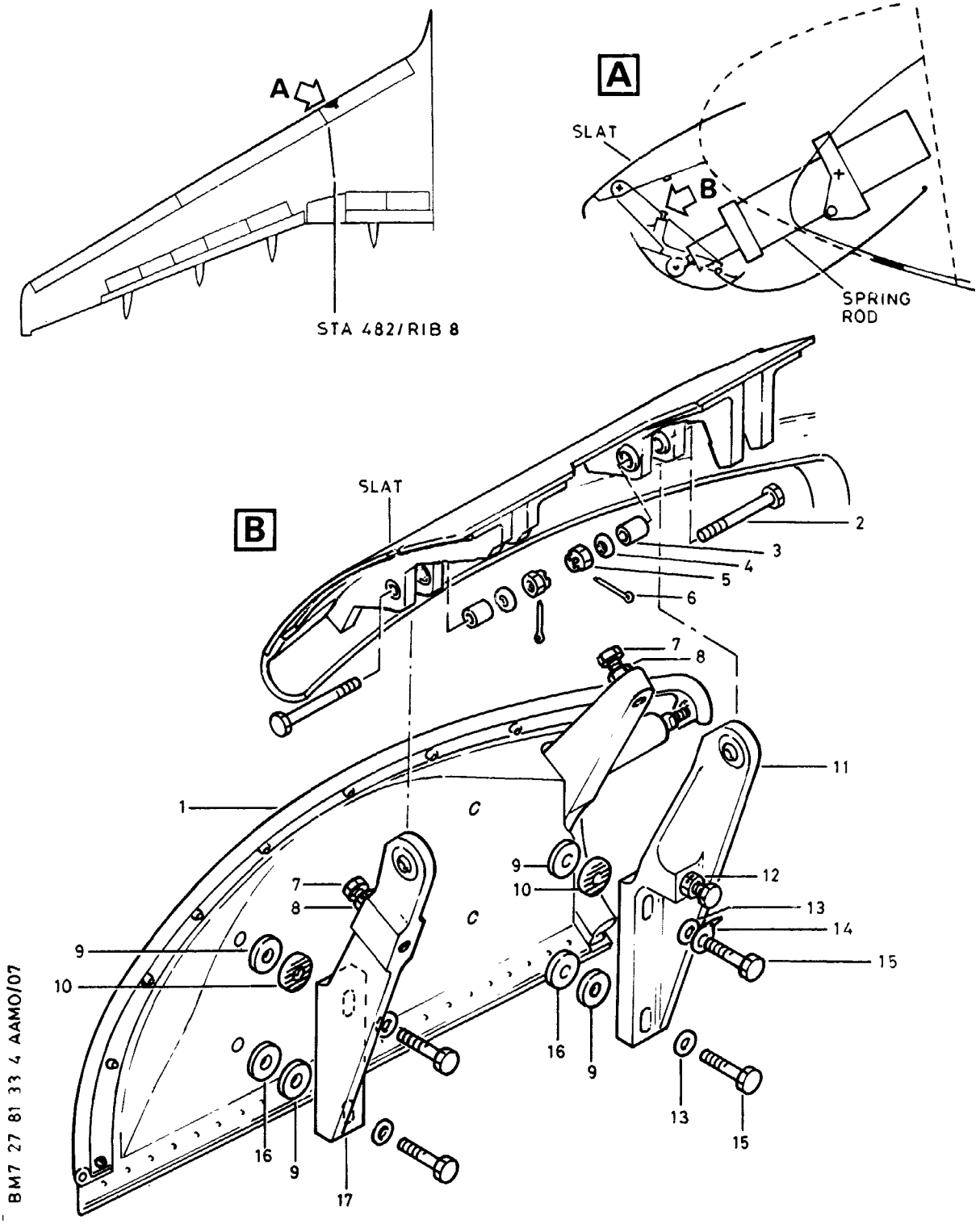
PANEL	SERVICE	IDENT.	LOCATION
133VY	SLATS/SYS 2/26 VAC	4CV	335/R64
133VU	SLATS/SYS 2/SFCC & CTL SUPPLY/NORM	8CV	333/T64
133VU	SLATS/SYS 1/SFCC & CTL SUPPLY/LAND RECOVERY	9CV	335/R66
133VU	SLATS/SYS 1/SFCC & CTL SUPPLY/NORM	7CV	333/T63
133VU	SLATS/SYS 1/26 VAC	3CV	335/R65

PANEL	SERVICE	IDENT.	LOCATION
133VU	KRUEGER	45CV	333/T61

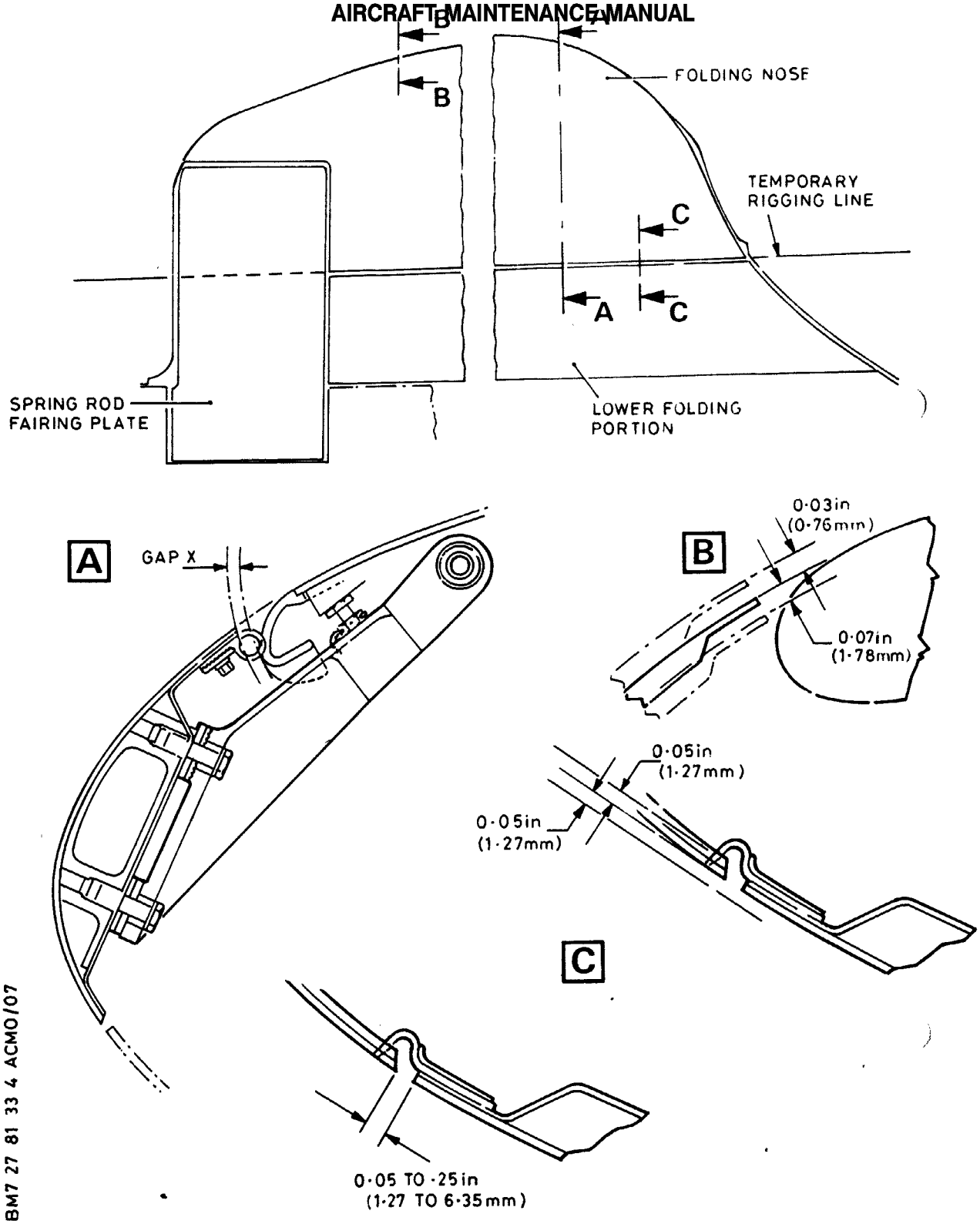
(6)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(7)Disconnect spring rod from folding nose (Ref. 27-81-34, P. Block 401).

B. Removal
(1)Manually support folding nose (1) then remove cotter-pins (6), nuts (5), washers (4), bolts (2) and folding nose (1). Collect bushes (3).
(2)If a replacement folding nose (1) is to be installed proceed as follows:
(a)Cut and remove lockwire from nuts (8). Loosen nuts and screw stop bolts (7) fully in.
(b)Note position and number of laminated washers (9).
(c)Cut and remove lockwire from nut (12).
(d)Cut and remove lockwire from bolts (15) then remove bolts, attachment (14), washers (13), hinge assemblies (11,17), washers (16), serrated washers (10) and laminated washers (9).

C. Preparation for Installation of Replacement Folding Nose
(1)Apply Material No. 09-015 to bolts (15).
(2)Install hinges (11,17) on folding nose (1) using laminated washers (9), in numbers and positions as noted in Removal step (2), serrated washers (10), washers (13,16), attachment (14) and bolts (15). Leave bolts hand tight.
(3)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks are ventilated (Ref. 21-20-00, P. Block 301).
(4)On panel 133VU, remove safety clips and tags and close circuit breakers 4CV,8CV,9CV,7CV and 3CV.
(5)On panel 9VU, place SLATS/FLAPS control lever in gate 1.
(6)Slowly pressurize hydraulic system to retract slats until slat trailing edge is within 200 to 300 mm (8 to 12 in) of temporary line on rubbing strip. Shut down hydraulic ground power cart then depressurize the hydraulic system (Ref. 29-10-00, P. Block 301).
(7)On panel 133VU, open, safety and tag circuit breakers 4CV,8CV,9CV,7CV and 3CV
(8)On panel 9VU, place SLATS/FLAPS control lever in gate 2.
(9)Position folding nose (1) on slat and secure with bushes (3), bolts (2), washers (4) and nuts (5). Do not safety with cotter-pins (6) at this stage.
(10)Hold folding nose (1) to slat profile and align with temporary rigging mark on slat using slotted holes and serrated washers (10). Mark position of serrated washers on hinge assemblies (11,17).
(11)Hold folding nose (1) to slat profile and check into and out-of-wind tolerances. If necessary adjust laminated washers (9), beginning with inboard hinge assembly (11), then screw out stop bolts (7) to contact slat structure.
(12)Make certain that Gap X is between 2.5 and 7.5 mm (0.10 and 0.30 in). If necessary, adjust on bolts (15) and slotted holes to obtain this dimension.



Folding Nose - Installation
Figure 401



Into and Out-of-Wind Tolerances
and Gap Clearances
Figure 402

(13)Remove nuts (5), washers (4), bolts (2), and folding nose (1). Collect bushes (3). Make certain serrated washers (10) are correctly engaged on hinge assemblies (11,17). Tighten bolts (15) and safety with lockwire.

D. Installation

(1)Position folding nose (1) on slat and secure with bushes (3), bolts (2), washers (4) and nuts (5). Safety with cotter-pins (6).
(2)Apply a fillet of Material No. 09-013 to nuts (5) and heads of bolts (2).
(3)Connect spring rod to folding nose (1) and install spring rod fairing plate (Ref. 27-81-34, P. Block 401).

WARNING : SLATS MAY EXTEND TO 16 DEG POSITION WHEN HYDRAULIC SYSTEM IS PRESSURIZED.

(4)Pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).

(5)On panel 133VU, remove safety clips and tags and close circuit breakers 4CV,8CV,9CV,7CV and 3CV.
(6)Fully retract the slats (Ref. 27-80-00, P. Block 301).
(7)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(8)On panel 133VU, open, safety and tag circuit breakers 4CV,8CV,9CV,7CV and 3CV.
(9)Make certain that gap clearance and all into and out-of-wind tolerances are correct.
(10)If necessary, extend slats and adjust on inboard stop bolt (7).
(11)Safety nuts (8) with lockwire.
(12)Safety nut (12) to attachment (14) with lockwire.

E. Preparation for Test

(1)Pressurize the Green Hydraulic system (Ref. 29-10-00, P. Block 301).
(2)On panel 133VU, remove safety clips and tags and close circuit breakers 4CV,8CV,9CV,7CV and 3CV.

F. Test

(1)Perform the following:

ACTION	RESULT
Extend the slats (Ref. 27-80-00, P. Block 301) During slat extension make certain folding nose operates smoothly	Slats extend fully
Retract the slats (Ref. 27-80-00, P. Block 301)	Slats retract fully

ACTION	RESULT
During slat retraction make certain folding nose operates smoothly and closes correctly	

G. Close-Up
(1)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(2)De-energize the aircraft electrical system (Ref. 24-41-00, P. Block 301).
(3)Remove safety clip and tag and close circuit breaker 45CV.
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(5)Remove access platform.

SPRING ROD - FOLDING NOSE- REMOVAL/INSTALLATION

WARNING : LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROL SURFACES - MAKE CERTAIN TRAVEL RANGE IS CLEAR.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices - Prohibiting the Use of Slats/Flaps Systems
B.	Lockwire, Corrosion Resistant Steel, Dia 0.8 mm (0.032 in)
C.	Access Platform 3 m (10 ft)
D.	Circuit Breaker Safety Clips and Tags
E. Material No. 04-004	Common Greases (Ref.20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

2. Procedure

(Ref. Fig. 401)
(Ref. Fig. 402)

A. Job Set-Up

(1)Position warning notices.
(2)Position access platform.
(3)Remove bolts (15) and detach panel (14) from wing leading edge.

B. Removal

(1)Remove bolts (19) and remove fairing plate (17) from brackets (16). Retain and record position and number of washers (18).
(2)Open, safety and tag the following circuit breakers:

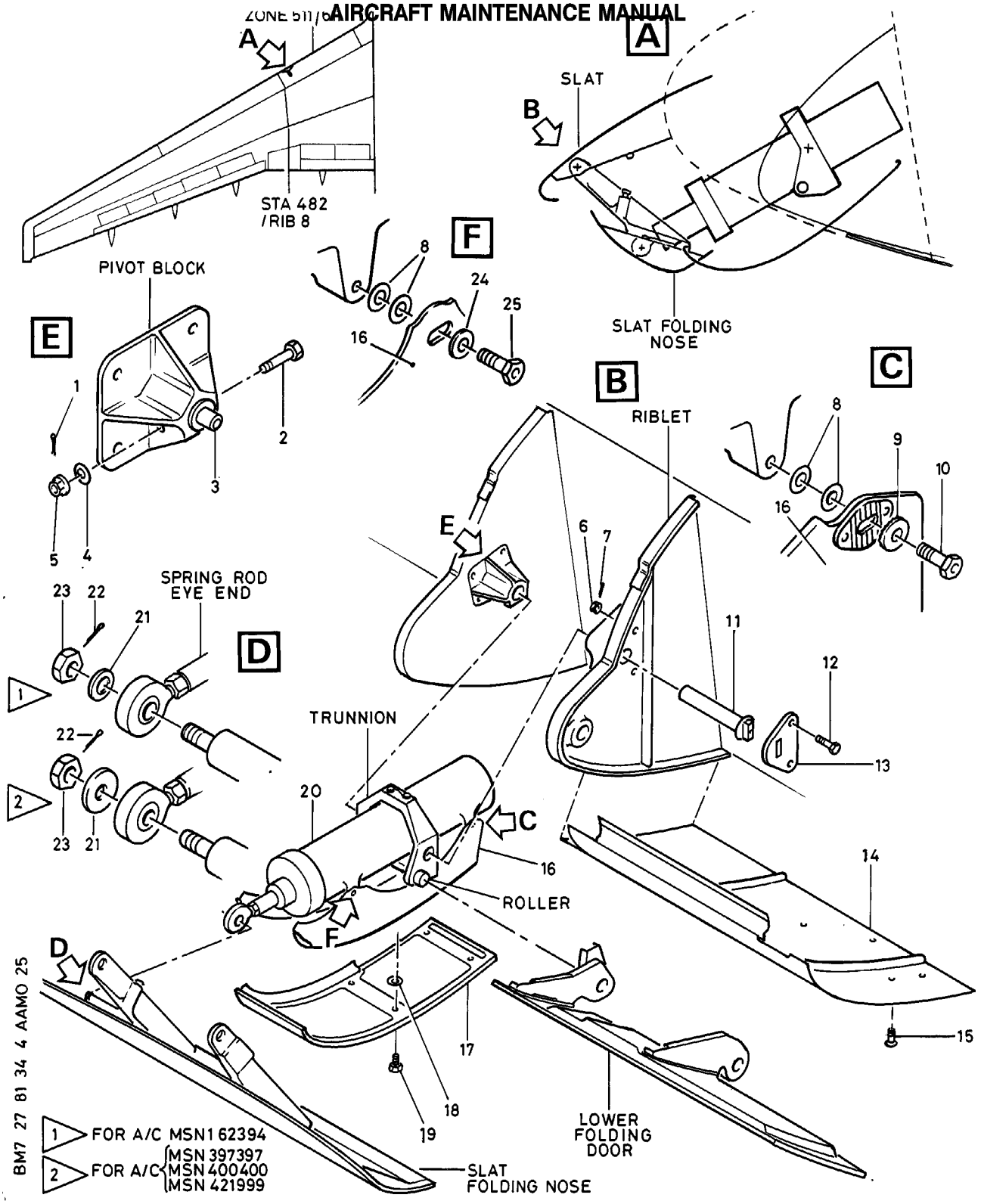
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 2/26 VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 2/SFCC & CTL SUPPLY NORM	6CV	331/V61
133VU	FLT CTL/FLAPS/SYS 1/SFCC & CTL SUPPLY NORM	5CV	332/U61
133VU	FLT CTL/FLAPS/SYS 1/SFCC & CTL SUPPLY/ LAND RECOVERY	10CV	335/R67

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 1/26 VAC	1CV	335/R61
133VU	FLT CTL/SLATS/WTB 1	13CV	336/Q65
133VU	FLT CTL/SLATS/WTB 2	14CV	336/Q64
133VU	FLT CTL/KRUGER	45CV	333/T61

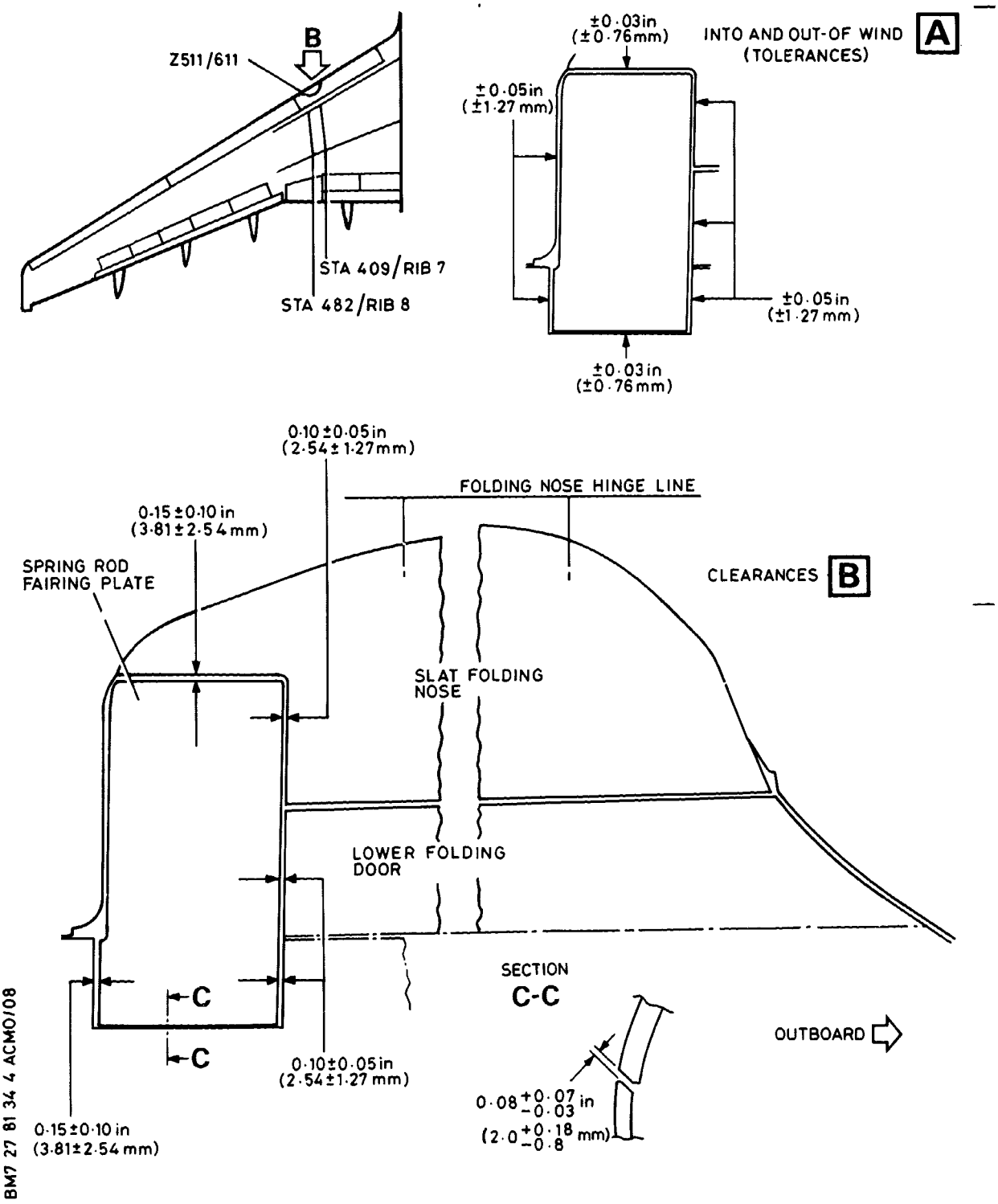
(3)Place slat/flap control lever in gate 2 and partially extend slats (Ref. 27-80-00, P. Block 301).
(4)On panel 133VU, open, safety and tag SLATS circuit breakers 3CV (335/R65), 4CV(335/R64), 7CV(333/T63), 8CV(333/T64) and 9CV (335/R66).
(5)Depressurize hydraulic system (Ref.29-10-00, P. Block 301).
(6)Remove cotter-pin (22), nut (23) and washer (21), and separate spring rod (20) from slat folding nose.
(7)Manually support spring rod (20).
(8)Remove cotter-pins (7), nuts (6) and bolts (12), and remove pin retainer (13). Withdraw pin (11) from spring rod trunnion.
(9)Remove cotter-pin (1), nut (5), washer (4) and bolt (2), slide pin (3) clear of spring rod trunnion.
(10)Disengage roller from lower folding door and remove spring rod (20), complete with trunnion and brackets (16).
(11)Temporarily secure slat folding nose and lower folding door in folded position.
(12)If a replacement spring rod (20), is to be installed, cut lockwire and remove bolts (10,25), washers (24), serrated washers (9), brackets (16) and washers (8). Record number of washers (8) at each position.

C. Preparation of Replacement Component
(1)Install brackets (16) on new spring rod (20) with washers (8) in positions recorded in step B (12), washers (24), serrated washers (9) and bolts (10,25). Position brackets with bolts in center of slotted holes. Tighten bolts, but do not safety at this stage.

D. Installation
(1)Release lower folding door, then position spring rod (20) and trunnion between pivot block and riblet and engage roller in lower folding door.
(2)Lubricate pins (3, 11) with a thin smear of grease (Material No.04-004).
(3)Insert pin (3) into trunnion, and secure with bolt (2), washer (4) and nut (5). Safety with cotter-pin (1).
(4)Install pin (11). Position pin retainer (13) and secure with bolts (12) and nuts (6). Safety with cotter-pins (7).
(5)Release slat folding nose, then connect spring rod eye-end to folding nose and secure with washer (21) and nut (23). Safety with cotter-pin (22).
(6)Remove safety clips and tags, and close SLATS circuit breakers 3CV,4CV, 7CV,8CV and 9CV.
(7)Fully retract slats (Ref.27-80-00, P. Block 301).
(8)Depressurize hydraulic system (Ref.29-10-00, P. Block 301).



Spring Rod - Installation
Figure 401



Into and Out-of-Wing Limits
Figure 402

(9)On panel 133VU, open, safety and tag SLATS circuit breakers 3CV,4CV,7CV, 8CV and 9CV.
(10)Install fairing plate (17), washers (18), in positions noted in step B. (1), and bolts (19).
(11)Install panel (14) and bolts (15).
(12)Make certain that gaps and into and out-of-wind tolerances between fairing plate (17) and surrounding structure are correct.
(13)Remove fairing plate (17). If necessary, adjust position of brackets (16), using slotted holes and washers (8). Tighten bolts (10,25) and safety with lockwire.
(14)Install fairing plate (17) with washers (18) and bolts (19). Recheck into and out-of-wind tolerances. If necessary, adjust with washers (18) to obtain correct dimensions.
(15)On panel 133VU, remove safety clips and tags, and close SLATS circuit breakers 3CV,4CV,7CV,8CV and 9CV.

E. Test
(1)Perform the following:

ACTION	RESULT
Fully extend slats (Ref.27-80-00, P. Block 301) During slat extension, make certain slat folding nose and lower folding door operate smoothly, without fouling	- slats extend fully
Fully retract slats (Ref.27-80-00, P. Block 301) During slat retraction, make certain slat folding nose and lower folding door operate smoothly, without fouling	- slats retract fully

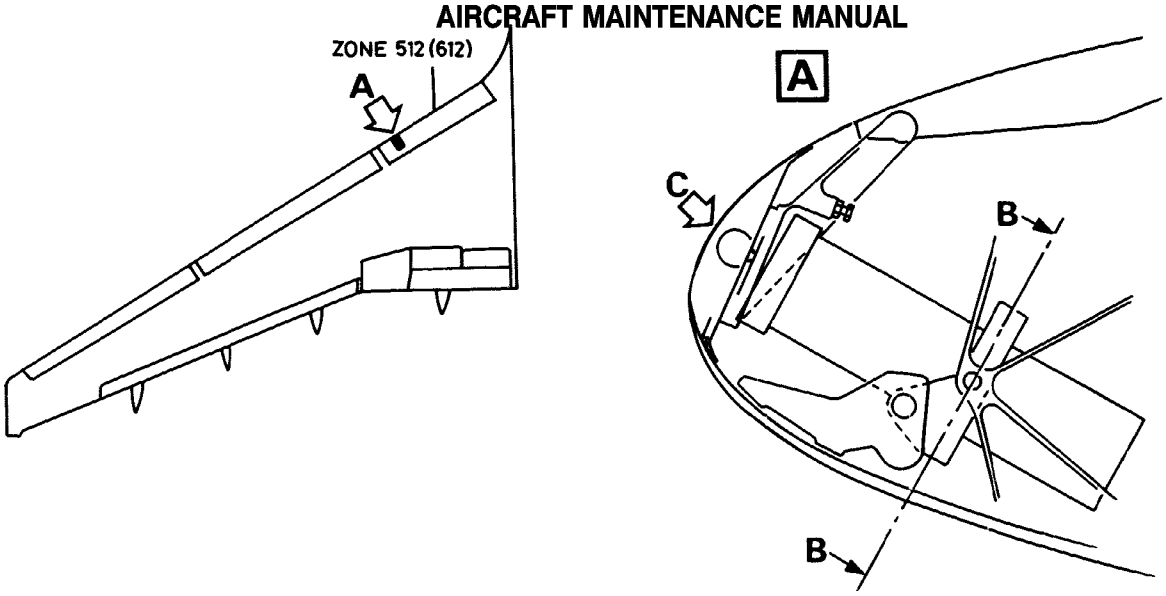
F. Close-Up
(1)Depressurize hydraulic system (Ref.29-10-00, P. Block 301).
(2)On panel 133VU, remove safety clips and tags and close circuit breakers 1CV,10CV,5CV,6CV,2CV 13CV, 14CV and 45CV.
(3)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(4)Remove warning notices.
(5)Remove access platform.
(6)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

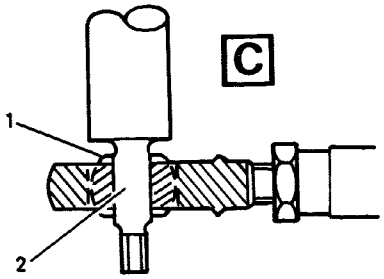
1. Reason for the Job

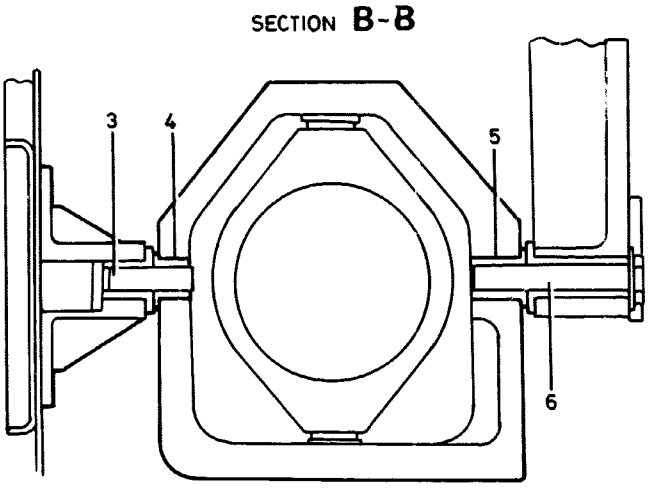
A. Check of fits and clearances after removal.

Table of Fits and Clearances
(Ref. Fig. 601)

Detail and Item No.	Original Mfg Limits: Dimension inches (Millimeters) Min.	Original Mfg Limits: Dimension inches (Millimeters) Max.	Original Mfg Limits: Assy. Clearance Inch. (Milli.) Min.	Original Mfg Limits: Assy. Clearance Inch. (Milli.) Max.	In-Service Wear Limits: Dimension Limits Inch. (Milli.) Min.	In-Service Wear Limits: Dimension Limits Inch. (Milli.) Max.	In-Service Wear Limits: Max. Allow. clear in. (mm)
OD2	0.3737 (9.492)	0.3743 (9.507)			0.3725 (9.462)		
			0.0002 (0.005)	0.0013 (0.033)			0.0040 (0.102)
ID1	0.3745 (9.512)	0.3750 (9.525)				0.3765 (9.563)	
OD3 6	0.3744 (9.510)	0.3748 (9.520)			0.3730 (9.474)		
			0.0008 (0.020)	0.0021 (0.053)			0.0050 (0.127)
ID4 5	0.3756 (9.540)	0.3765 (9.563)				0.3780 (9.601)	







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Spring Rod - Attachment Details
Figure 601

SEALING SHUTTERS, TRACK 2 - REMOVAL/INSTALLATION

WARNING : LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE CERTAIN GROUND SAFETIES AND NOTICES ARE IN POSITION.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4m (13 ft)
B.	Warning Notices - Prohibiting Operation of Flaps and Slats
C.	Circuit Breaker Safety Clips and Tags

ITEM	DESIGNATION
D. Material No. 04-017	Common Greases (Ref. 20-31-00)
E. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

2. Procedure

R (Ref. Fig. 401)
R (Ref. Fig. 402)

A. Job Set-Up
(1)Fully extend slats (Ref. 27-80-00, P. Block 301).
(2)Display warning notices.
(3)Make certain that Blue and Green hydraulic systems are depressurized (Ref. 29-10-00, P. Block 301).
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC LAND RECOVERY SUPPLY/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26 VAC/SYS 2	4CV	335/R64

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 1/26 VAC	1CV	335/R61
133VU	FLT CTL/SFCC LAND RECOVERY SUPPLY/FLAPS/ SYS 1	10CV	335/R67
133VU	FLT CTL/SFCC NORM SUPPLY/FLATS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLATS/SYS 2	6CV	331/V61
133VU	FLT CTL/FLAPS/SYS 2/26 VAC	2CV	334/S62

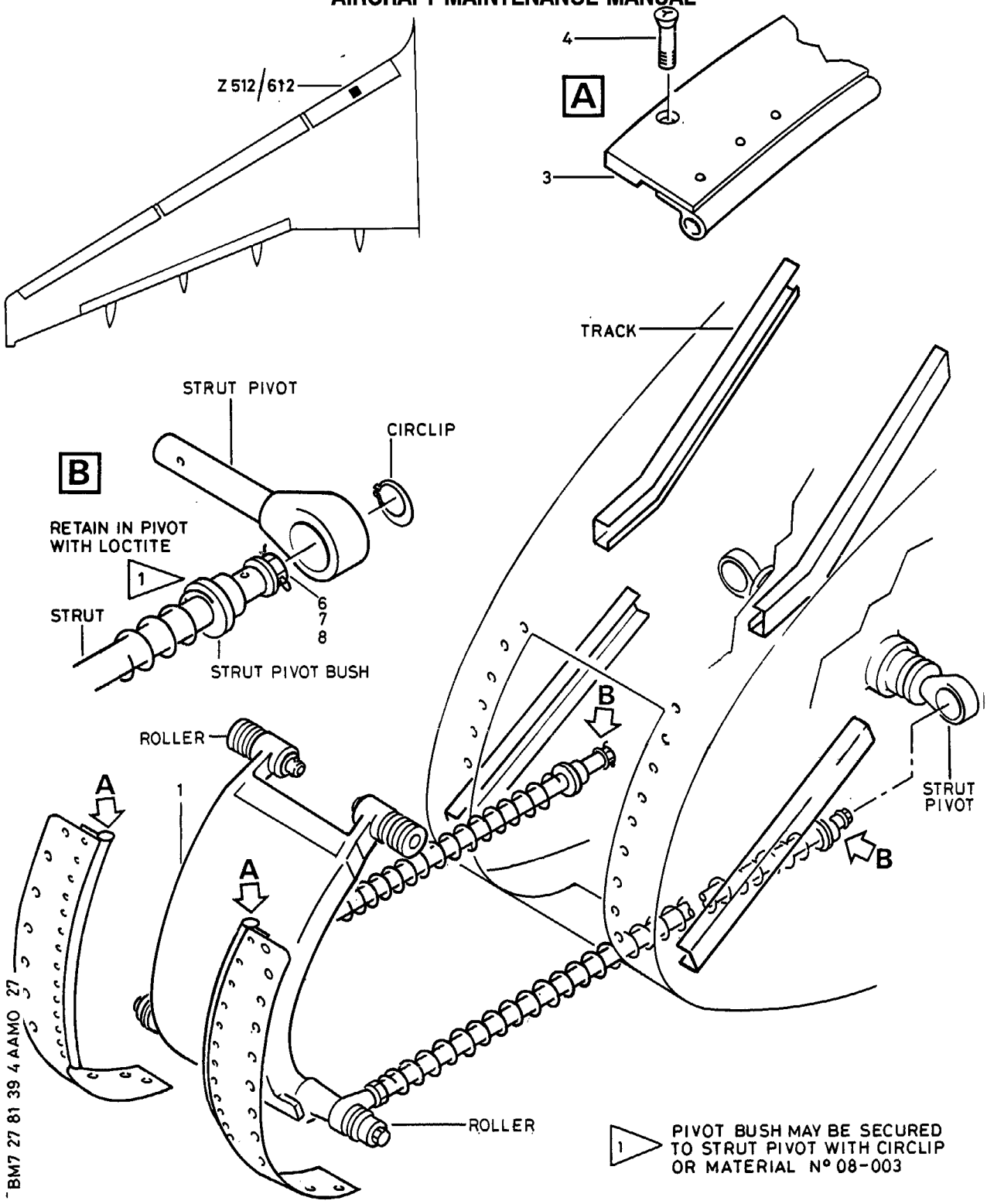
R (5)Position access platform at track 2.

B. Removal
(1)Open access doors 512(612)EB and 512(612)DB.
R (2)Remove and discard cotter pins (8).
(3)Remove nuts (7) and washers (6).
(4)Manually support shutter (1) against strut spring-loading and remove bolts (4) and retaining plates (3).
(5)Allow shutter (1) to slide forward so that rollers disengage from tracks.
(6)Slide struts out of pivots and withdraw shutter assembly through aperture.

C. Preparation of Replacement Component
(1)Thoroughly clean all dirt and grease from rollers, struts, strut springs and upper and lower tracks with suitable brush and cleaning agents (Material No.11-004).
(2)Apply a light coating of grease (Material No. 04-017) onto rollers, struts, flat surfaces of strut springs and all contact surfaces of upper and lower tracks.

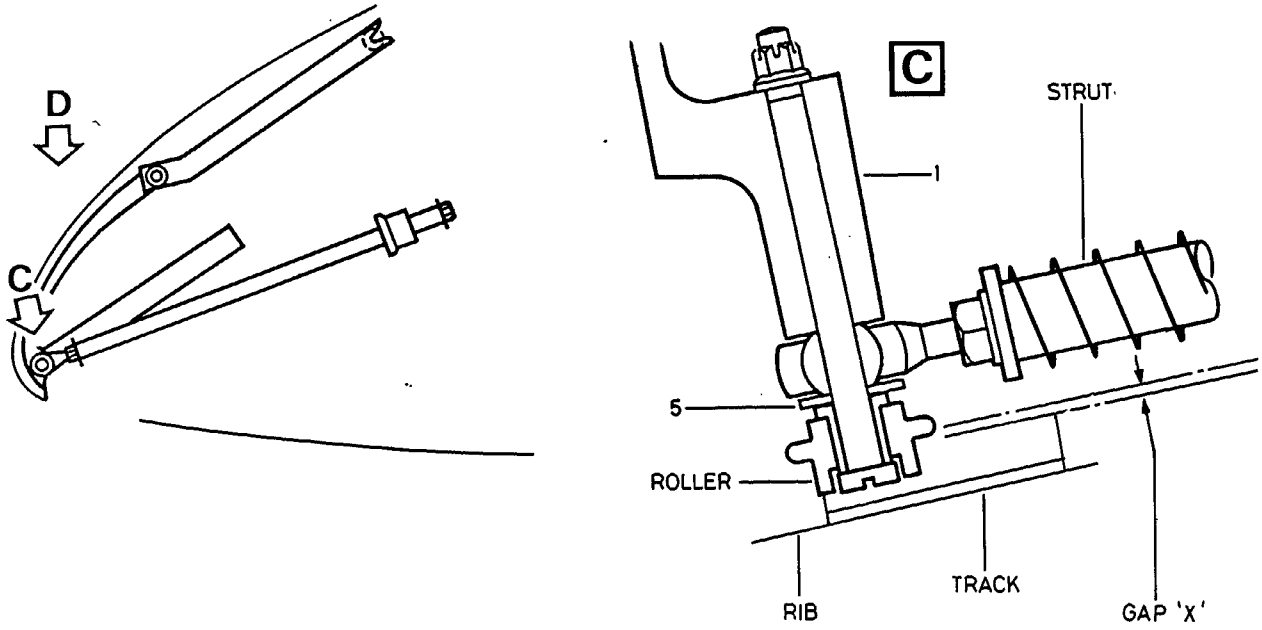
D. Installation (***//AAMO//ACMO//***)
(1)Make certain that strut pivot assembly is wirelocked and swivels freely.
(2)Slide struts into strut pivot bushes and engage rollers in tracks.
(3)Make certain that shutter side float (gap 'X'), is between 0.030 in. (0.76 mm) at tightest point between tracks, and 0.080 in (2.03 mm) maximum at any position along tracks. It may be necessary to disassemble the strut/shutter link shown in detail 'C' and install an alternative washer (5) to achieve the required dimension. The link must then be reassembled and safetied with a new cotter pin.
(4)Manually support shutter (1) against strut spring-loading, position retaining plates (3) and install bolts (4).
R (5)Secure struts in strut pivots with washers (6), nuts (7) and safety
R with new cotter pins (8).
(6)Make certain that shutter mismatch with outside skin surface does not exceed limits.

E. Preparation for Test
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

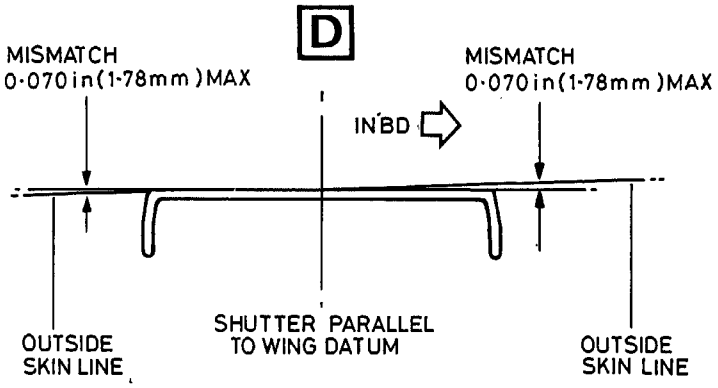


Sealing Shutters - Installation
Figure 401

R



SIDE ROLLER ADJUSTMENT (TYPICAL)



SHUTTER MISMATCH WITH
LEADING EDGE

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Sealing Shutters - Adjustment
Figure 402

R

(2)Make certain that slat travel range is clear.
(3)Install access doors 512(612)EB and 512(612)DB.
(4)Remove access platform.
(5)Remove warning notices.
(6)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 4CV, 5CV, 6CV, 7CV, 8CV, 9CV, 10CV and 45CV.
(7)Pressurize Blue and Green hydraulic systems (Ref. 29-10-00, P. Block 301).

F. Test
Perform the following:

ACTION	RESULT
1. Retract slats (Ref. 27-80-00, P. Block 301)	- slats retract Make certain movement of shutter is smooth over complete range of slat travel
2. Extend slats (Ref. 27-80-00, P. Block 301)	- slats extend Make certain movement of shutter is smooth and that shutter seals the aperture
3. Retract slats (Ref. 27-80-00, P. Block 301)	- slats retract

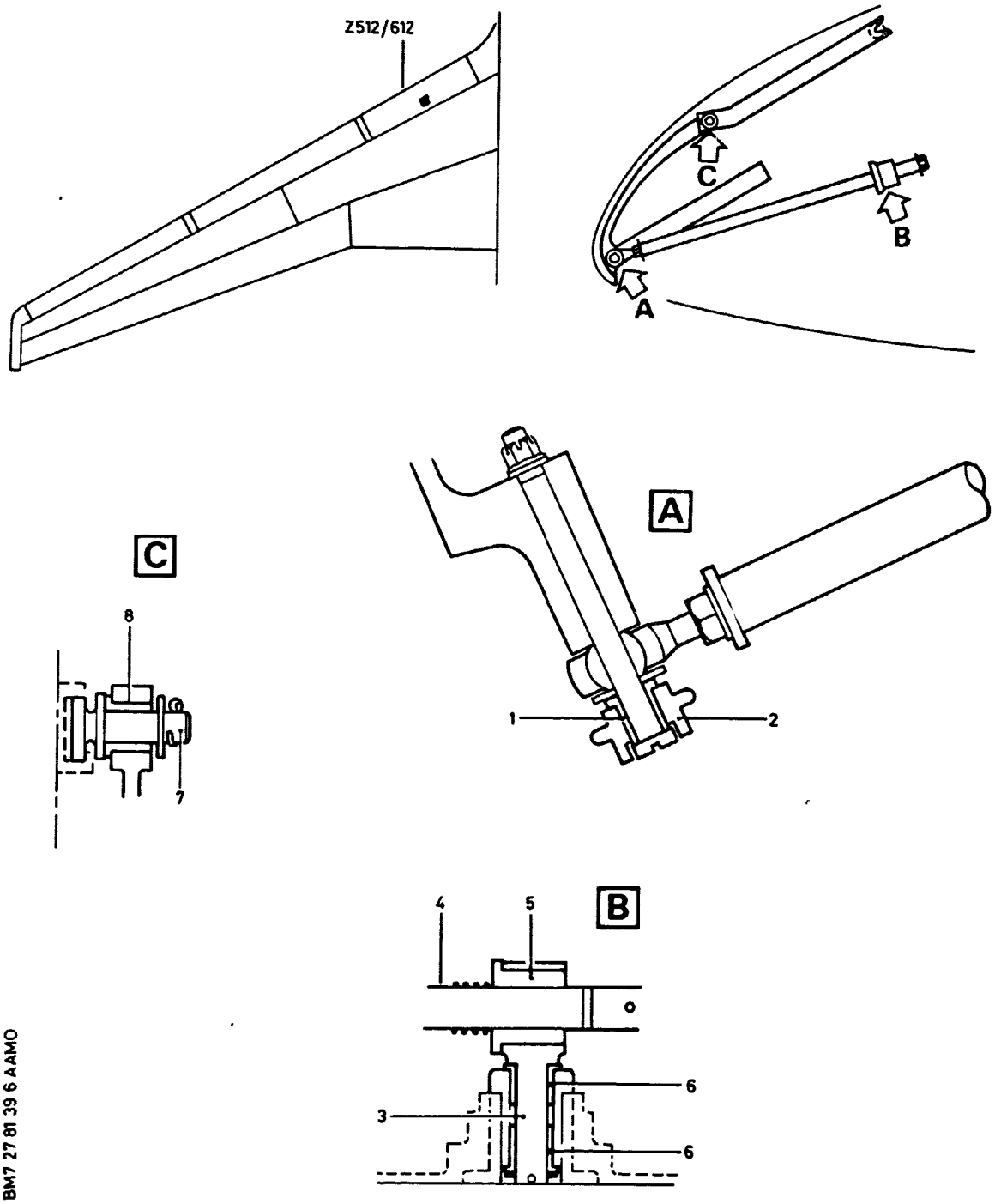
G. Close-Up
(1)Depressurize Blue and Green hydraulic systems (Ref. 29-10-00, P. Block 301).
(2)Restore the system or aircraft to normal operating condition.
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

SEALING SHUTTERS, TRACK 2
- INSPECTION/CHECK

1. Reason for the Job

A. Check of fits and clearances
With removal - Table of Fits and Clearances
(Ref. Fig. 601)

Detail and Item No.	Original Mfg Limits: Dimension inches (Millimeters) Min.	Original Mfg Limits: Dimension inches (Millimeters) Max.	Original Mfg Limits: Assy. Clearance Inch. (Milli.) Min.	Original Mfg Limits: Assy. Clearance Inch. (Milli.) Max.	In-Service Wear Limits: Dimension Limits Inch. (Milli.) Min.	In-Service Wear Limits: Dimension Limits Inch. (Milli.) Max.	In-Service Wear Limits: Max. Allow. clear in. (mm)
A							
OD1	0.3135 (7.963)	0.3139 (7.973)			0.3120 (7.925)		
			0.0011 (0.028)	0.0035 (0.089)			0.0070 (0.178)
ID2	0.3150 (8.001)	0.3170 (8.052)				0.3190 (8.103)	
B							
OD3	0.3741 (9.502)	0.3745 (9.512)			0.3725 (9.462)		
			0.0011 (0.028)	0.0024 (0.061)			0.0055 (0.1397)
ID6	0.3756 (9.540)	0.3765 (9.563)				0.3780 (9.601)	
B							
OD4	0.4950 (12.573)	0.5050 (12.827)			0.4850 (12.319)		
			0.0000 (0.000)	0.0120 (0.305)			0.0250 (0.635)
ID5	0.5050 (12.827)	0.5070 (12.878)				0.5100 (12.954)	
C							
OD7	0.1860 (4.724)	0.1867 (4.742)			0.1850 (4.699)		
			0.0008 (0.020)	0.0022 (0.056)			0.0050 (0.127)
ID8	0.1875 (4.762)	0.1882 (4.780)				0.1900 (4.826)	
C							
OD7	0.5000 (12.7)	0.5100 (12.954)			Engineer's discretion		



Sealing Shutters - Attachment Details
Figure 601

SEALING SHUTTER, TRACKS 1 THRU 3 - DEACTIVATION/REACTIVATION

Ref.: Configuration Deviation List (CDL) Section 6.01.01, Chap 27. Item 6

CAUTION : THIS PROCEDURE IS SUBJECT TO THE LIMITATIONS IMPOSED BY THE CDL.

WARNING : LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE CERTAIN GROUND SAFETIES AND NOTICES ARE IN POSITION.

FLIGHT CONTROL SURFACES - MAKE CERTAIN TRAVEL RANGE IS CLEAR.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

ELECTRICAL POWER - BEFORE COMMENCING MAINTENANCE WORK MAKE CERTAIN THAT ELECTRICAL CIRCUITS ARE ISOLATED.

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Warning Notices - Prohibiting Operation of Slats and Flaps
C.	Circuit Breaker Safety Clips and Tags
Referenced Procedures	
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

B. Procedure.
(Ref. Fig. 901)
(1)Job Set-Up
(a)Fully extend the slats (Ref. 27-80-00, P. Block 301).
(b)Display warning notices.
(c)Make certain that hydraulic system is depressurized (Ref. 29-10-00, P. Block 301).
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62

(e)Position access platform at track 2.

(2)Removal

(a)Open access doors 512(612)DB and EB.

(b)Remove and discard cotter pins (8).

(c)Remove nuts (7) and washers (6).

(d)Manually support shutter (1) against strut spring-loading and remove bolts (4) and retaining plates (3).

(e)Allow shutter (1) to slide forward so that rollers disengage from tracks.

(f)Slide strut out of pivots and withdraw shutter assembly through aperture.

(3)Preparation For Test

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Make certain that slat travel range is clear.

(c)Pressurize the hydraulic systems (Ref. 29-10-00, P. Block 301).

(d)Remove safety clips and tags and close circuit breakers 45CV, 3CV, 7CV, 9CV, 8CV, 4CV, 1CV, 10CV, 5CV, 6CV and 2CV.

(e)Remove warning notices.

(f)Remove access platform.

(4)Test

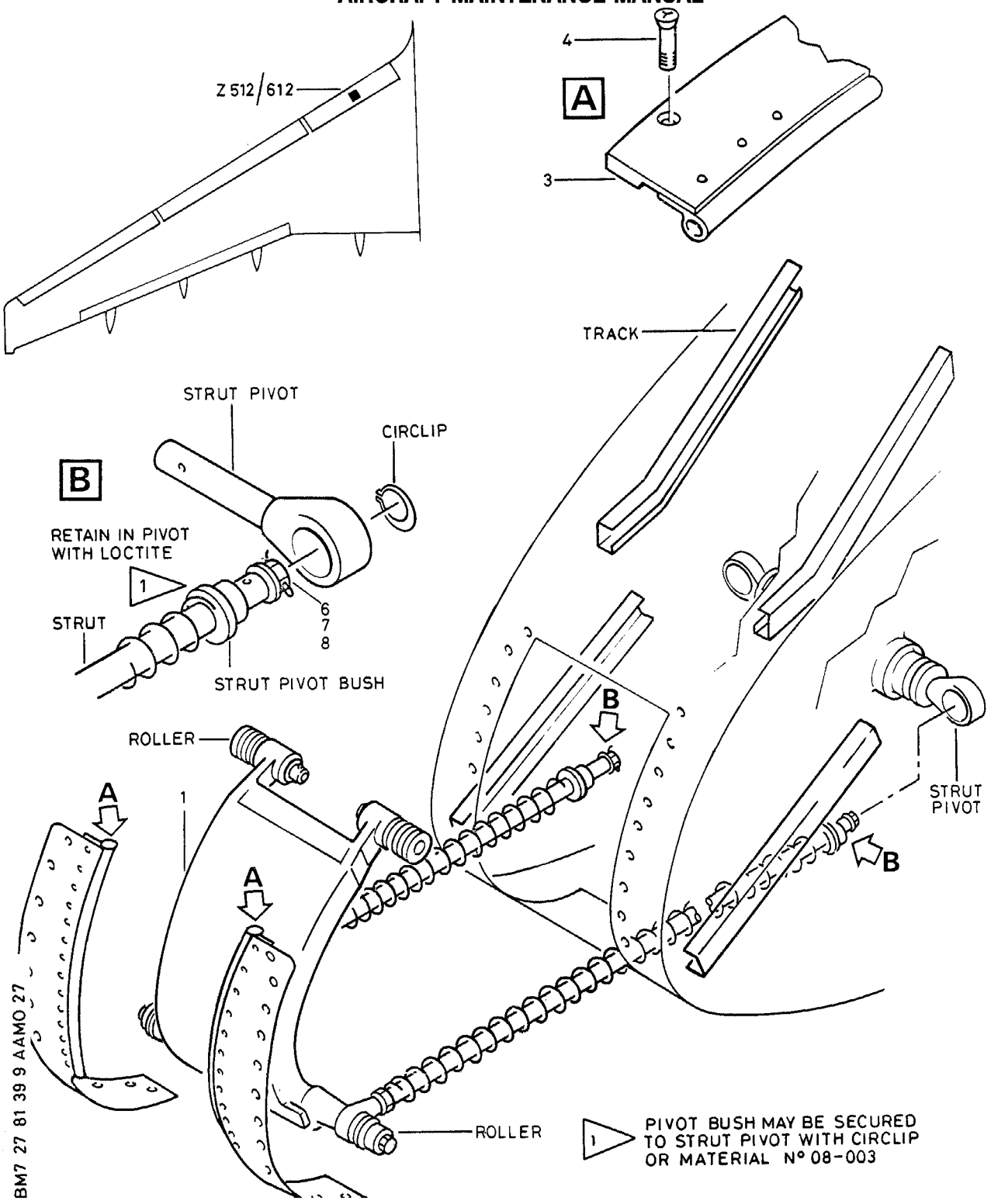
Perform the following:

ACTION	RESULT
1. Place FLAP and SLAT control lever in slat 0 position	- slats retract - check that slats move freely and smoothly - check there is no fouling between moving parts and structure
2. Place FLAP and SLAT control lever in slat 40 position	- slats extend fully - repeat checks given above
3. Place FLAP and SLAT control lever in slat 0 position	- slats retract

(5)Close-Up

(a)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).

(b)Install temporary notices on Captain's and First Officer's instrument panels to warn pilots that No. 2 (LH/RH) track sealing shutter(s) is (are) removed.



Sealing Shutters Track 2
Figure 901

(c)Package sealing shutter and all other parts removed for return to base with aircraft.
(d)Re-position access platform.
(e)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(f)Close access doors 512(612)DB and EB.
(g)Remove access platform.
(h)Make appropriate entries in the aircraft technical log.

2. Reactivation

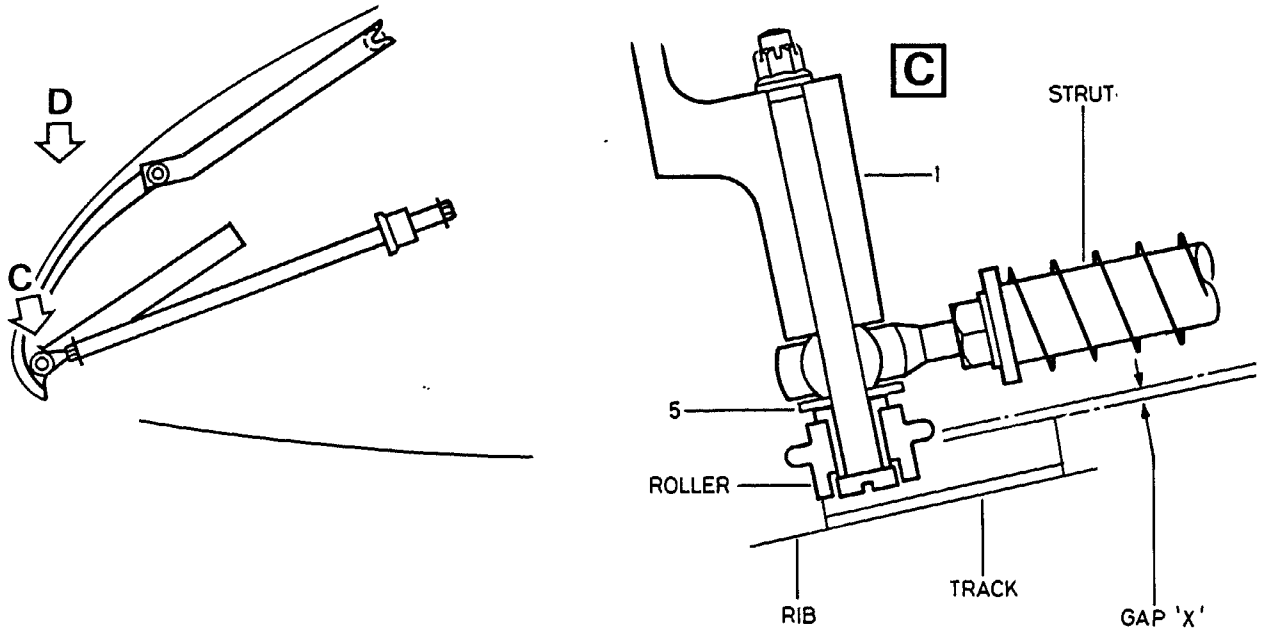
A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Warning Notices - Prohibiting Operation of Slats and Flaps
C.	Circuit Breaker Safety Clips and Tags
D. Material No. 04-017	Common Greases (Ref. 20-31-00)
E. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

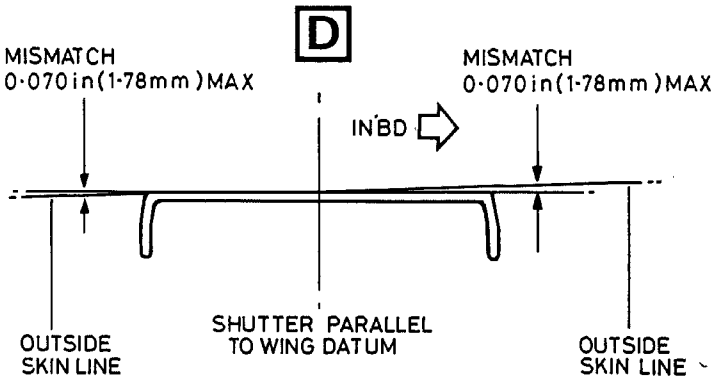
B. Procedure.
(Ref. Fig. 902)
(1)Job Set-Up
(a)Fully extend the slats (Ref. 27-80-00, P. Block 301).
(b)Display warning notices.
(c)Make certain that hydraulic system is depressurized (Ref. 29-10-00, P. Block 301).
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62

(e)Position access platform at track 2.
(f)Open access doors 512(612)DB and EB.



SIDE ROLLER ADJUSTMENT (TYPICAL)



SHUTTER MISMATCH WITH LEADING EDGE

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Sealing Shutters - Adjustment
Figure 902

(2)Preparation of Replacement Component.
(a)Thoroughly clean all dirt and grease from rollers, struts, strut springs and upper and lower tracks with a suitable brush and cleaning agent (Material No. 11-004).
(b)Apply a light coating of grease (Material No. 04-017) onto rollers, struts, flat surfaces of strut springs and all contact surfaces of upper and lower tracks.
(3)Installation (***//AAMO//ACMO//***)
(a)Make certain strut pivot assembly is wirelocked and swivels freely.
(b)Slide struts into strut pivot bushes and engage rollers in tracks.
(c)Make certain shutter side float (gap 'X') is between 0.030 in (0.76 mm) at tightest point between tracks and 0.080 in (2.03 mm) maximum at any position along tracks. It may be necessary to disassemble the strut/shutter link shown in detail 'C' and install an alternative washer (5) to achieve the required dimension. The link must then be reassembled and safetied with a new cotter pin.
(d)Manually support shutter (1) against strut spring-loading, position retaining plates (3) and install bolts (4).
(e)Secure struts in strut pivots with washers (6) and nuts (7), and safety with new cotter pins (8).
(f)Make certain that shutter mismatch with outside skin surface does not exceed limits.

(4)Preparation for Test
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Make certain that slat travel range is clear.
(c)Remove access platform.
(d)Remove warning notices.
(e)Pressurize the hydraulic systems (Ref. 29-10-00, P. Block 301).
(f)Remove safety clips and tags and close circuit breakers 45CV, 3CV, 7CV, 9CV, 8CV, 4CV, 1CV, 10CV, 5CV, 6CV and 2CV.
(5)Test
(a)Perform the following:

ACTION	RESULT
1. Place FLAP and SLAT control lever in slat 0 position	- slats retract - check that movement of shutter is smooth over complete range of slat travel
2. Place FLAP and SLAT control lever in slat 40 position	- slats extend - check that movement of shutter is smooth and that shutter seals the aperture
3. Place FLAP and SLAT control lever in slat 0 position	- slats retract.

(6)Close-Up
(a)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(b)Restore aircraft to normal operating condition by removing temporary warning notices from Captain's and First Officer's instrument panels.
(c)Re-position access platform.
(d)Close access doors 512(612)DB and EB.
(e)Remove access platform.
(f)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(g)Make appropriate entries in the aircraft technical log.

SEALING SHUTTERS, TRACKS 4 TO 11 - REMOVAL/INSTALLATION

WARNING : LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE CERTAIN GROUND SAFETIES AND NOTICES ARE IN POSITION.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Warning Notices - Prohibiting Operation of Flaps and Slats
C.	Circuit Breaker Safety Clips and Tags
D. Material No. 04-017	Common Greases (Ref. 20-31-00)
E. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

2. Procedure

(Ref. Fig. 401)
(Ref. Fig. 402)

A. Job Set-Up
(1)Fully extend slats (Ref. 27-80-00, P. Block 301).
(2)Display warning notices.
(3)Make certain Blue and Green hydraulic systems are depressurized (Ref. 29-10-00, P. Block 301).
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC LAND RECOVERY SUPPLY/SLATS/SYS 2	9CV	335/R66
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 2	8CV	333/T64

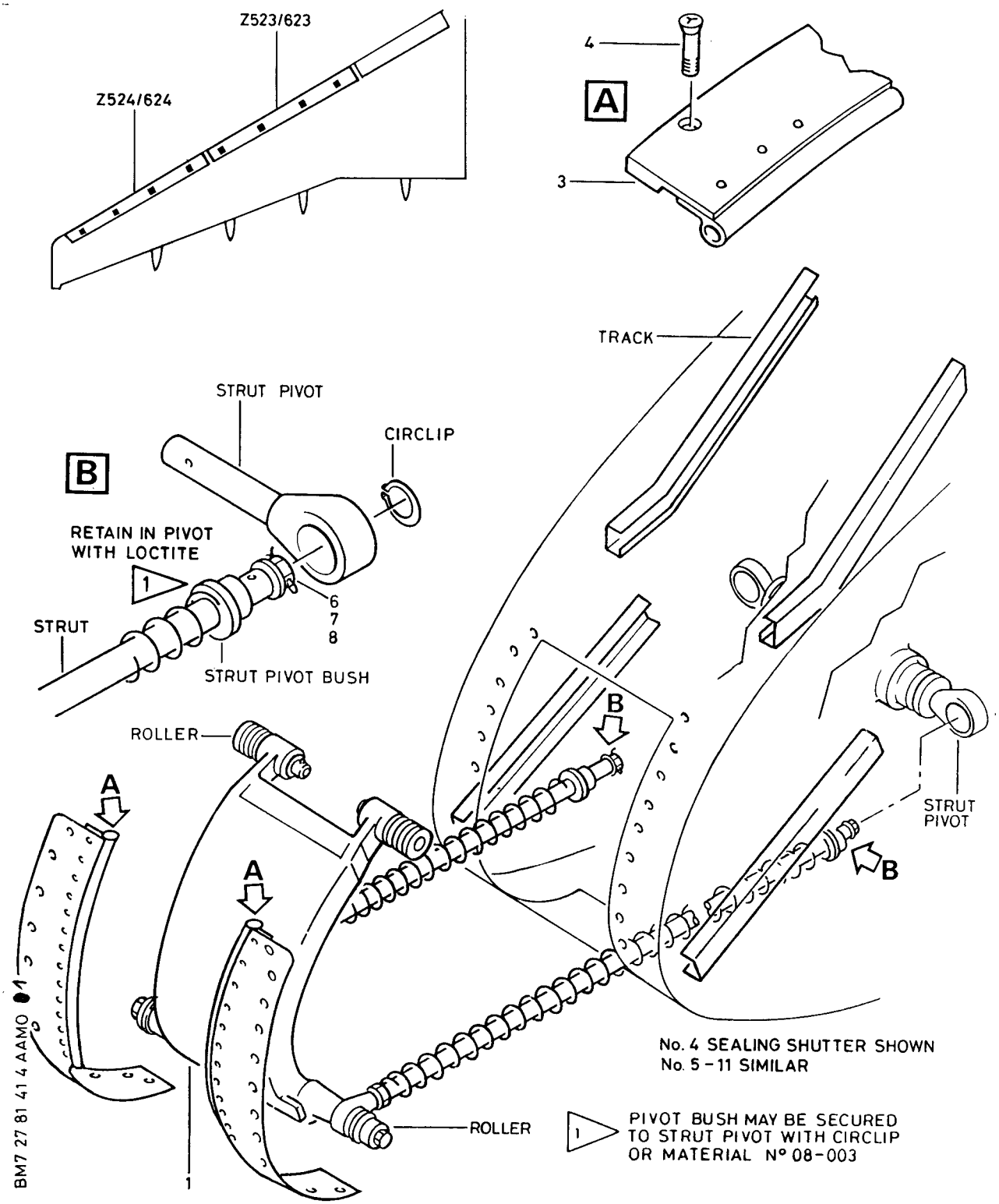
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC/SYS 2	4CV	335/R64
133VU	FLT CLT/FLAPS/SYS 1/26 VAC	1CV	335/R61
133VU	FLT CTL/SFCC LAND RECOVERY SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/FLAPS/SYS 2/26 VAC	2CV	334/S62

(5)Position access platform.

B. Removal
(1)Open the following access doors:
(a)For track four open 523(623) BB and CB.
(b)For track five open 523(623) FB.
(c)For track six open 523(623) GB and JB.
(d)For track seven open 523(623) LB and MB.
(e)For track eight open 524(624) BB and CB.
(f)For track nine open 524(624) EB and FB.
(g)For track ten open 524(624) GB and HB.
(h)For track eleven open 524(624) KB.
(2)Remove and discard cotter pins (8).
(3)Remove nuts (7) and washers (6).
(4)Manually support shutter (1) against strut spring-loading and remove bolts (4) and retaining plates (3).
(5)Allow shutter (1) to slide forward so that rollers disengage from tracks.
(6)Slide struts out of pivots and withdraw shutter assembly through aperture.

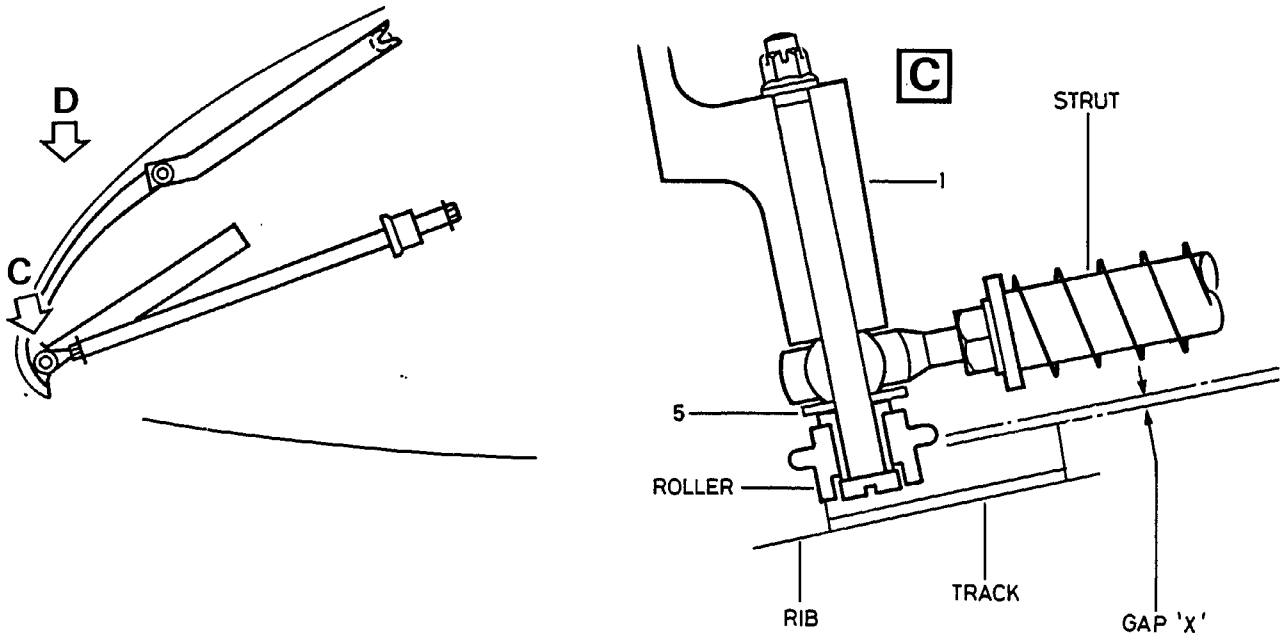
C. Preparation of Replacement Component
(1)Thoroughly clean all dirt and grease from rollers, struts, strut springs and upper and lower tracks with a suitable brush and cleaning agent (Material No. 11-004).
(2)Apply a light coating of grease (Material No. 04-017) onto rollers, struts, flat surfaces of strut springs and all contact surfaces of upper and lower tracks.

D. Installation (***//AAM0//ACM0//***)
(1)Make certain that strut pivot assembly is wire locked and swivels freely.
(2)Slide strut pivots into strut pivot bushes and engage rollers in tracks.
(3)Make certain that shutter side float (gap 'X') is between 0.030 in. (0.76 mm) at tightest point between tracks, and 0.080 in. (2.03 mm) maximum at any position along tracks. It may be necessary to disassemble the strut/shutter link shown in detail 'C' and install an alternative washer (5) to achieve the required dimension. The link must then be reassembled and safetied with a new cotter pin.

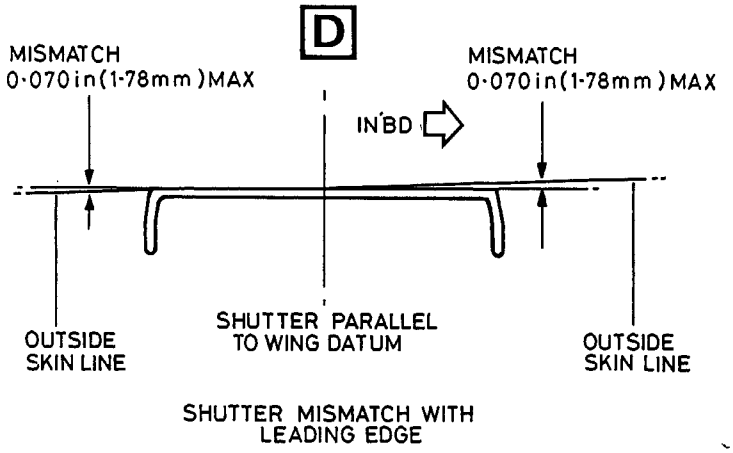


Sealing Shutters - Installation
Figure 401

R



SIDE ROLLER ADJUSTMENT (TYPICAL)



SHUTTER MISMATCH WITH
LEADING EDGE

BM7 27 81 41 4 ACMO 01

Sealing Shutters - Adjustment
Figure 402

R

(4)Manually support shutter (1) against strut spring-loading, position retaining plates (3) and install bolts (4).
(5)Secure struts in strut pivots with washers (6) nuts (7) and safety with new cotter pins (8).
(6)Make certain that shutter mismatch with outside skin surface does not exceed limits.

E. Preparation for Test
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Make certain that slat travel range is clear.
(3)Close the following access doors:
(a)For track four close 523(623) BB and CB.
(b)For track five close 523(623) FB.
(c)For track six close 523(623) GB and JB.
(d)For track seven close 523(623) LB and MB.
(e)For track eight close 524(624) BB and CB.
(f)For track nine close 524(624) EB and FB.
(g)For track ten close 524(624) GB and HB.
(h)For track eleven close 524(624) KB.
(4)Remove access platform.
(5)Remove warning notices.
(6)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 3CV, 4CV, 5CV, 6CV, 7CV, 8CV, 9CV, 10CV and 45CV.
R (7)Pressurize Blue and Green hydraulic systems (Ref. 29-10-00,
R P. Block 301).

R F. Test
R Perform the following:

ACTION	RESULT
1. Retract slats (Ref. 27-80-00, P. Block 301).	- slats retract.
Make certain movement of shutter is smooth over complete range of slat travel.	
2. Extend slats (Ref. 27-80-00, P. Block 301).	- slats extend.
Make certain movement of shutter is smooth and that shutter seals the aperture.	
3. Retract slats (Ref. 27-80-00, P. Block 301).	- slats retract.

R G. Close-up
R (1)Depressurize Blue and Green hydraulic systems (Ref. 29-10-00,

R P. Block 301).
R (2)Restore the systems or aircraft to normal operating condition.
R (3)Make certain that working area is clean and clear of tools and
R miscellaneous items of equipment.

SEALING SHUTTERS TRACKS 4 TO 11 - INSPECTION/CHECK

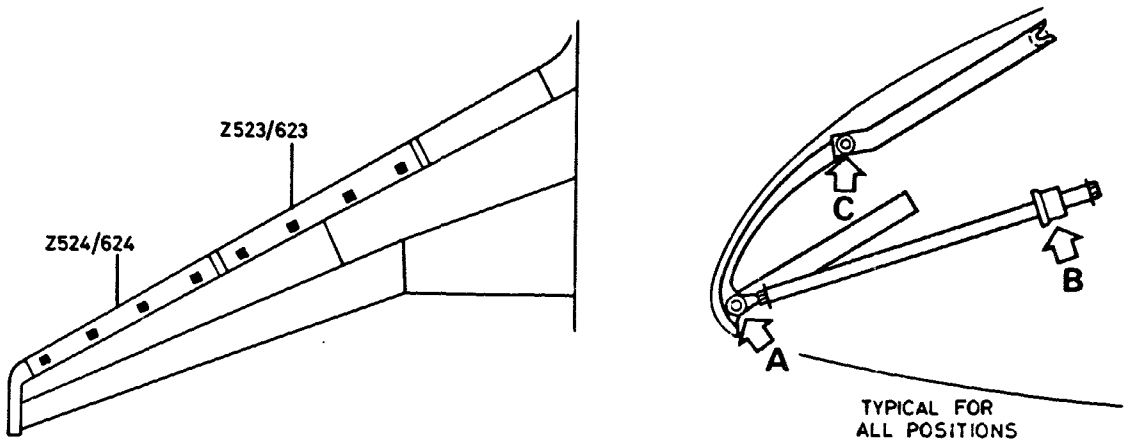
1. Reason for the Job

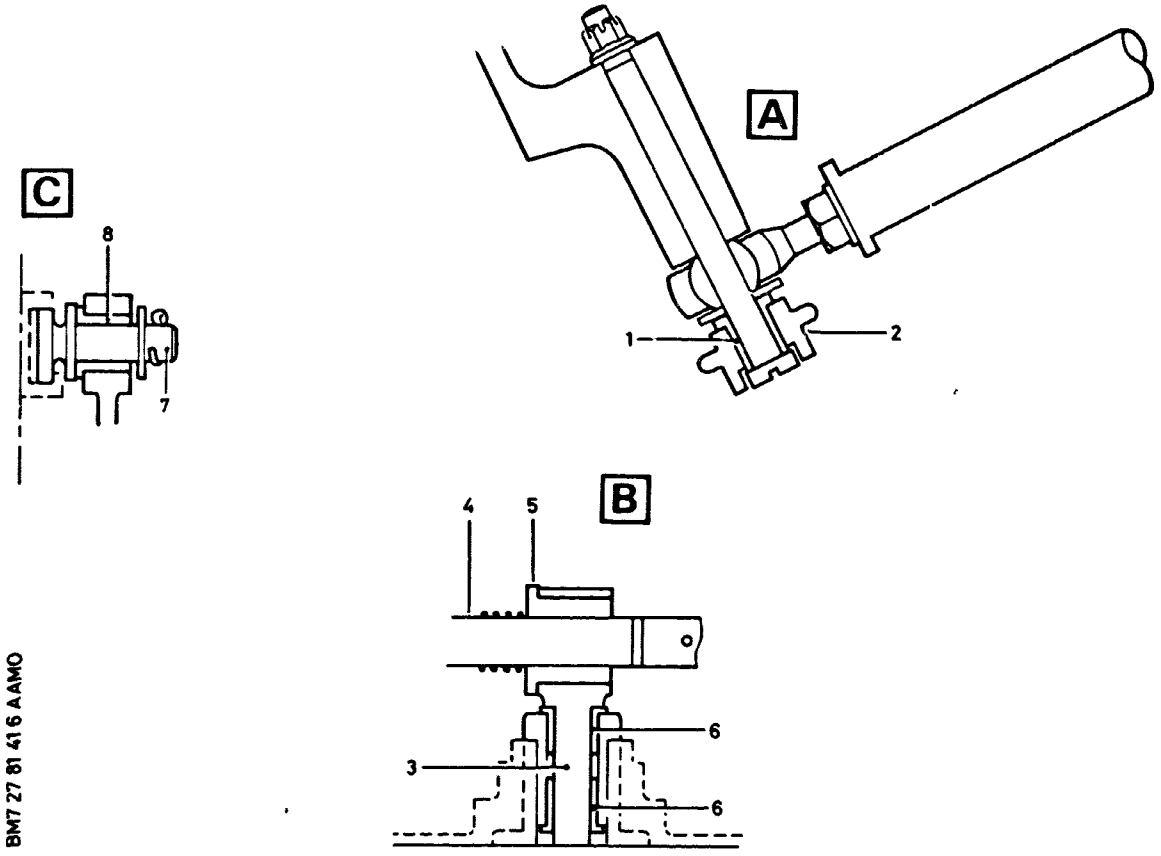
A. Check of fits and clearances

With removal - Table of Fits and Clearances
(Ref. Fig. 601)

Detail and Item No.	Original Mfg Limits: Dimension inches (Millimeters) Min.	Original Mfg Limits: Dimension inches (Millimeters) Max.	Original Mfg Limits: Assy. Clearance Inch. (Milli.) Min.	Original Mfg Limits: Assy. Clearance Inch. (Milli.) Max.	In-Service Wear Limits: Dimension Limits Inch. (Milli.) Min.	In-Service Wear Limits: Dimension Limits Inch. (Milli.) Max.	In-Service Wear Limits: Max. Allow. clear in. (mm)
A							
OD1	0.3135 (7.963)	0.3139 (7.973)			0.3120 (7.925)		
			0.0011 (0.028)	0.0035 (0.089)			0.0070 (0.178)
ID2	0.3150 (8.001)	0.3170 (8.052)				0.3190 (8.103)	
B							
OD3	0.3741 (9.502)	0.3745 (9.512)			0.3725 (9.462)		
			0.0011 (0.028)	0.0024 (0.061)			0.0055 (0.140)
ID6	0.3756 (9.540)	0.3765 (9.563)				0.3780 (9.601)	
B							
OD4	0.4950 (12.573)	0.5050 (12.827)			0.4850 (12.319)		
			0.0000 (0.000)	0.0120 (0.305)			0.0250 (0.635)
ID5	0.5050 (12.827)	0.5070 (12.878)				0.5100 (12.954)	
C							
	0.1860 (4.724)	0.1867 (4.742)			0.1850 (4.699)		
			0.0008 (0.020)	0.0022 (0.056)			0.0050 (0.127)
ID8	0.1875 (4.762)	0.1882 (4.780)				0.1900 (4.826)	

Detail and Item No.	Original Mfg Limits				In-Service Wear Limits		
	Dimension inches (Millimeters)		Assy. Clearance Inch. (Milli.)		Dimension Limits Inch. (Milli.)		Max. Allow. clear in. (mm)
	Min.	Max.	Min.	Max.	Min.	Max.	
C OD7	0.5000 (12.700)	0.5100 (12.954)			Engineer's discretion		





Sealing Shutters - Details
Figure 601

SEALING SHUTTER, TRACKS 4 TO 11 - DEACTIVATION/REACTIVATION

Ref. : CDL Section 6.01.01, CHAP 27 Item 6

CAUTION : THIS PROCEDURE IS TO BE USED IN ACCORDANCE WITH THE CONFIGURATION DEVIATION LIST.

WARNING : LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE CERTAIN GROUND SAFETIES AND NOTICES ARE IN POSITION.

FLIGHT CONTROL SURFACES - MAKE CERTAIN TRAVEL RANGE IS CLEAR.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

1. Deactivation

A. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform 4 m (13 ft)
R	B.	Warning Notices - Prohibiting Operation of Slats and Flaps
R	C.	Circuit Breaker Safety Clips and Tags
R	Referenced Procedures	
	- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps).
	- 29-10-00, P. Block 301	Main Hydraulic Power.

B. Procedure

(Ref. Fig. 901)

(1)Job Set-Up

(a)Fully extend the slats (Ref. 27-80-00, P. Block 301).

(b)Display warning notices.

(c)Make certain that hydraulic system is depressurized. (Ref. 29-10-00, P. Block 301).

(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62

(e)Position access platform.

(2)Removal

(a)Open the following access doors for:
- track 4 - 523 (623) BB, 523 (623) CB
- track 5 - 523 (623) FB
- track 6 - 523 (623) GB, 523 (623) JB
- track 7 - 523 (623) LB, 523 (623) MB
- track 8 - 524 (624) BB, 524 (624) CB
- track 9 - 524 (624) EB, 524 (624) FB
- track 10 - 524 (624) GB, 524 (624) HB
- track 11 - 524 (624) KB

(b)Remove and discard cotter pins (8)

(c)Remove nuts (7) and washers (6)

(d)Manually support shutter (1) against strut spring-loading and remove bolts (4) and retaining plates (3).

(e)Allow shutter (1) to slide forward so that rollers disengage from tracks.

(f)Slide struts out of pivots and withdraw shutter assembly through aperture.

(3)Preparation for Test

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Make certain that slat travel range is clear.

(c)Pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).

(d)Remove safety clips and tags and close circuit breakers 45CV, 3CV, 7CV, 9CV, 8CV, 4CV, 1CV, 10CV, 5CV, 6CV and 2CV.

(e)Remove warning notices.

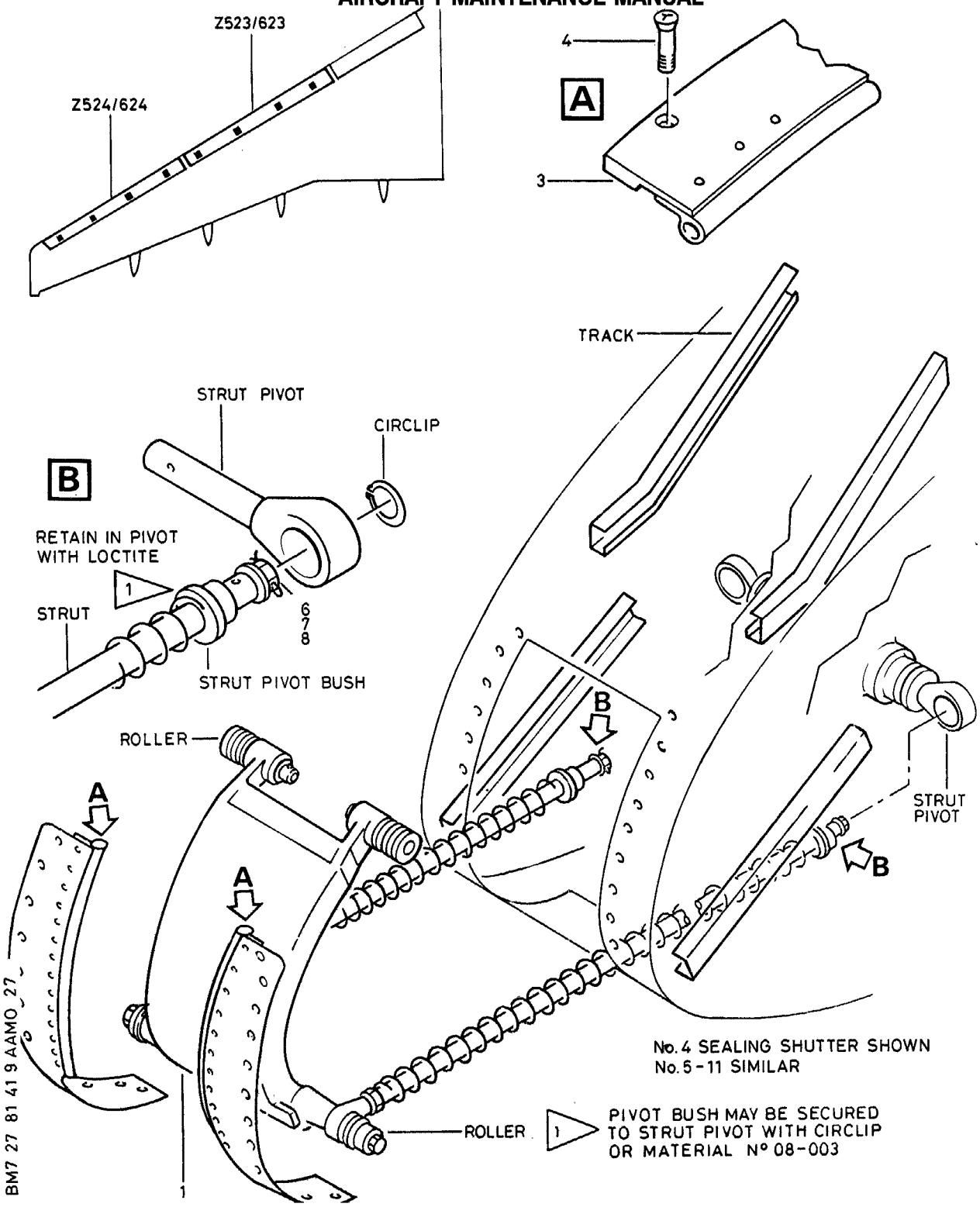
(f)Remove access platform.

(4)Test

(a)Perform the following:

ACTION	RESULT
1. Place FLAP and SLAT control lever in slat 0 position	- slats retract - check that slats move freely and smoothly - check there is no fouling between moving parts and structure
2. Place FLAP and SLAT control lever in slat 40 position	- slats extend fully - repeat checks given above
3. Place FLAP and SLAT control lever	- slats retract

ACTION	RESULT
in slat 0 position	
R (5)Close-Up (a)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301). (b)Install temporary notices on Captain's and First Officer's instrument panels to warn pilots which track sealing shutter(s) is (are) removed. (c)Package sealing shutter and all other parts removed for return to base with aircraft. (d)Re-position access platform. (e)Make certain that working area is clean and clear of tools and miscellaneous items of equipment. (f)Close access doors for: - track 4 - 523 (623) BB, 523 (623) CB - track 5 - 523 (623) FB - track 6 - 523 (623) GB, 523 (623) JB - track 7 - 523 (623) LB, 523 (623) MB - track 8 - 524 (624) BB, 524 (624) CB - track 9 - 524 (624) EB, 524 (624) FB - track 10 - 524 (624) GB, 524 (624) HB - track 11 - 524 (624) KB (g)Remove access platform. (h)Make appropriate entries in the aircraft technical log.	



Sealing Shutters Tracks 4 thru 11
Figure 901

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Warning Notices - Prohibiting Operation of Slats and Flaps
C.	Circuit Breaker Safety Clips and Tags
D. Material No. 04-017	Common Greases (Ref. 20-31-00)
E. Material No. 11-004	Cleaning Agents (Ref. 20-31-00).
Referenced Procedures	
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

(Ref. Fig. 902)

B. Procedure

(1)Job Set-Up

(a)Fully extend the slats (Ref. 27-80-00, P. Block 301).

(b)Display warning notices.

(c)Make certain the hydraulic system is depressurized. (Ref. 29-10-00, P. Block 301).

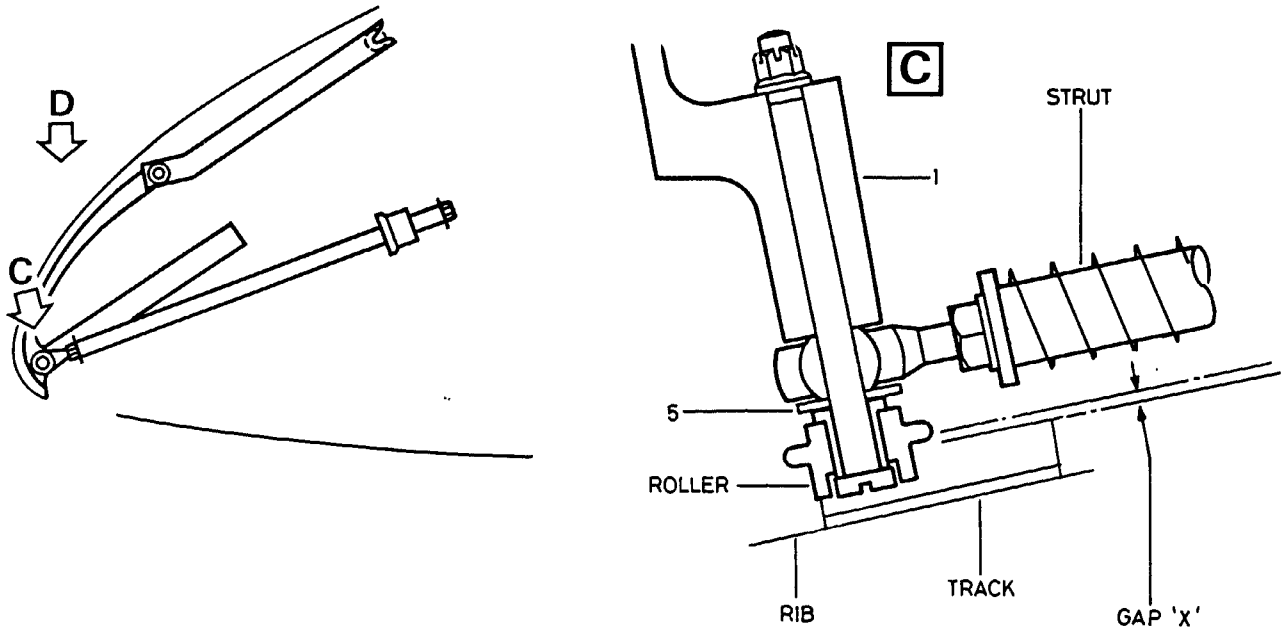
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62

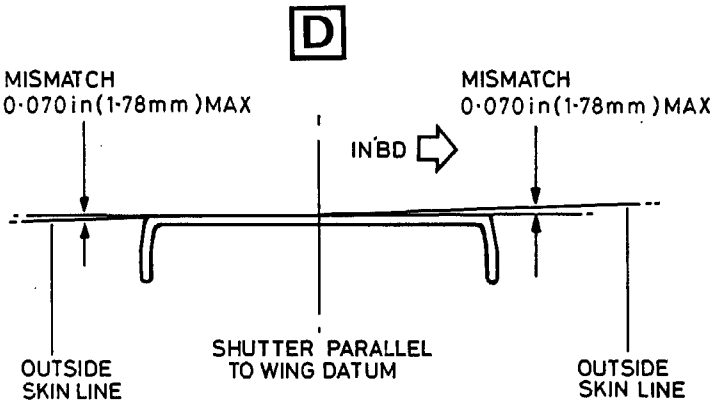
(e)Position access platform.

(f)Open the following access doors for:

- track 4 - 523 (623) BB, 523 (623) CB
- track 5 - 523 (623) FB
- track 6 - 523 (623) GB, 523 (623) JB
- track 7 - 523 (623) LB, 523 (623) MB
- track 8 - 524 (624) BB, 524 (624) CB
- track 9 - 524 (624) EB, 524 (624) FB
- track 10 - 524 (624) GB, 524 (624) HB
- track 11 - 524 (624) KB



SIDE ROLLER ADJUSTMENT (TYPICAL)



SHUTTER MISMATCH WITH
LEADING EDGE

BM7 27 81 41 9 ACMO 01

Sealing Shutters - Adjustment
Figure 902

R (2)Preparation of Replacement Component
(a)Thoroughly clean all dirt and grease from rollers, struts, strut springs and upper and lower tracks with a suitable brush and cleaning agent (Material No. 11-004).
(b)Apply a light coating of grease (Material No. 04-017) onto rollers, struts, flat surfaces of strut springs and all contact surfaces of upper and lower tracks.
(3)Installation (***//AAMO//ACMO//***)
R (a)Make certain strut pivot assembly is wirelocked and swivels freely.
(b)Slide struts into strut pivot bushes and engage rollers in tracks.
(c)Make certain that shutter side float (gap 'X') is between 0.030 in. (0.76 mm) at tightest point between tracks and 0.080 in. (2.03 mm) maximum at any position along tracks. It may be necessary to disassemble the strut/shutter link shown in detail 'C' and install an alternative washer (5) to achieve the required dimension. The link must then be reassembled and safetied with a new cotter pin.
(d)Manually, support shutter (1) against strut spring-loading, position retaining plates (3) and install bolts (4).
(e)Secure struts in strut pivots with washers (6) and nuts (7), and
R safety with new cotter pins (8).
(f)Make certain that shutter mismatch with outside skin surface does not exceed limits.
(4)Preparation for Test
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Make certain that slat travel range is clear.
(c)Remove access platform.
(d)Remove warning notices.
(e)Pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).
(f)Remove safety clips and tags and close circuit breakers 45CV, 3CV, 7CV, 9CV, 8CV, 4CV, 1CV, 10CV, 5CV, 6CV and 2CV.
R (5)Test
(a)Perform the following:

ACTION	RESULT
1. Place FLAP and SLAT control lever in slat 0 position	- slats retract - check that movement of shutter is smooth over complete range of slat travel
2. Place FLAP and SLAT control lever in slat 40 position	- slats extend - check that movement of shutter is smooth and that shutter seals the aperture
3. Place FLAP and SLAT control lever in slat 0 position	- slats retract

(6)Close-Up
(a)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(b)Restore aircraft to normal operating condition by removing temporary warning notices from Captain's and First Officer's instrument panels.
R (c)Re-position access platform.
(d)Close access doors:
- track 4 - 523 (623) BB, 523 (623) CB
- track 5 - 523 (623) FB
- track 6 - 523 (623) GB, 523 (623) JB
- track 7 - 523 (623) LB, 523 (623) MB
- track 8 - 524 (624) BB, 524 (624) CB
- track 9 - 524 (624) EB, 524 (624) FB
- track 10 - 524 (624) CB, 524 (624) HB
- track 11 - 524 (624) KB

(e)Remove access platform.
(f)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(g)Make appropriate entries in aircraft technical log.

SEALING SHUTTERS (NO.1 SCREWJACK/TRACK 1 AND NO.2 SCREWJACK/TRACK 3) - REMOVAL/INSTALLATION

WARNING: LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE CERTAIN GROUND SAFETIES AND NOTICES ARE IN POSITION.

FLIGHT CONTROLS - BEFORE APPLY OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Warning Notices - Prohibiting Operation of Flaps and Slats
C.	Circuit Breaker Safety Clips and Tags
D. Material No. 04-017	Common Greases (Ref. 20-31-00)
E. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

2. Procedure

R (Ref. Fig. 401)
R (Ref. Fig. 402)

A. Job Set-Up
(1)Fully extend the slats (Ref. 27-80-00, P. Block 301).
(2)Display warning notices.
(3)Make certain that Blue and Green hydraulic systems are depressurized (Ref. 29-10-00, P. Block 301).
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/SFCC NORM SUPPLY/SLATS SYS 1	7CV	333/T63
133VU	FLT CTL/SLATS/SFCC LAND RECOVERY/ SUPPLY/SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SLATS/SFCC NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26 VAC/SYS 2	4CV	335/R64

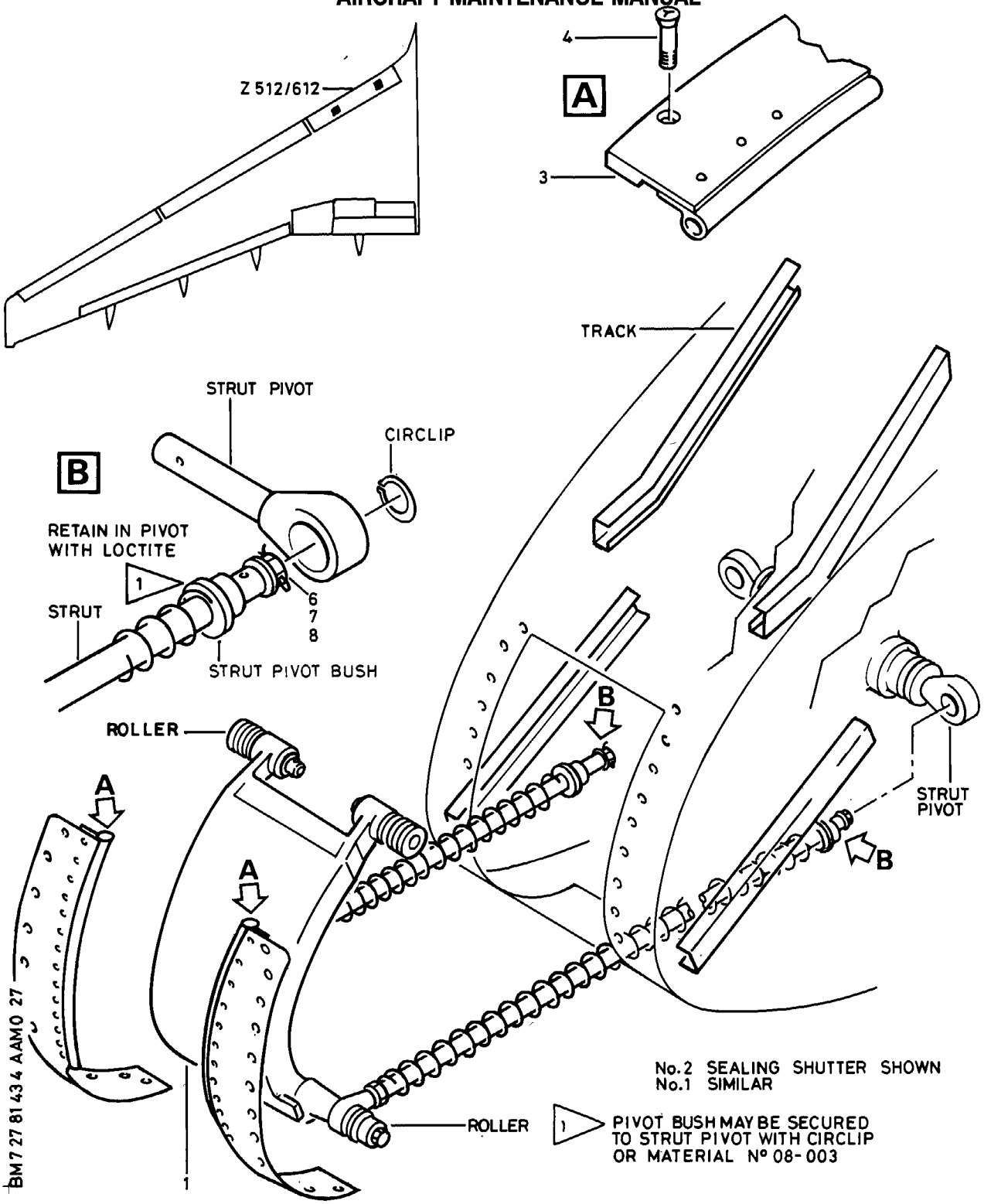
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 1/26 VAC	1CV	335/R61
133VU	FLT CTL/FLAPS/SFCC LAND RECOVERY/ SUPPLY/FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/FLAPS/SFCC NORM SUPPLY/FLAPS/ SYS 1	5CV	332/U61
133VU	FLT CTL/FLAPS/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/FLAPS/SYS 2/26 VAC	2CV	334/S62

(5)Position access platform.

B. Removal
(1)Open the following access doors:
(a)For track one open 512(612) BB and DB.
(b)For track three open 512(612) GB and JB.
(2)Remove and discard cotter pins (8).
(3)Remove nuts (7) and washers (6).
(4)Manually support shutter (1) against strut spring-loading and remove bolts (4) and retaining plates (3).
(5)Allow shutter (1) to slide foward so that rollers disengage from tracks.
(6)Slide struts out of pivots and withdraw shutter assembly through aperture.

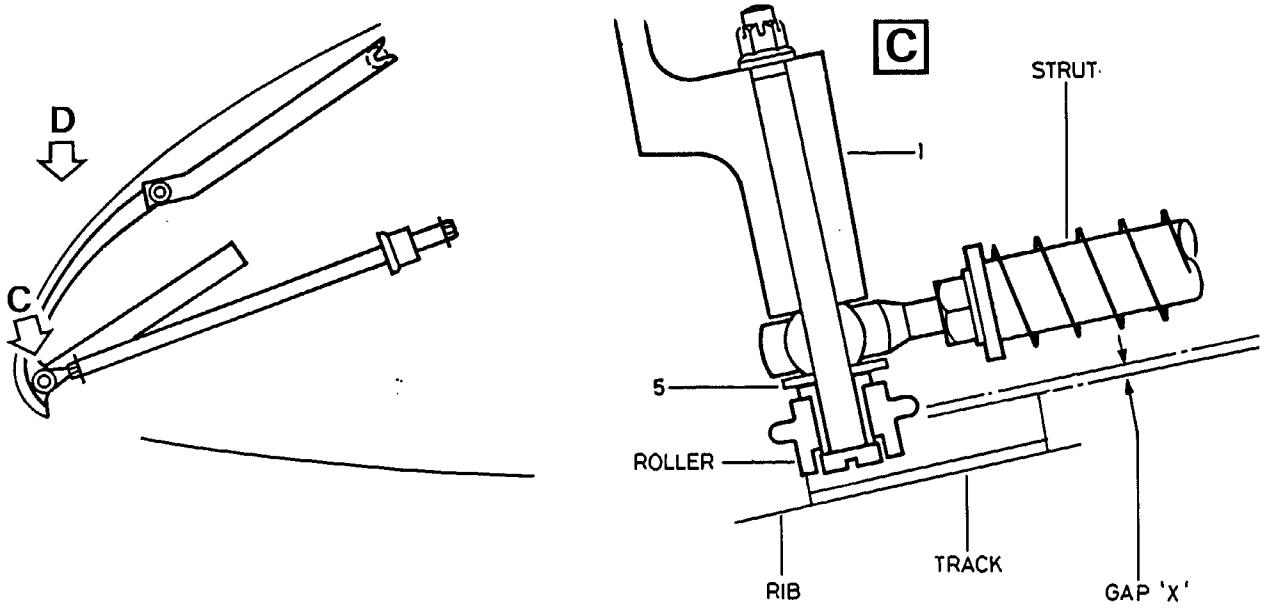
C. Preparation of Replacement Component
(1)Thoroughly clean all dirt and grease from rollers, struts, strut springs and upper and lower tracks with suitable brush and cleaning agent (Material No. 11-004).
(2)Apply a light coating of grease (Material No. 04-017) onto rollers, struts, flat surfaces of strut springs and all contact surfaces of upper and lower tracks.

D. Installation (Ref. Fig. 401, 402)
(1)Make certain that strut pivot assembly is wirelocked and swivels freely.
(2)Slide strut pivots into strut pivotbushes and engage rollers in tracks.
(3)Make certain that shutter side float (Gap 'X') is between 0.030 in (0.76 mm) at tightest point between tracks, and 0.080 in (2.03 mm) maximum at any position along tracks. It may be necessary to disassemble the strut/shutter link shown in detail 'C' and install an alternative washer (5) to achieve the required dimension. The link must then be reassembled and safetied with a new cotter pin.
(4)Manually support shutter (1) against strut spring-loading, position retaining plates (3) and install bolts (4).
(5)Secure struts in strut pivots with washers (6) nuts (7) and safety with new cotter pins (8).
(6)Make certain that shutter mismatch with outside skin surface does not exceed limits.

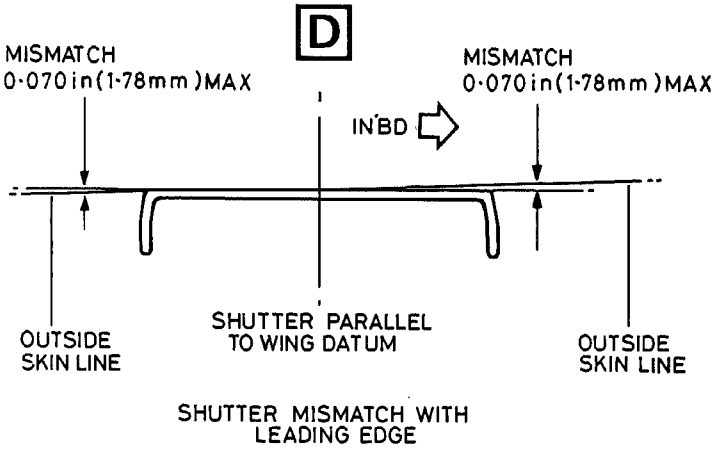


Sealing Shutters - Installation
Figure 401

R



SIDE ROLLER ADJUSTMENT (TYPICAL)



SHUTTER MISMATCH WITH
LEADING EDGE

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R

Sealing Shutters - Adjustment
Figure 402

R E. Preparation for Test.
R (1)Make certain that working area is clean and clear of tools and
R miscellaneous items of equipment.
R (2)Make certain that slat travel range is clear.
R (3)Install access doors as follows:
R (a)For track one install 512(612) BB and DB.
R (b)For track three install 512(612) GB and JB.
R (4)Remove access platform.
R (5)Remove warning notices.
(6)Remove safety clips and tags and close circuit breakers 45CV, 3CV, 7CV, 9CV, 8CV, 4CV, 1CV, 10CV, 5CV, 6CV and 2CV.
(7)Pressurize Blue and Green hydraulic system (Ref. 29-10-00, P. Block 301).

F. Test
Perform the following:

ACTION	RESULT
1. Retract slats (Ref. 27-80-00) P. Block 301)	- slats retract Make certain movement of shutter is smooth over complete range of slat travel
2. Extend slats (Ref. 27-80-00) P. Block 301)	- slats extend Make certain movement of shutter is smooth and that shutter seals the aperture
3. Retract slats (Ref. 27-80-00) P. Block 301)	- slats retract

G. Close-Up
(1)Depressurize Blue and Green hydraulic system (Ref. 29-10-00, P. Block 301).
(2)Restore the system or aircraft to normal operating condition.
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

SEALING SHUTTERS (No.1 SCREWJACK/TRACK 1 AND No.2 SCREWJACK/TRACK 3) - INSPECTION/CHECK

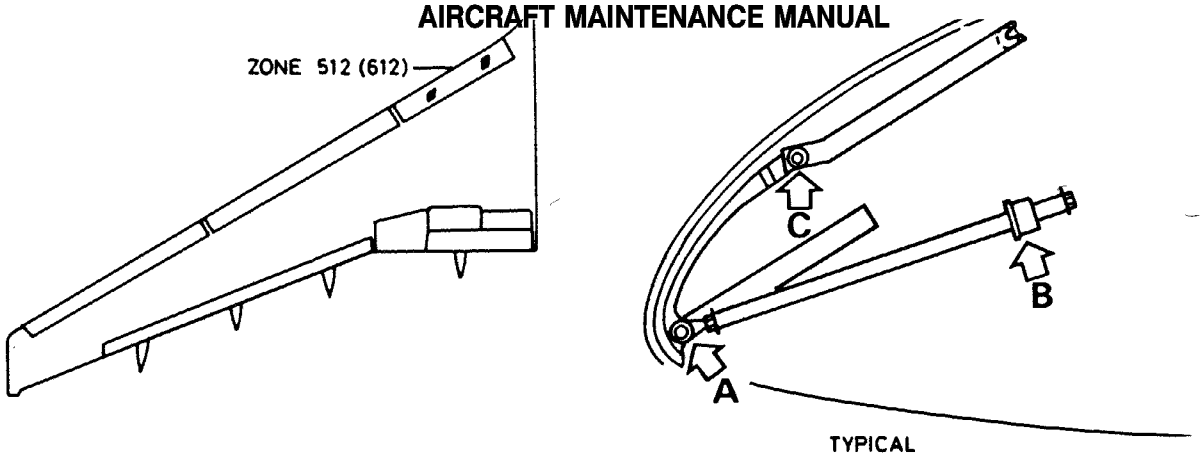
1. Reason for the Job

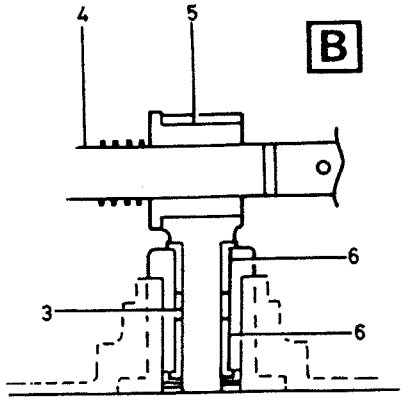
A. Check of fits and clearances

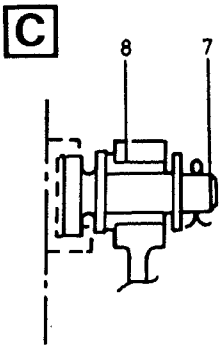
With removal - Table of Fits and Clearances
(Ref. Fig. 601)

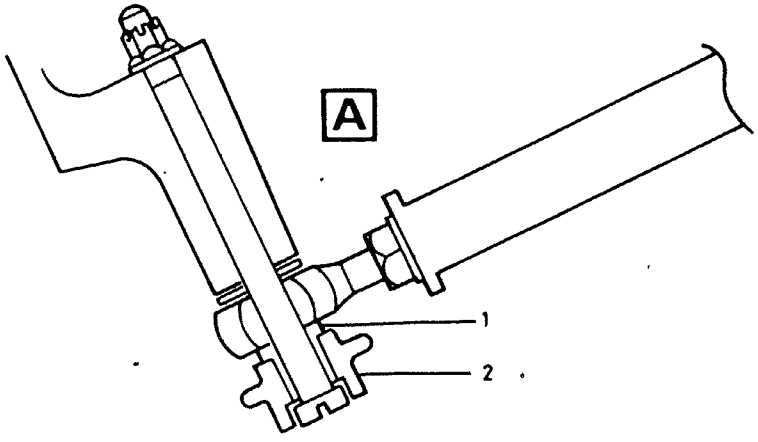
Detail and Item No.	Original Mfg Limits				In-Service Wear Limits		
	Dimension inches (Millimeters)		Assy. Clearance Inch. (Milli.)		Dimension Limits Inch. (Milli.)		Max. Allow. clear in. (mm)
	Min.	Max.	Min.	Max.	Min.	Max.	
A							
OD1	0.3135 (7.963)	0.3139 (7.973)			0.3120 (7.925)		
			0.0011 (0.028)	0.0035 (0.089)			0.0070 (0.178)
ID2	0.3150 (8.001)	0.3170 (8.052)				0.3190 (8.103)	
B							
OD3	0.3741 (9.502)	0.3745 (9.512)			0.3725 (9.462)		
			0.0011 (0.028)	0.0024 (0.061)			0.0055 (0.1397)
ID6	0.3756 (9.540)	0.3765 (9.563)				0.3780 (9.601)	
B							
OD4	0.495 (12.573)	0.505 (12.827)			0.4850 (12.319)		
			0.000 (0.000)	0.012 (0.305)			0.0250 (0.635)
ID5	0.505 (12.827)	0.507 (12.878)				0.5100 (12.954)	
C							
OD7	0.1860 (4.724)	0.1867 (4.742)			0.1850 (4.699)		
			0.0008 (0.020)	0.0022 (0.056)			0.0050 (0.127)
ID8	0.1875 (4.762)	0.1882 (4.780)				0.1900 (4.826)	
C							
OD7	0.500 (12.7)	0.510 (12.954)			Engineer's discretion		

Detail and Item No.	Original Mfg Limits: Dimension inches (Millimeters) Min.	Original Mfg Limits: Dimension inches (Millimeters) Max.	Original Mfg Limits: Assy. Clearance Inch. (Milli.) Min.	Original Mfg Limits: Assy. Clearance Inch. (Milli.) Max.	In-Service Wear Limits: Dimension Limits Inch. (Milli.) Min.	In-Service Wear Limits: Dimension Limits Inch. (Milli.) Max.	In-Service Wear Limits: Max. Allow. clear in. (mm)









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Sealing Shutters - Attachment Details
Figure 601

SEALING SHUTTERS (No.1 SCREWJACK/TRACK 1, AND No.2 SCREWJACK/TRACK 3) DEACTIVATION/REACTIVATION

Ref. : CDL SECTION 6.01.01, CHAP 27 Item 6

CAUTION : THIS PROCEDURE IS TO BE USED IN ACCORDANCE WITH THE CONFIGURATION DEVIATION LIST.

WARNING : LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE CERTAIN GROUND SAFETIES AND NOTICES ARE IN POSITION.

FLIGHT CONTROL SURFACES - MAKE CERTAIN TRAVEL RANGE IS CLEAR.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

HYDRAULICS - BEFORE PRESSURIZING, MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Warning Notices - Prohibiting Operation of Slats and Flaps
C.	Circuit Breaker Safety Clips and Tags
Referenced Procedures	
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

B. Procedure

R (Ref. Fig. 901)

(1)Job Set-Up
(a)Fully extend the slats (Ref. 27-80-00, P. Block 301).
(b)Display warning notices.
(c)Make certain hydraulic system is depressurized (Ref. 29-10-00, P. Block 301).
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62

(e)Position access platform.

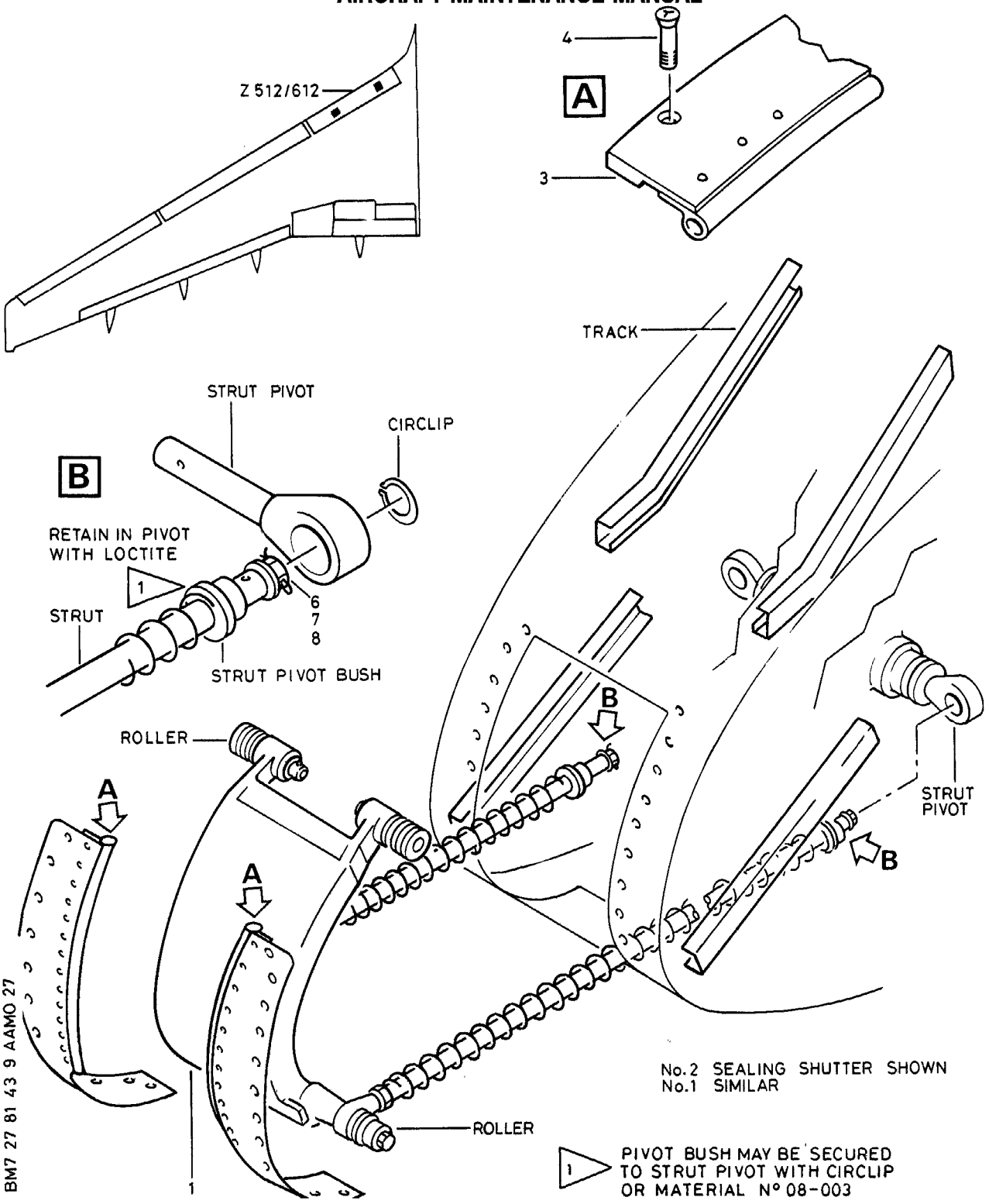
(2)Removal
(a)Open the following access doors for:
- track 1 - 512(612)BB and DB
- track 2 - 512(612)GB and JB

(b)Remove and discard cotter pins (8).
(c)Remove nuts (7) and washers (6).
(d)Manually support shutter (1) against strut spring loading and remove bolts (4) and retaining plates (3).
(e)Allow shutter (1) to slide forward so that rollers disengage from tracks.
(f)Slide struts out of pivots and withdraw shutter assembly through aperture.

(3)Preparation for Test
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Make certain that slat travel range is clear.
(c)Pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).
(e)Remove warning notices.
(f)Remove access platform.

(4)Test
(a)Perform the following:

	ACTION	RESULT
	1. Place FLAP and SLAT control lever in slat 0 position	- slats retract - check that slats move freely and smoothly - check there is no fouling between moving parts and structure
R	2. Place FLAP and SLAT control lever in slat 40 position	-slats extend fully - repeat checks given above
	3. Place FLAP and SLAT control lever in slat 0 position	- slats retract



Sealing Shutters No.1 Screwjack/Track 1 and No.2 Screwjack/Track 3
Figure 901

R

(5)Close-Up
(a)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(b)Install temporary notices on Captain's and First Officer's instrument panels to warn pilots which track sealing shutter(s) is (are) removed.
(c)Package sealing shutter and all other parts removed for return to base with aircraft.
(d)Re-position access platform.
(e)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(f)Close the following access doors for:
- track 1 - 512 (612) BB and DB
- track 2 - 512 (612) GB and JB
(g)Remove access platform.
(h)Make appropriate entries in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Warning Notices-Prohibiting Operation of Slats and Flaps
C.	Circuit Breaker Safety Clips and Tags
D. Material No. 04-017	Common Greases (Ref. 20-31-00)
E. Material No. 11-004	Cleaning Agents (Ref. 20-31-00).
Referenced Procedures	
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

B. Procedure
(Ref. Fig. 902)

(1)Job Set-Up
(a)Fully extend the slats (Ref. 27-80-00, P. Block 301).
(b)Display warning notices.
(c)Make certain that hydraulic system is depressurized (Ref. 29-10-00, P. Block 301).
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/	10CV	335/R67

PANEL	SERVICE	IDENT.	LOCATION
	FLAPS/SYS 1		
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62

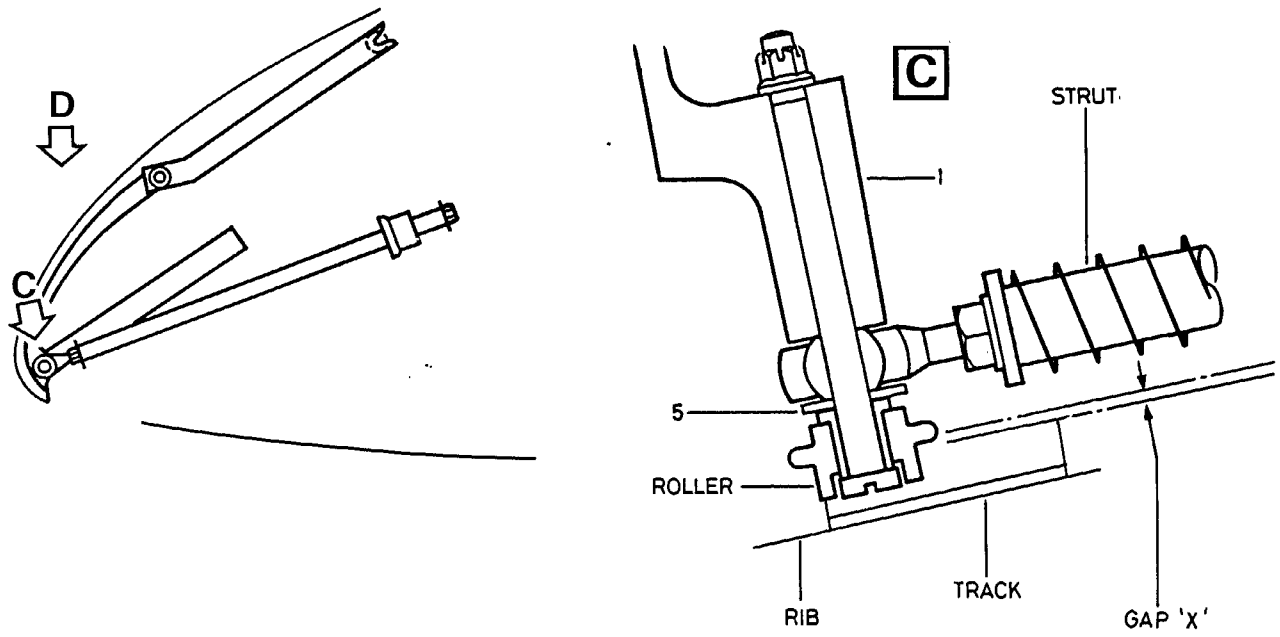
(e)Position access platform.
(f)Open access doors for:
- track 1, 512(612)BB and DB
- track 2, 512(612)GB and JB

(2)Preparation of Replacement Component
(a)Thoroughly clean all dirt and grease from rollers, struts, strut springs and upper and lower tracks with a suitable brush and cleaning agent (Material No. 11-004).
(b)Apply a light coating of grease (Material No. 04-017) onto rollers, struts, flat surfaces of strut springs and all contact surfaces of upper and lower tracks.

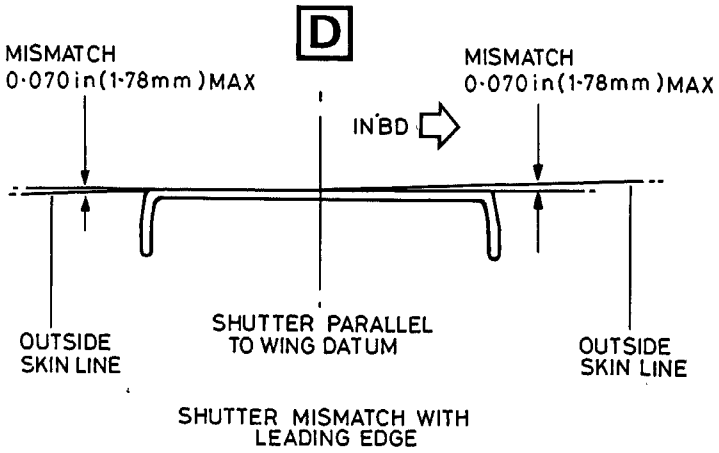
(3)Installation (Ref. Fig. 901, 902)
(a)Make certain strut pivot assembly is wirelocked and swivels freely.
(b)Slide struts into strut pivot bushes and engage rollers in tracks.
(c)Make certain that shutter side float (gap 'X') is between 0.030in (0.76mm) at tightest point between tracks and 0.080in (2.03mm) maximum at any position along tracks. It may be necessary to disassemble the strut/shutter link shown in detail 'C' and install an alternative washer (5) to achieve the required dimension. The link must then be reassembled and safetied with a new cotter pin.
R (d)Manually support shutter (1) against strut spring-loading, position retaining plates (3) and install bolts (4).
(e)Secure struts in strut pivots with washers (6) and nuts (7), and
R safety with new cotter pins (8).
(f)Make certain that shutter mismatch with outside skin surface does not exceed limits.

(4)Preparation for Test
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Make certain that slat travel range is clear
(c)Remove access platform.
(d)Remove warning notices.
(e)Pressurize the hydraulic systems (Ref. 29-10-00, P. Block 301).
(f)Remove safety clips and tags and close circuit breakers 45CV, 3CV, 7CV, 9CV, 8CV, 4CV, 1CV, 10CV, 5CV, 6CV and 2CV.

R (5)Test.
(a)Perform the following:



SIDE ROLLER ADJUSTMENT (TYPICAL)



SHUTTER MISMATCH WITH LEADING EDGE

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R

Sealing Shutters - Adjustment
Figure 902

ACTION	RESULT
1. Place FLAP and SLAT control lever in slat 0 position	- slats retract - check that movement of shutter is smooth over complete range of slat travel
2. Place FLAP and SLAT control lever in slat 40 position	- slats extend - check that movement of shutter is smooth and that shutter seals the aperture
3. Place FLAP and SLAT control lever in slat 0 position	- slats retract

(6)Close-Up
(a)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(b)Restore aircraft to normal operating condition by removing
R temporary warning notices from Captain's and First Officer's instrument panels.
(c)Re-position access platform.
(d)Close access doors for :
- track 1, 512 (612) BB DB.
- track 2, 512 (612) GB JB.
(e)Remove access platform.
(f)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(g)Make appropriate entries in aircraft technical log.

SEALING SHUTTERS - NOS.3,4,5 AND 6 SCREWJACKS
REMOVAL/INSTALLATION

WARNING : LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE CERTAIN TRAVEL RANGE IS CLEAR.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4m (13 ft)
B.	Warning Notices - Prohibiting Operation of Flaps and Slats
C.	Circuit Breaker Safety Clips and Tags
D. Material No. 04-017	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power
- 27-80-00, P. Block 301	Lift Augmenting

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Extend the slats (Ref. 27-80-00, P. Block 301).

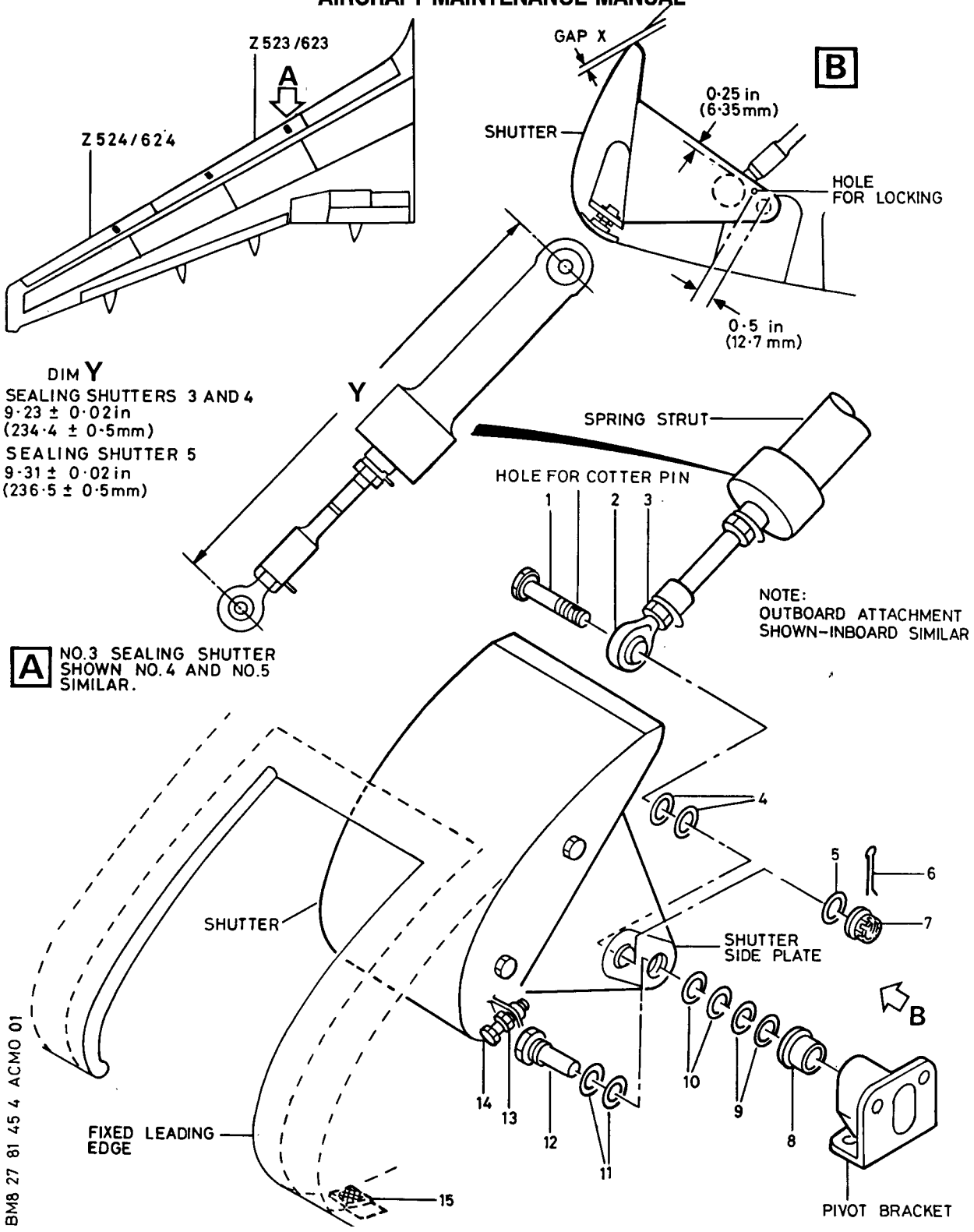
(2)Display warning notice.

(3)Depressurize Blue hydraulic system (Ref. 29-10-00, P. Block 301).

(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	KRUEGER	45CV	333/T61
133VU	SLATS/SYS1/26VAC	3CV	335/R65
133VU	SLATS/SYS1/SFCC & CTL SUPPLY/NORM	7CV	333/T63
133VU	SLATS/SYS1/SFCC & CTL SUPPLY/LAND RECOVERY	9CV	335/R66
133VU	SLATS/SYS2/SFCC & CTL SUPPLY/NORM	8CV	333/T64
133VU	SLATS/SYS2/26VAC	4CV	335/R64
133VU	FLAPS/SYS1/26VAC	1CV	335/R61
133VU	FLAPS/SYS1/SFCC & CTL SUPPLY/LAND RECOVERY	10CV	335/R67
133VU	FLAPS/SYS1/SFCC & CTL SUPPLY/NORM	5CV	332/U61
133VU	FLAPS/SYS2/SFCC & CTL SUPPLY/NORM	6CV	331/V61
133VU	FLAPS/SYS2/26VAC	2CV	334/S62

(5)Position access platform.



Nos. 3, 4 and 5 Screwjack Sealing Shutters - Installation
Figure 401

R

B. Removal

(1)Remove sealing shutters 3, 4 and 5 as follows:

(a)Open access panels 523(623)DB or 523(623)KB or 524(624)DB.

R (b)Remove cotter-pin (6), nut (7), washer (5), bolt (1) and washers (4). Disconnect spring strut from shutter side plate.

(c)Remove lockwire from pivot bolts (12). Support sealing shutter and remove pivot bolts, washers (10 and 11) and washer shims (9).

(2)Remove sealing shutter 6 as follows:

(a)Open access panels 524(624)HB, 524(624)JB and 524(624)KB.

WARNING : THE SEALING SHUTTER SPRING IS STILL IN TENSION IN THIS POSITION

(b)Unhook and remove springs (31).

(c)Remove cotter pins (22), nuts (23), washers (34) and bolts (32)

(d)Remove nuts (27), retainers (26), pins (25) and lever (21).

(e)Remove shutter (30) together with links (33) from tracks (29).

C. Preparation of Replacement Component

R (1)If a new sealing shutter 3, 4 or 5 is to be installed drill a
R 1.7 mm (0.07 in.) dia. hole, as shown in bolt (1).
R Deburr drilled hole.

R (2)If a new sealing shutter 6 is to be installed drill a 1.7 mm
R (0.07 in.) dia. hole, as shown, in spigot (24) and bolt (32).
R Deburr drilled holes.

D. Installation

(Ref. Fig. 402)

(1)Install sealing shutter 6 as follows:

(a)Position shutter (30) complete with links (33); slide onto tracks (29).

(b)Install lever (21), pins (25), retainers (26) and nuts (27).

(c)Connect links (33) to lever (21) with bolts (32), washers (34) and nuts (23). Tighten and safety with cotter-pins (22).

(d)Install springs (31).

(e)Make certain that profiles of shutter and fixed leading edge align. If necessary adjust as follows:

1 Loosen locknuts (35).

2 Adjust bolts (36).

3 Tighten locknuts (35).

4 Make certain that gap X is at least 0.05 in (1.27 mm).

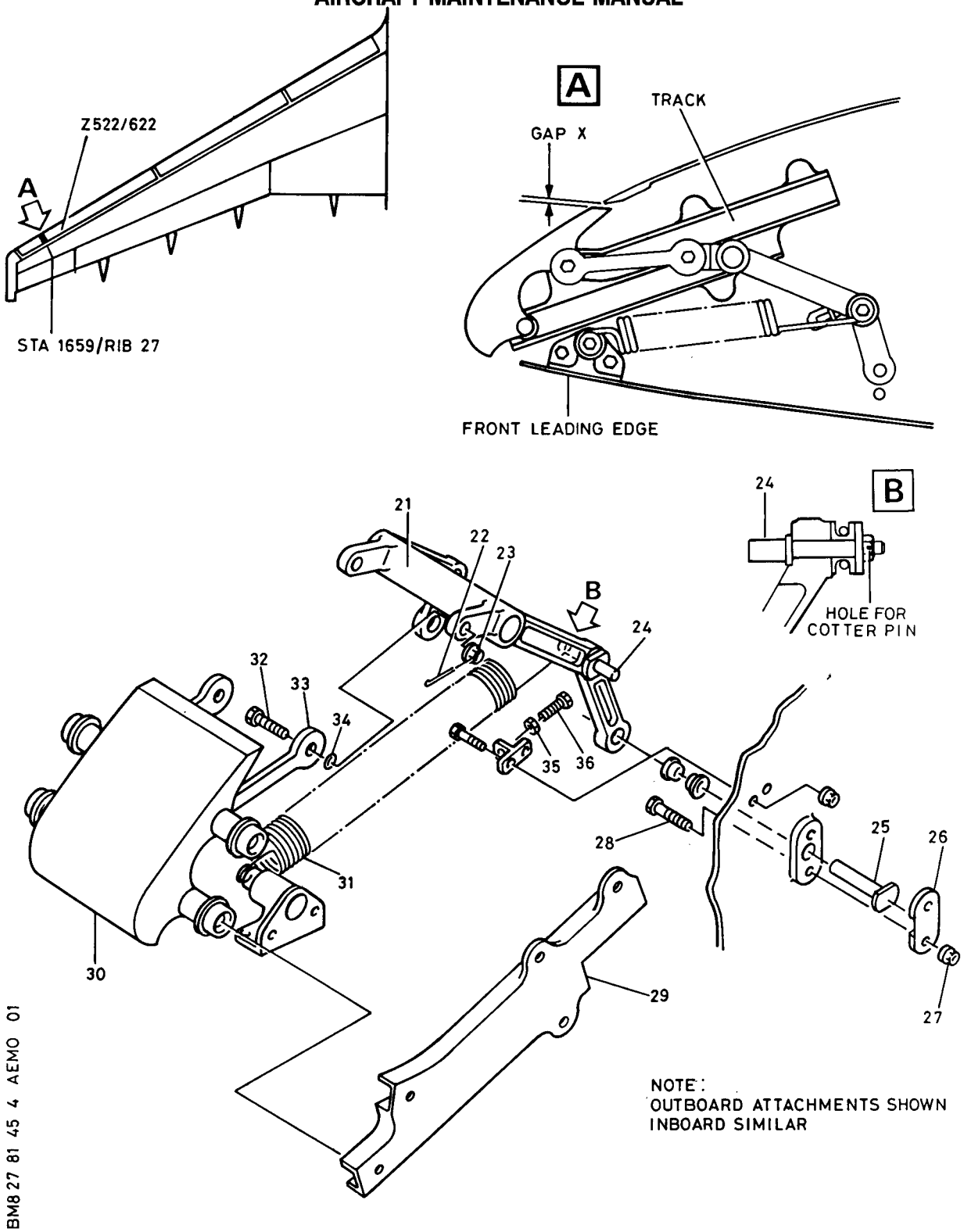
(2)Install sealing shutters 3 and 4 as follows:

(a)Position sealing shutter.

(b)Install washer shims (9), washers (10 and 11) and pivot bolts (12). Make certain that countersunk face of washers (10 and 11) face underside head of pivot bolts.

(c)Tighten pivot bolts and wirelock to shutter sideplates.

(d)With shutter on downstop (15), make certain that profile of shutter aligns with profile of fixed leading edge. If necessary, adjust as follows:



No. 6 Screwjack Sealing Shutter - Installation
Figure 402

R

1 Loosen locknut (13).
2 Adjust downstop screw (14).
3 Tighten locknut (13).
4 Make certain that gap 'X' is at least 0.05 in (1.27 mm).

(e)Make certain that spring strut is correct length, Dimension 'Y'. If necessary adjust as follows:
1 Cut and remove lockwire and loosen nut (3).
2 Adjust rod end (2).
3 Make certain that rod end is in safety.
4 Tighten nut (3) and safety with lockwire.

(f)Connect spring strut to shutter using bolt (1), washers (4 and 5) and nut (7). Tighten nut (7) and safety with cotter pin (6).

(3)Install sealing shutter 5 as follows:-

(a)Position sealing shutter.

(b)Install washer shims (9) and washers (10 and 11) and pivot bolts (12). Make certain that countersunk face of washers (10 and 11) face underside head of pivot bolts (12).

(c)Tighten pivot bolts (12) and wirelock to shutter sideplates.

(d)With shutter on downstop (15), make certain that profile of shutter aligns with profile of fixed leading edge. If necessary, adjust as follows:
1 Loosen locknut (13).
2 Adjust downstop screw (14).
3 Tighten locknut (13).
4 Make certain that gap 'X' is at least 0.05 in (1.27 mm).

(e)Make certain that spring strut is correct length, Dimension 'Y'. Position shutter downstop screw (14) on downstop (15) and adjust, if if necessary, spring strut rod end as follows:
1 Cut and remove lockwire and loosen nut (3).
2 Adjust rod end (2) making certain that dimension 'Y' is maintained.
3 Make certain that rod end (2) is in safety.
4 Tighten nut (3) and safety with lockwire.

(f)Connect spring strut to shutter using bolt (1), washers (4 and 5) and nut (7). Tighten and safety with cotter pin (6).

E. Preparation for Test

(1)Make certain work area is clean and clear of tools and miscellaneous items of equipment.

(2)Make certain that travel range of slats, Kreuger flap and ailerion droop is clear

(3)Close access panels.

(4)Remove access platform.

(5)Pressurize hydraulic system (Ref. 29-10-00, P. Block 301).

(6)Remove safety clips and tags and close circuit breakers 45CV,3CV,7CV, 9CV,8CV,4CV,1CV,10CV,5CV,6CV and 2CV.

(7)Remove warning notices.

F. Test

(1)Perform the following:

ACTION	RESULT
On panel 9VU: - retract slats (Ref. 27-80-00, P. Block 301) Make certain movement of shutter is smooth over complete range of slat travel	slats retract
On panel 9VU: - extend slats (Ref. 27-80-00, P. Block 301) Make certain movement of shutter is smooth and that the shutter seals the aperture	slats extend
On panel 9VU: - retract slats (Ref. 27-80-00, P. Block 301)	slats retract

G. Close-Up
(1) Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(2) Shut down and disconnect hydraulic power cart.
(3) Restore the system or the aircraft to normal operating condition.
(4) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(5) Remove all ground handling and maintenance equipment, standard and special tools, together with ground power and replenishing equipment, all access equipment and miscellaneous items.

1. Reason for the job

A. Check of fits and clearances after removal.

Table of Fits and Clearances
(Ref. Fig. 601)
NOTE: Limits annotated with an asterisk *, only apply while there is a thickness of chrome plating remaining on the bearing surface.

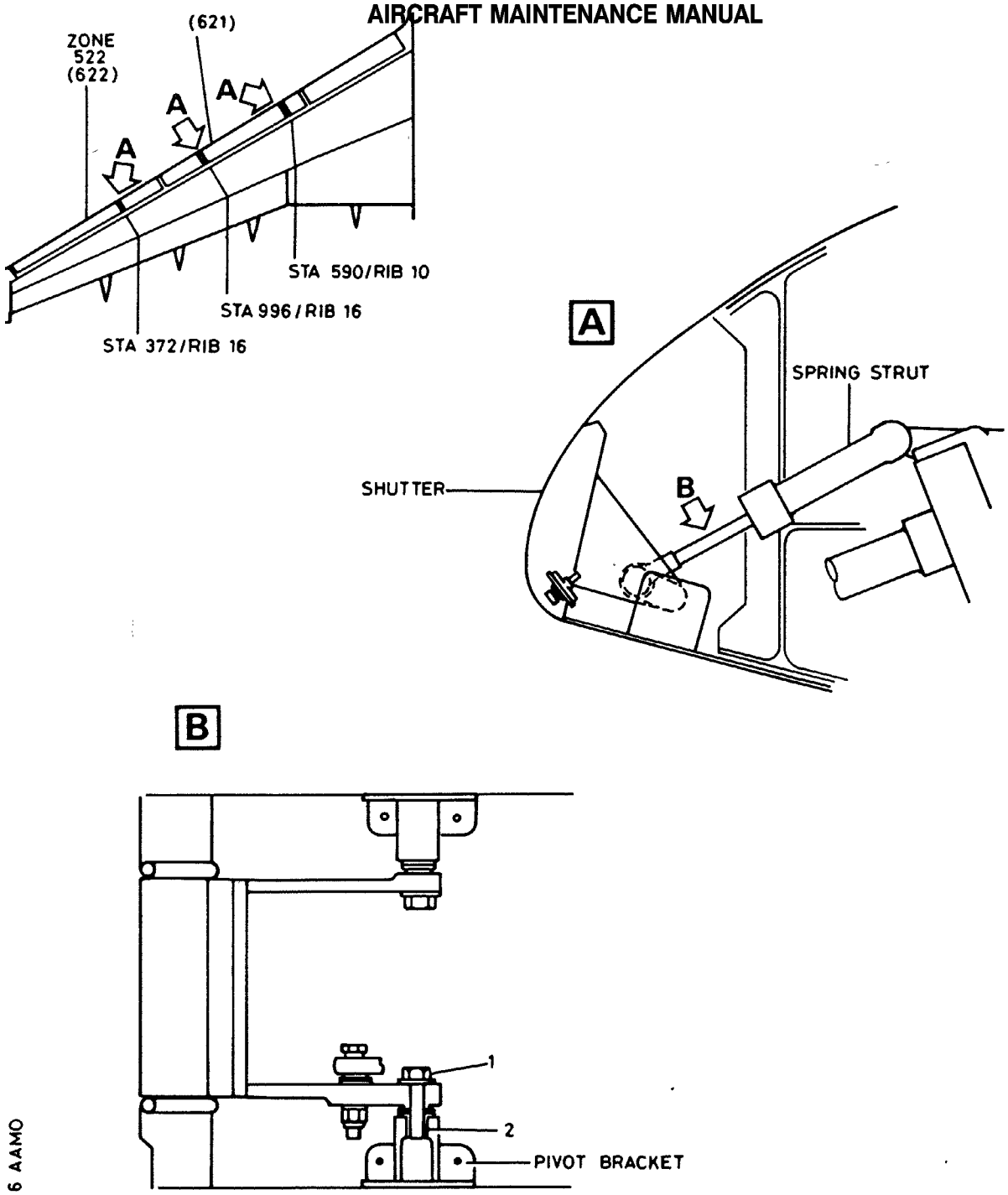
Detail and Item No.	Original Mfg Limits: Dimension inches (Millimeters) Min.	Original Mfg Limits: Dimension inches (Millimeters) Max.	Original Mfg Limits: Assy. Clearance Inch. (Milli.) Min.	Original Mfg Limits: Assy. Clearance Inch. (Milli.) Max.	In-Service Wear Limits: Dimension Limits Inch. (Milli.) Min.	In-Service Wear Limits: Dimension Limits Inch. (Milli.) Max.	In-Service Wear Limits: Max. Allow. clear in. (mm)
OD1 *	0.2494 (6.335)	0.2498 (6.345)			0.2480 (6.299)		
			0.0005 (0.013)	0.0018 (0.046)			0.0045 (0.114)
ID2	0.2503 (6.358)	0.2512 (6.380)				0.2525 (6.414)	

Table of Fits and Clearances

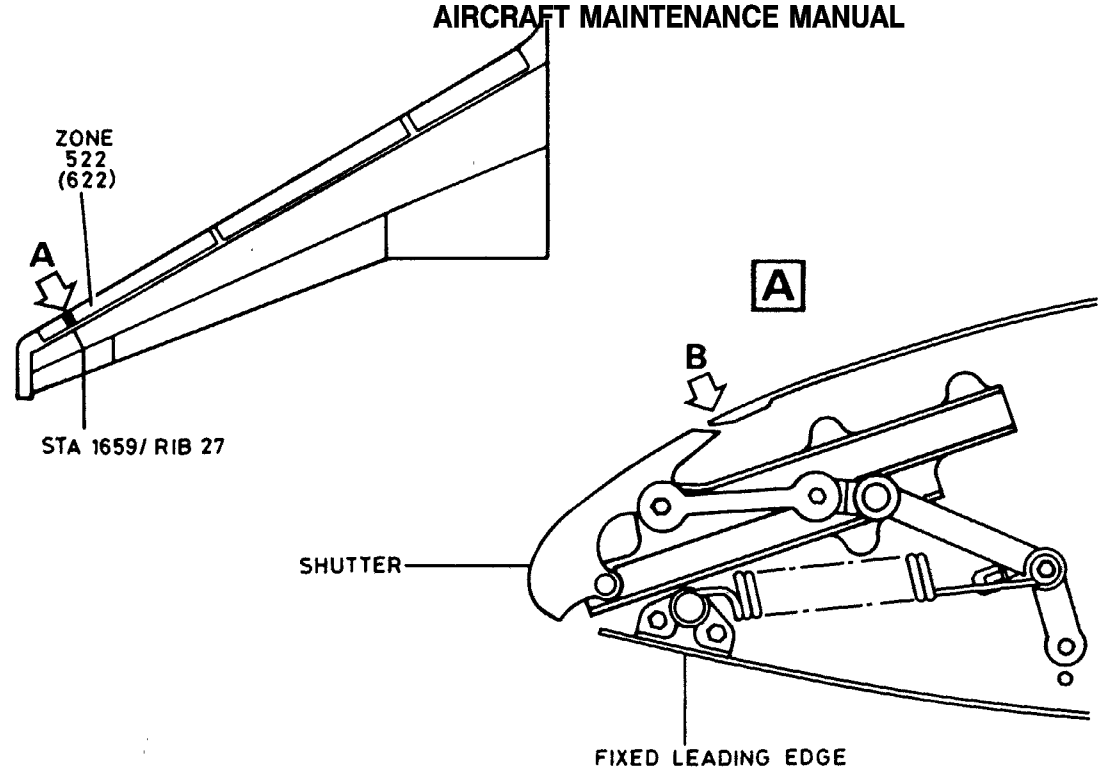
(Ref. Fig. 602)
NOTE: Limits annotated with an asterisk *, only apply while there is a thickness of chrome plating remaining on the bearing surface.

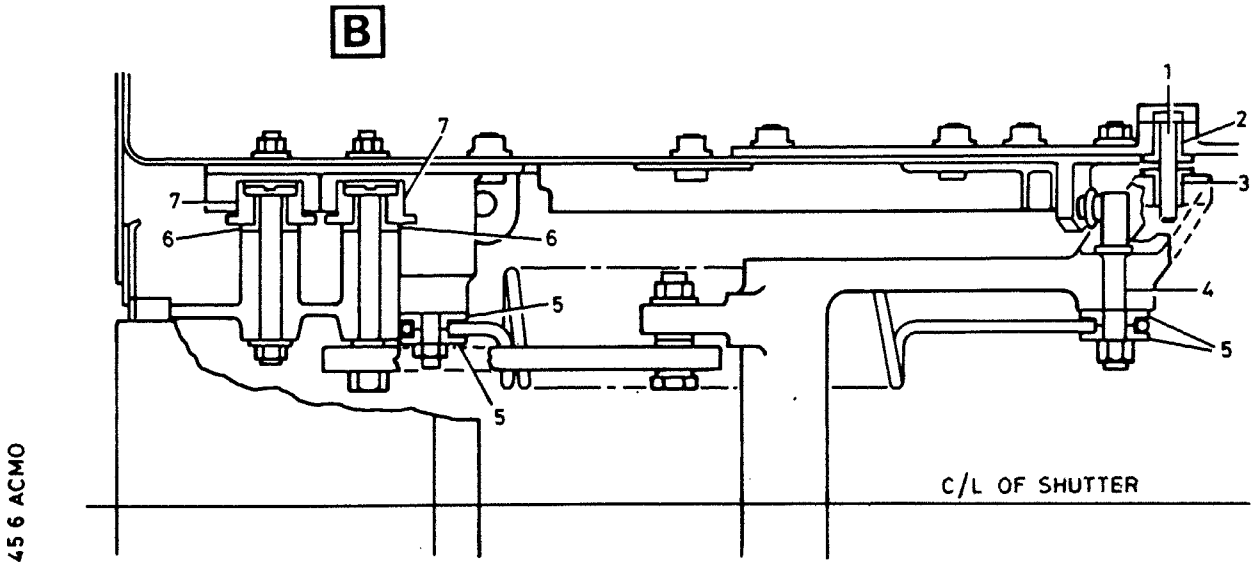
Detail and Item No.	Original Mfg Limits: Dimension inches (Millimeters) Min.	Original Mfg Limits: Dimension inches (Millimeters) Max.	Original Mfg Limits: Assy. Clearance Inch. (Milli.) Min.	Original Mfg Limits: Assy. Clearance Inch. (Milli.) Max.	In-Service Wear Limits: Dimension Limits Inch. (Milli.) Min.	In-Service Wear Limits: Dimension Limits Inch. (Milli.) Max.	In-Service Wear Limits: Max. Allow. clear in. (mm)
OD1	0.2489 (6.322)	0.2495 (6.337)			0.2475 (6.287)		
			0.0008 (0.021)	0.0023 (0.058)			0.0050 (0.127)
ID2 AND 3	0.2503 (6.358)	0.2512 (6.380)				0.2525 (6.414)	

Detail and Item No.	Original Mfg Limits				In-Service Wear Limits		
	Dimension inches (Millimeters)		Assy. Clearance Inch. (Milli.)		Dimension Limits Inch. (Milli.)		Max. Allow. clear in. (mm)
	Min.	Max.	Min.	Max.	Min.	Max.	
OD4	0.2485 (6.312)	0.2495 (6.337)			0.2470 (6.274)		
			0.0035 (0.089)	0.0065 (0.165)			0.0100 (0.254)
ID5	0.2530 (6.426)	0.2550 (6.477)				0.2570 (6.528)	
OD5	0.3800 (9.652)	NOMINAL					
OD6	0.3105 (7.887)	0.3115 (7.912)			0.3090 (7.849)		
			0.0010 (0.025)	0.0029 (0.073)			0.0065 (0.165)
ID7	0.3125 (7.937)	0.3134 (7.960)				0.3155 (8.014)	



No. 3,4 and 5 Screwjack Sealing Shutters -
Fits and Clearances
Figure 601





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No. 6 Screwjack Sealing Shutter -
Fits and Clearances
Figure 602

SEALING SHUTTERS 3,4,5,6 SCREWJACKS - LH, RH
DEACTIVATION/REACTIVATION

WARNING : LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE CERTAIN GROUND SAFETIES AND NOTICES ARE IN POSITION.

FLIGHT CONTROL SURFACES - MAKE CERTAIN TRAVEL RANGE IS CLEAR.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Warning Notice - Prohibiting the Use of Slats System
C.	Circuit Breaker Safety Clips and Tags
D.	Cotter-Pins
E. Material No. 09-024	Sealants (Ref. 20-31-00)
Referenced Procedures	
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

B. Procedure
(Ref. Fig. 901)
(Ref. Fig. 902)

(1)Job Set-Up
(a)Extend the slats (Ref. 27-80-00, P. Block 301).
(b)Display warning notices.
(c)Depressurize the hydraulic system (Ref. 29-10-00, P. Block 301).
(d)Open, safety and tag the following circuit breakers.

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUEGER	45CV	333/T61
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/SLATS SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/FLAPS/ SYS 1	10CV	335/R67
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 1	5CV	333/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62

(e)Position access platform.

(2)Removal

(a)Remove sealing shutters, 3, 4 and 5 screwjacks, as follows:

1Open access panels 523(623)DB or 523(623)KB or 524(624)DB.

2Remove cotter-pin (13), nut (14), washer (12), bolt (8) and washers (11). Disconnect spring strut (7) from shutter side plate.

3Remove lockwire from pivot bolts (18). Support sealing shutter (21) and remove pivot bolts (18), washers (17 and 16) and washer shim (15).

4Remove sealing shutter (21).

5If necessary, remove access panel landing attachment plates or angles for access.

6Remove cotter-pin (5), nut (6) and washer (4).

7Support the spring-rod (7), remove bolt (1), washer (2) and sleeve (3). Withdraw the spring-rod (7).

(b)Remove sealing shutter, 6 screwjack, as follows:

1Open access panels 524(624)HB, 524(624)JB and 524(624)KB.

WARNING : THE SEALING SHUTTER SPRING IS STILL IN TENSION IN THIS POSITION.

2Unhook and remove springs (5).

3Remove cotter-pins (7), nuts (8), washers (4) and bolts (2).

4Remove nuts (15), retainers (14), pins (13), lever (6), washer (12) and bolt (11).

5Remove shutter (1) together with links (3) from tracks.

(3)Preparation For Test

(a)Make certain work area is clean and clear of tools and miscellaneous items of equipment.

(b)If applicable (Ref. step (2) (a) 5); clean sealant from ribs and landings, assemble with sealant (Material No. 09-024) and install removed items.

(c)Close the access panels.

(d)Make certain slat travel range is clear.

(e)Remove access platform.

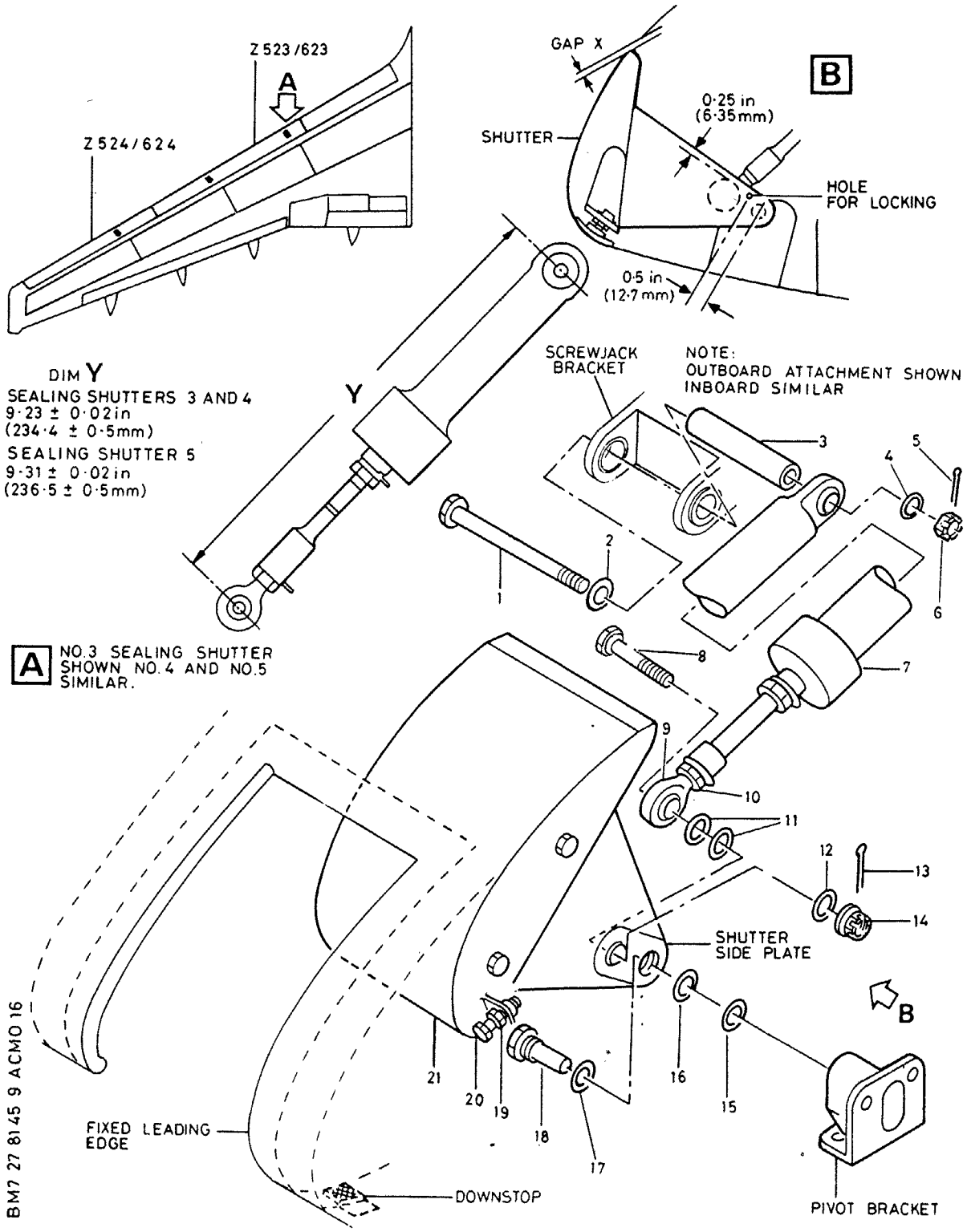
(f)On panel 133VU; remove safety clips and tags and close circuit breakers 45CV, 3CV, 7CV, 9CV, 8CV, 4CV, 1CV, 10CV, 5CV, 6CV and 2CV.

(g)Remove warning notices.

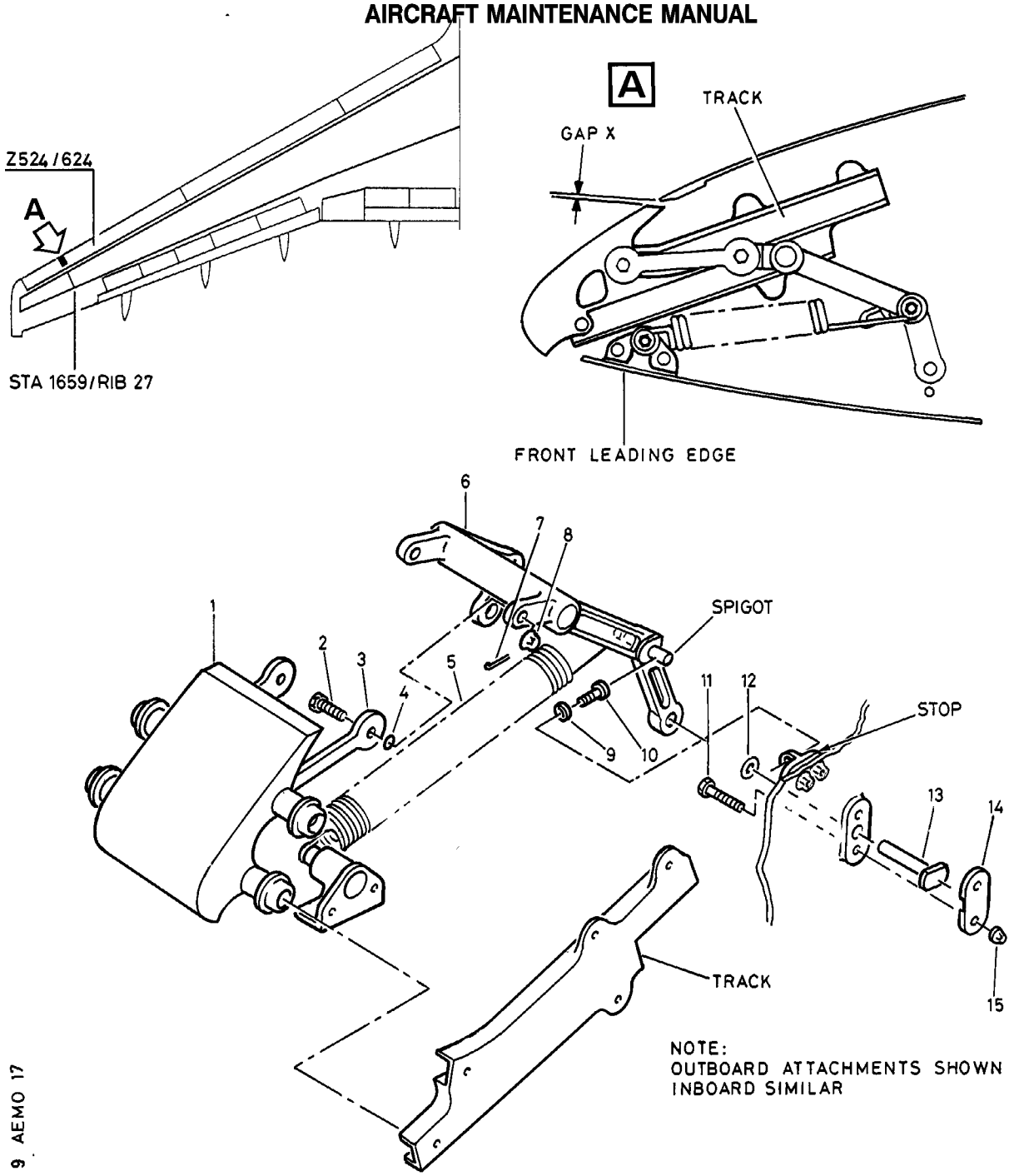
(h)Pressurize the hydraulic system (Ref. 29-10-00, P. Block 301).

(4)Test

(a)Perform the following:



No.3, 4 and 5 Screwjack Sealing Shutters
- Installation.
Figure 901



No.6 Screwjack Sealing Shutters - Installation.
Figure 902

ACTION	RESULT
1. Retract slats (Ref. 27-80-00, P. Block 301). Make certain movement of slat is smooth over complete range of travel and no fouling occurs	- slats retract
2. Extend slats (Ref. 27-80-00, P. Block 301). Make certain movement of slat is smooth and that no fouling occurs	- slats extend
3. Retract slats	- slats retract

(b)Depressurize the hydraulic system (Ref. 29-10-00, P. Block 301).
(5)Close-Up
(a)For 3,4 and 5 screwjack sealing shutters:
measure and record length of spring-rod (7).
(b)Package the sealing shutter, spring-rod, and all other parts removed, for return to base with the aircraft.
(c)Install temporary notices on Captain's and First Officer's instrument panels to warn pilots that:
1 Nos.3,4,5 or 6 slat screwjack(s) LH(RH) sealing shutter(s) is(are) removed.
(d)Make appropriate entries in the aircraft technical log.

2. Reactivation
A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Warning Notice - Prohibiting the Use of Slats System
C.	Circuit Breaker Safety Clips and Tags
D.	Cotter-Pins
E. Material No. 04-004	Common Greases (Ref. 20-31-00)
F. Material No. 09-024	Sealants (Ref. 20-31-00)
G.	Corrosion-Resistant Steel Lockwire, Dia. 0.8 mm (0.032 in)
Referenced Procedures	
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

B. Procedure (Ref. Fig. 901, 902)
(1)Job Set-Up
(a)Extend the slats (Ref. 27-80-00, P. Block 301).
(b)Display warning notice.
(c)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUEGER	45CV	333/T61
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/SLATS/ SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SFCC LAND RECOVERY/SUPPLY/FLAPS/ SYS 1	10CV	335/R67
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 1	5CV	333/U61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62

(e)Position access platform.

(f)For sealing shutters, Nos. 3,4 and 5 screwjacks; open access panels 523(623)DB, 523(623)KB or 524(624)DB.

(g)For sealing shutter, No. 6 screwjack; open access panels 524(624)HB, 524(624)JB and 524(624)KB.

(2)Preparation of Replacement Component.

(a)For new sealing shutters, Nos. 3,4 or 5 screwjacks;

1 Drill 1.4 mm dia hole for locking as shown on detail B.

2 Deburr the hole.

(b)Adjust spring-rod (7), for No. 3,4 or 5 screwjacks, to maintain dimension 'Y':

1 Cut and remove lockwire, loosen nut (10).

2 Adjust rod-end (9).

3 Make certain that rod-end (9) is in safety.

4 Tighten nut (10) and safety with lockwire.

(3)Installation.

(a)Sealing shutters for 3,4 or 5 screwjacks: (Ref. Fig. 901)

1 If necessary, remove access panel, landing attachment plates or angles for access.

2 Locate spring-rod (7) on screwjack bracket. Coat bolt (1) and sleeve (3) with grease (Material No. 04-004). Install sleeve (3), bolt (1), washers (2) and (4) and nut (6). Safety nut with cotter-pin (5).

3 Position sealing shutter. Install washer shim (15), washers (16) and (17) and pivot bolts (18). Make certain that countersunk face of washers (16) and (17) face underside head of pivot bolts (18).

4 Tighten pivot bolts (18) and wirelock to shutter sideplates.

5 With shutter on downstop, make certain that profile of shutter aligns with profile of fixed leading edge.

6 If necessary; loosen locknut (19), adjust downstop bolt (20) and tighten locknut (19).

7 Make certain GAP 'X' is 0.05 in (1.27 mm) minimum.

8 Make certain rod-end (9) can be secured by bolt (8) to shutter side-plate with shutter (21) on downstop. Adjust if necessary (Ref. step (2)(b)).

9 Secure rod-end (9) to shutter side-plate with bolt (8), washers (11)

and (12) and nut (14).
10 Safety nut (14) with cotter-pin (13).

(b) Sealing shutter, No. 6 screwjack: (Ref. Fig. 902)
1 Position shutter (1) complete with links (3) and slide onto tracks.
2 Install lever (6), pins (13), washers (12), retainers (14), bolts (11) and nuts (15).
3 Connect links (3) to lever (6) with bolts (2), washers (4) and nuts (8). Tighten and safety with cotter-pins (7).
4 Install springs (5).
5 Make certain that profiles of shutter and fixed leading edge align, with bolt (10) against spigot.
6 If necessary, loosen locknut (9), adjust bolt (10) against spigot and tighten locknut (9).
7 Make certain that GAP 'X' is 0.05 in (1.27 mm) minimum.

(4) Preparation for Test
(a) Make certain work area is clean and clear of tools and miscellaneous items of equipment.
(b) If applicable (Ref. step (3)(a)1); clean sealant from ribs and landings, assemble with sealant (Material No. 09-024) and install removed items.
(c) Close the access panels.
(d) Make certain slat travel range is clear.
(e) Remove access platform.
(f) On panel 133VU, remove safety clips and tags and close circuit breakers 45CV,3CV,7CV,9CV,8CV,4CV,1CV,10CV,5CV,6CV and 2CV.
(g) Remove warning notices.
(h) Pressurize hydraulic system (Ref. 29-10-00, P. Block 301).

(5) Test
(a) Perform the following:

ACTION	RESULT
1. Retract slats (Ref. 27-80-00, P. Block 301). Make certain movement of shutter is smooth over complete range of slat travel.	- slats retract
2. Extend slats (Ref. 27-80-00, P. Block 301). Make certain movement of shutter is smooth and that shutter seals the aperture	- slats extend
3. Retract slats	- slats retract

(b) Depressurize the hydraulic system (Ref. 29-10-00, P. Block 301).

(6) Close-Up
(a) Shut down and disconnect hydraulic ground power cart.
(b) De-energize the aircraft electrical network (Ref. 24-41-00,

P. Block 301).

(c)Remove temporary notices from Captain's and First Officer's instrument panels.

(d)Make appropriate entries in the aircraft technical log.

SPRING ROD - SEALING SHUTTERS SCREWJACKS 3 THRU 5 - REMOVAL/INSTALLATION

WARNING: LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE CERTAIN GROUND SAFETIES AND NOTICES ARE IN POSITION.

MAKE CERTAIN THAT FIRE FIGHTING EQUIPMENT IS AVAILABLE AND ADEQUATE.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

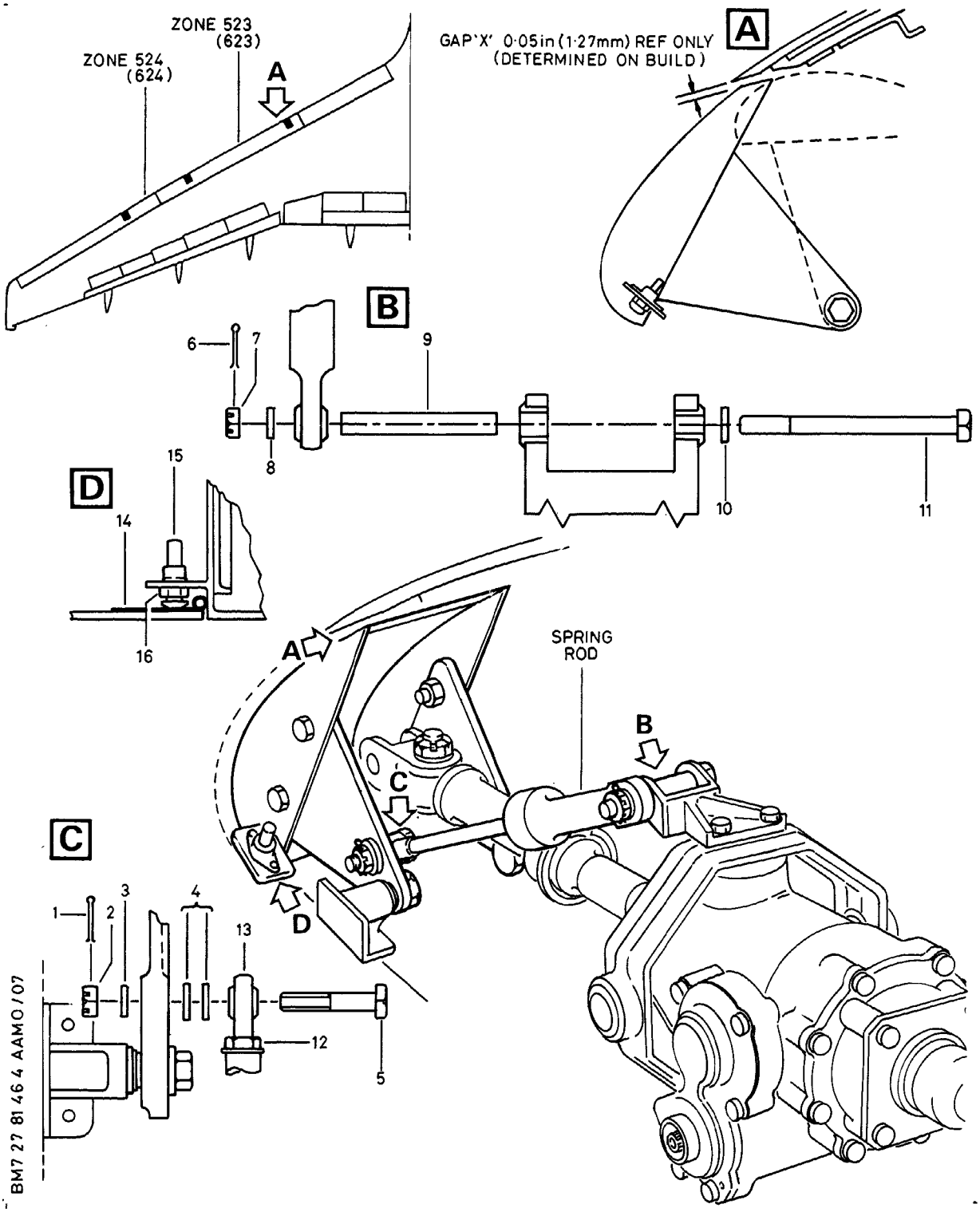
1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 to 5 m (6 to 17 ft)
B.	Warning Notice - Prohibiting the Use of Slats System
C.	Circuit Breaker Safety Clips and Tags
D.	Cotter-Pins
E. Material No. 04-004	Common Greases (Ref. 20-31-00)
F. Material No. 09-024	Sealants (Ref. 20-31-00)
Referenced Procedures - 27-80-00, P. Block 301	Lift Augmenting

2. Procedure
(Ref. Fig. 401)
A. Job Set-Up
(1)Extend slats (Ref. 27-80-00, P. Block 301).
(2)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	SLATS/SYS 2/26 VAC	4CV	335/R64
133VU	SLATS/SYS 2/SFCC & CTL SUPPLY/NORM	8CV	333/T64
133VU	SLATS/SYS 1/SFCC & CTL SUPPLY/LAND RECOVERY	9CV	335/R66
133VU	SLATS/SYS 1/SFCC & CTL SUPPLY/NORM	7CV	333/T63
133VU	SLATS/SYS 1/26 VAC	3CV	335/R65
133VU	KRUGER	45CV	333/T61

(3)Position warning notice.
(4)Position access platform.
(5)Remove access panel 523(623)DB for screwjack 3, 523(623)KB for



Spring Rod Installation
Figure 401

screwjack 4, 524(624)DB for screwjack 5.
(6)If necessary (to facilitate access) remove access panel landing attachment plates and/or angles.

B. Removal
(1)Remove and discard cotter-pin (1).
(2)Remove nut (2), washer (3), bolt (5) and washers (4).
(3)Remove and discard cotter-pin (6).
(4)Remove nut (7), washer (8), bolt (11), sleeve (9), and washer (10).
(5)Remove spring rod. Measure and record length of rod.

C. Preparation of Replacement Component
(1)Set length of replacement rod to match that of removed rod as follows:-
(a)Cut and remove lockwire, loosen nut (12).
(b)Adjust rod end (13).
(c)Make certain that rod end is in safety.
(d)Tighten nut (12) and safety with lockwire.

D. Installation
(1)Locate spring rod on screwjack bracket. Coat bolt (11) and sleeve (9) with Material No. 04-004. Install sleeve (9), bolt (11), washer (8) and nut (7). Safety nut with cotter-pin (6).
(2)Locate spring rod on shutter side plate. Coat bolt (5) with Material No. 04-004. Install bolt (5), washers (4), washer (3) and nut (2). Safety nut with cotter-pin.
(3)Make certain that a gap exists between top of shutter and wing structure ('X' on figure).
(4)Make certain that shutter downstop screw (15) is in contact with downstop (14), and that shutter profile aligns with fixed leading edge profile. If necessary, adjust downstop after slackening locknut (16). Tighten locknut (16).

E. Preparation for Test
(1)On panel 133VU, remove safety clips and tags and close circuit breakers 4CV,8CV,9CV,7CV,3CV and 45CV.
(2)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.
(3)Remove warning notice.

F. Test
(1)Perform the following:

ACTION	RESULT
Retract slats (Ref. 27-80-00, P. Block 301) Make certain movement of shutter is smooth over complete range of slat travel.	- slats retract

ACTION	RESULT
Extend slats (Ref. 27-80-00, P. Block 301)	- slats extend
Make certain movement of shutter is smooth and that shutter seals the aperture	
Retract slats	- slats retract

G. Close-Up
(1)If applicable (Ref. step 2A(6)) clean sealant from ribs and landings. Assemble with Material 09-024 and install previously removed items (step 2A(6)).
(2)Close access doors (Ref. step 2A(5)).
(3)Remove access platform.

FAIRING PLATES - DEACTIVATION/REACTIVATION

Ref. CDL 6.01.01 Chapter 27. Item 3 Ref. Para.2
Ref. CDL 6.01.01 Chapter 27. Item 4 Ref. Para.4

CAUTION : THIS PROCEDURE IS SUBJECT TO THE LIMITATIONS IMPOSED BY THE CDL.

WARNING : LANDING GEAR - MAKE CERTAIN THAT GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE CERTAIN THAT GROUND SAFETIES AND NOTICES ARE IN POSITION.

FLIGHT CONTROLS - MAKE CERTAIN THAT TRAVEL RANGES OF CONTROL SURFACES ARE CLEAR.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ANY ELECTRICAL CIRCUIT UPON WHICH WORK IS IN PROGRESS IS ISOLATED.

1. Reason for the Job

R A. Deactivation procedure for Slat Screwjack and Track Fairing Plates - Ref. Configuration Deviation List& (CDL) Section 6.01.01 Chap.27,& Item 3

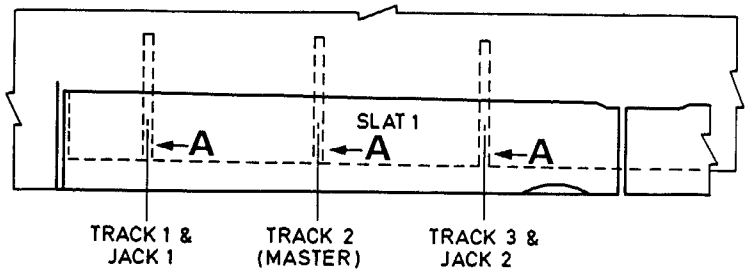
B. Deactivation procedure for Slat Anti-Ice Duct Fairing Door - Ref. Configuration Deviation List& (CDL) Section 6.01.01 Chap.27,& Item 4

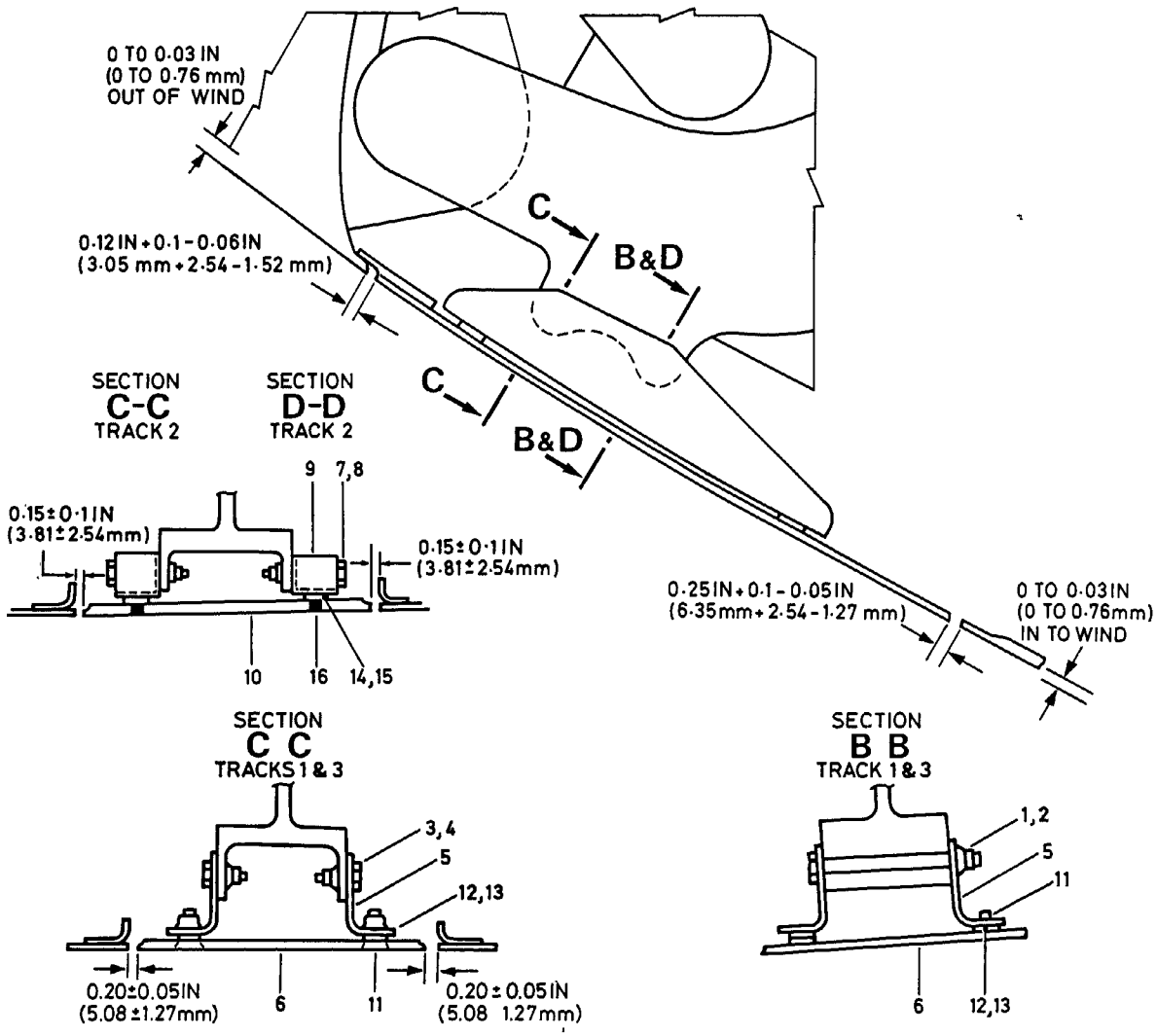
2. Deactivation - Slat Screwjack and Track Fairing Plates

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 to 6m (13 to 20 ft)
B.	Warning Notices - Prohibiting Operation of Slats and Flaps
C.	Circuit Breaker Safety Clips and Tags
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

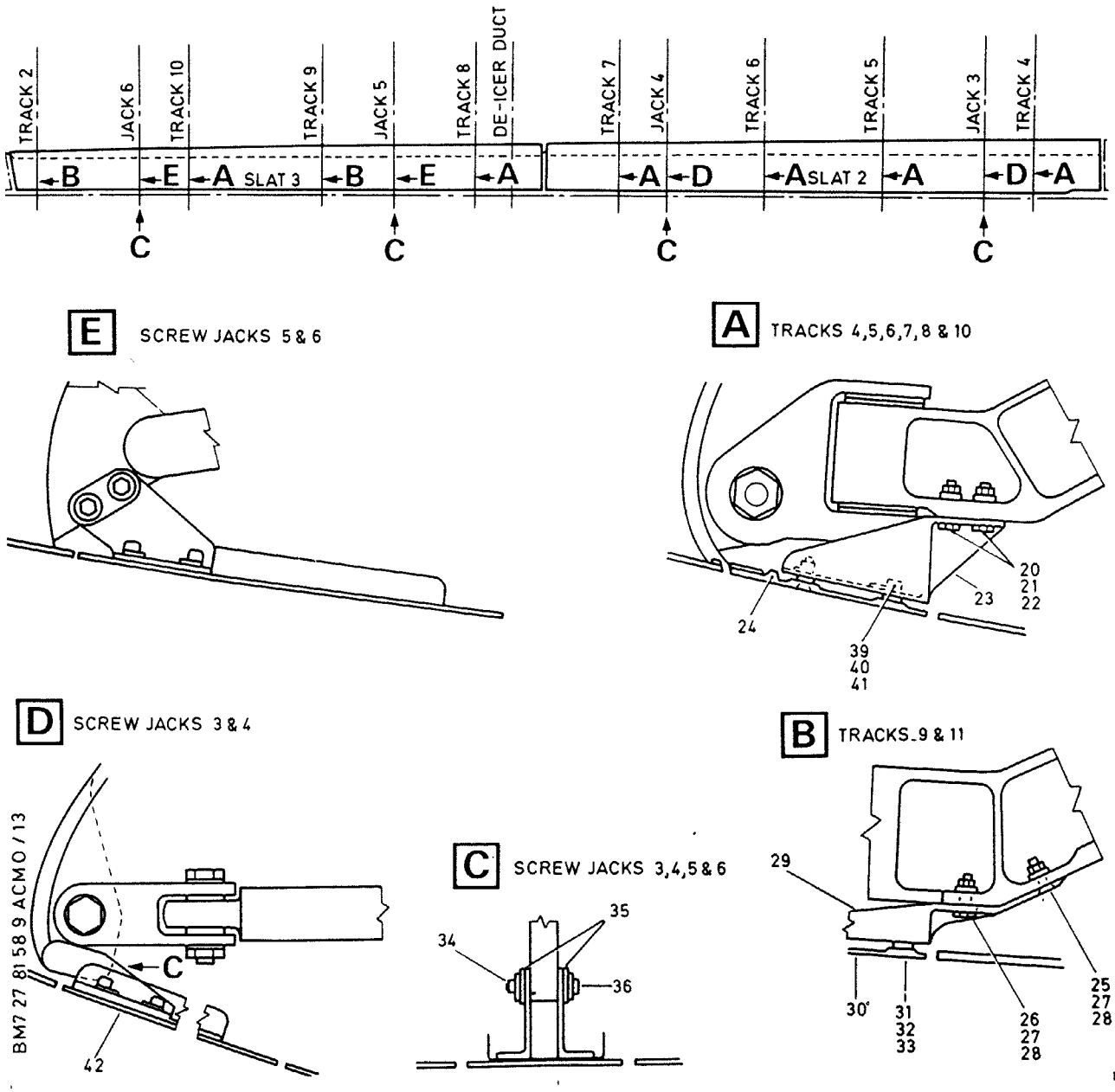
B. Procedure
(Ref. Fig. 901)
(Ref. Fig. 902)





Slat 1 Fairing Plates
Figure 901

R



Slat 2 and 3 Fairing Plates
Figure 902

(1)Job Set-Up
(a)Energize aircraft electrical network and make certain that flight compartment and electronics racks are ventilated (Ref. 24-41-00, P. Block 301).
(b)Pressurize aircraft hydraulic systems (Ref. 29-10-00, P. Block 301).
(c)Fully extend slats (Ref. 27-80-00, P. Block 301).
(d)Depressurize aircraft hydraulic systems.
(e)Display warning notices.
(f)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/26 VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/KRUGER	45CV	333/T61

(2)Removal(Ref. Fig. 901, 902)
- Fairing Plates,Track 1/Screwjack 1 and Track 3/Screwjack 2:
(a)Remove forward nut (1) and bolt (2).
(b)Remove rear nuts (3) and bolts (4).
(c)Remove track bracket (5) complete with fairing plate (6).
- Fairing Plate, Track 2
(a)Remove forward and rear nuts (7) and bolts (8). Remove bracket (9) complete with fairing plate (10).
- Fairing Plates, Tracks 4, 5, 6, 7, 8 and 10
(a)Remove nuts (20), washers (21) and bolts (22).
(b)Remove support bracket (23) complete with fairing plate (24).
- Fairing Plates, Tracks 9 and 11
(a)Remove nuts (28), washers (27) and countersunk bolts (25).
(b)Remove nut (28), washers (27) and bolts (26).
(c)Remove support bracket (29) complete with fairing plate (30).
- Fairing Plates, Screwjacks 3, 4, 5 and 6
(a)Remove nuts (34), serrated washers (35) and bolts (36).
(b)Remove support bracket (37) complete with fairing plate (38).
(3)Test.
(a)Remove safety tags and close SLAT circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV and 45CV.
(b)Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(c)Retract flaps/slats (Ref. 27-80-00, P. Block 301).
(d)Make certain that slats move freely and smoothly and that there is no fouling between moving parts and the structure.
(4)Close-Up.
(a)Depressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(b)Deenergize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Make certain that working area is clean and clear of tools and miscellaneous items.
(d)Remove access platform.
(e)Package fairing plate and all other parts removed, for return to base

with aircraft.
(f)Install temporary notices on Captain's and First Officer's instrument panels to warn pilots that slat screwjack and track fairing plates have been removed and that performance of the aircraft is degraded to the limits given in CDL.
(g)Make appropriate entries in the aircraft technical log.

3. Reactivation Slat Screwjack and Track Fairing Plates

A. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform 4 to 6m (13 to 20 ft)
	B.	Warning Notices - Prohibiting Operation of Slats and Flaps
	C.	Circuit Breaker Safety Clips and Tags
	D. Material No. 13-002	Pretreatment for Painting (Ref. 20-31-00, P. Block 1)
R	E. Material No. 16-006	Structure Paints (Ref. 20-31-00, P. Block 1)
R	F. Material No. 16-018	Structure Paints (Ref. 20-31-00, P. Block 1)
	Referenced Procedures	
	- 24-41-00, P. Block 301	AC External Power Control
	- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
	- 29-10-00, P. Block 301	Main Hydraulic Power
	- 51-23-10, P. Block 1	Paint Coatings

B. Procedure
(1)Job Set-Up.
(a)Energize aircraft electrical network and make certain that flight compartment and electronics racks are ventilated (Ref. 24-41-00, P. Block 301).
(b)Pressurize the aircraft hydraulic systems (Ref. 29-10-00, P. Block 301).
(c)Fully extend slats (Ref. 27-80-00, P. Block 301).
(d)Depressurize aircraft hydraulic systems.
(e)Display warning notices.
(f)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/26 VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/KRUGER	45CV	333/T61

(g)Position access platform.
- Fairing Plates, Track 1/Screwjack 1 and Track 3/Screwjack 2 (Ref. Fig. 901)

(2)Installation - using removed components:

(a)Remove screws (11) and separate fairing plate (6) from bracket (5). Retain laminated shim washers (12) and washers (13) installed between fairing plate and bracket. Record location of laminated shim washers (12).
(b)Check fairing plate (6) and bracket (5) for correct condition.
(c)Install bracket (5) on slat with forward nut (1) and bolt (2) and rear bolts (4) and nuts (3).
(d)Pressurize aircraft hydraulic systems.
(e)Remove safety clips and tags and close SLATS circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV and 45CV.
(f)Make certain that slat and flap travel ranges are clear.
(g)Fully retract slats (Ref. 27-80-00, P. Block 301).
(h)Depressurize aircraft hydraulic systems.
(j)Open, safety and tag SLATS circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV and 45CV.

(3)Installation - using replacement fairing:
(a)Trim fairing plate to obtain correct gap between fairing plate and leading edge skin.
(b)Deflect track inboard to limit of clearance between side load rollers and tracks.
(c)Trim inboard edge of fairing plate to obtain correct gap between fairing plate and skin.
R (d)Deflect track outboard to limit of clearance between side load rollers and tracks.
(e)Trim outboard edge of fairing plate to obtain correct gap between fairing plate and skin.
(f)Treat bare metal edges of fairing plate with Pretreatment for Painting (Material No. 13-002), then apply Structure Paints (Material No.
R 16-006) and Structure Paints (Material No. 16-018) to the treated edges (Ref. 51-23-10, P. Block 1).
(g)Install fairing plate (6) on bracket (5) using bolts (11) with laminated shim washers (12) and washers (13) (location recorded at step 3.B.(2)(a) - installed between the fairing plate and bracket.
(h)Check the into and out-of-wind steps at the trailing edge and leading edge of the fairing plate and, if necessary:
1Remove bolts (11) and remove fairing plate (6) from bracket (5).
2Adjust laminated skin washers (12).
3Install fairing plate (6) on bracket (5) using screws (11) with laminated shim washers (12) and washers (13) installed between the fairing plate (6) and bracket (5).

- Fairing Plate, Track 2 (Ref. Fig. 901)

(4)Installation - using removed components:
(a)Remove screws (16) and separate fairing plate (10) from bracket (9). Retain laminated shim washer (14) and washer (15) installed between fairing plate and bracket. Record the location of laminated shim washers.
(b)Check fairing plate (10) and bracket (9) for correct condition and renew as necessary.
(c)Install bracket (9) on slat with nuts (7) and bolts (8).
(d)Pressurize aircraft hydraulic systems.
(e)Remove safety clips and tags and close SLATS circuit breaker 3CV,

4CV, 7CV, 8CV, 9CV and 45CV.
(f)Make certain that slat and flap travel ranges are clear.
(g)Fully retract slats (Ref. 27-80-00, P. Block 301).
(h)Depressurize aircraft hydraulic systems.
(j)Open, safety and tag SLATS circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV and 45CV.
(k)Position access platform.
(5)Installation using replacement fairing:
(a)Trim fairing plate to obtain correct gap between fairing plate and leading edge skin.
(b)Deflect track inboard to limit of clearance between side load rollers and tracks.
(c)Trim inboard edge of fairing plate to obtain correct gap between fairing plate and skin.
(d)Deflect track outboard to limit of clearance between side load rollers and tracks.
(e)Trim outboard edge of fairing plate to obtain correct gap between fairing plate and skin.
(f)Treat bare metal edges of fairing plate with Pretreatment For Painting (Material No. 13-002), then apply Structure Paints (Material No.
R 16-006) and Structure Paints (Material No. 16-018) to the treated edges (Ref. 51-23-10, P. Block 1).
(g)Install fairing plate (10) on bracket (9) using screws (16) with laminated shim washers (14) and washers (15) (location recorded at step 3.B.(4)(a) installed between the fairing plate and bracket.
(h)Check the into and out-of-wind steps at the trailing edge and leading edge of the fairing plate and, if necessary:
1Remove screws (16) and remove fairing plate (10) from bracket (9).
2Adjust laminated shim washers (14).
3Install fairing plate (10) on bracket (9) using screws (16) with laminated shim washers (14) and washers (15) installed between the fairing plate (10) and bracket (9).
- Fairing Plate, Track Nos.4, 5, 6, 7, 8 and 10 (Ref. Fig. 902)
(6)Installation - using removed components:
(a)Remove screws (39) and separate fairing plate (24) from bracket (23). Retain laminated shim washers (40) and washers (41) installed between fairing plate and bracket. Record location of laminated shim washers (40).
(b)Check fairing plate (24) and bracket (23) for correct condition.
(c)Install bracket (23) on slat with nuts (20) bolts (21) and washer (22).
(d)Pressurize aircraft hydraulic systems.
(e)Remove safety clips and tags and close SLATS circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV and 45CV.
(f)Make certain that slat and flap travel ranges are clear.
(g)Fully retract slats (Ref. 27-80-00, P. Block 301).
(h)Depressurize aircraft hydraulic systems.
(j)Open, safety and tag SLATS circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV and 45CV.
(k)Position access platform.
(7)Installation using replacement fairing:

(a)Trim fairing plate to obtain correct gap between fairing plate and leading edge skin.
(b)Deflect track inboard to limit of clearance between side load rollers and tracks.
(c)Trim inboard edge of fairing plate to obtain correct gap between fairing plate and skin.
(d)Deflect track outboard to limit of clearance between side load rollers and tracks.
(e)Trim outboard edge of fairing plate to obtain correct gap between fairing plate and skin.
(f)Treat bare metal edges of fairing plate with Pretreatment For Painting (Material No. 13-002), then apply Structure Paint (Material No.
R 16-006) and Structure Paint (Material No. 16-018) to the treated edges (Ref. 51-23-10, P. Block 1).
(g)Install fairing plate (24) on bracket (23) using screws (39) with laminated shim washers (40) and washers (41) (location recorded at Step 3.B.(6)(a) installed between the fairing plate and bracket.
(h)Check the into and out-of-wind steps at the trailing edge and leading edge of the fairing plate and, if necessary:
1Remove screws (39) and separate fairing plate (24) from bracket (23).
2Adjust laminated shim washers (40).
3Install fairing plate (24) on bracket (23) using screws (39) with laminated shim washers (40) and washers (41) installed between the fairing plate (24) and bracket (23).
4Tracks 6, 7 and 10 only. After adjustment crop the tail of the forward screw (39) to leave a maximum protrustion of 0.12 in (3.05 mm).

- Fairing Plate, Track Nos.9 and 11

(8)Installation using removed components:
(a)Remove screws (31) and separate fairing plate (30) from bracket (29). Retain laminated shim washers (32) and washers (33) installed between fairing plate and bracket. Record location of laminated shim washers (32).
(b)Check fairing plate (30) and bracket (29) for correct condition.
(c)Install bracket (29) to the slat with countersunk screws (25), bolts (26), washers (27) and nuts (28).
(d)Pressurize aircraft hydraulic systems.
(e)Remove safety clips and tags and close SLATS circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV and 45CV.
(f)Make certain that slat and flap travel ranges are clear.
(g)Fully retract slats (Ref. 27-80-00, P. Block 301).
(h)Depressurize aircraft hydraulic systems.
(j)Open, safety and tag SLATS circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV and 45CV.
(k)Position access platform.

(9)Installation using replacement fairing:
(a)Trim fairing plate to obtain correct gap between fairing plate and leading edge skin.
(b)Deflect track inboard to limit of clearance between side load rollers and tracks.
(c)Trim inboard edge of fairing plate to obtain correct gap between fairing plate and skin.

(d)Deflect track outboard to limit of clearance between side load rollers and tracks.
(e)Trim outboard edge of fairing plate to obtain correct gap between fairing plate and skin.
(f)Treat bare metal edges of fairing plate with Pretreatment For Painting (Material No. 13-002), then apply Structure Paints (Material No. 16-006) and Structure Paints (Material No. 16-018) to the treated edges (Ref. 51-23-10, P. Block 1).
(g)Install fairing plate (24) on bracket (23) using screws (39) with laminated shim washers (40) and washers (41) (location recorded at step 3.B.(8)(a) installed between the fairing plate and bracket.
(h)Check the into and out-of-wind steps at the trailing edge and leading edge of the fairing plate and, if necessary:
1Remove screws (39) and remove fairing plate(24) from bracket (29).
2Adjust laminated shim washers (40).
3Install fairing plate (24) on bracket (29) using screws (39) with laminated shim washers (40) and washers (41) installed between the fairing plate (24) and bracket (29).

- Fairing Plate, Screwjack Nos. 3,4,5 and 6

(10)Installation using removed components:
(a)Remove bolts (42) and separate fairing plate (38) from support bracket (37).
(b)Check fairing plate (38) and support bracket (37) for correct condition and renew as necessary.
(c)Install support bracket (37) on the slat with bolts (36), nuts (34) and a serrated washer (35) under the head of the bolt and under the nut.

GAP	TRACKS 4,6,7,8,10 & 11	TRACKS 5 AND 9
INBOARD	0.1 in±0.05 in (2.54 mm±1.27 mm)	0.15 in±0.1 in (3.81 mm±2.54 mm)
OUTBOARD	0.1 in±0.05 in (2.54 mm±1.27 mm)	0.15 in±0.1 in 3.81 mm±2.54 mm)
LEADING EDGE	0.15 in+0.22 in-0.1 in (3.81 mm+5.6 mm-2.54 mm)	0.15 in+0.22 in-0.1 in (3.81 mm+5.6 mm-2.54 mm)
TRAILING EDGE	0.25 in+0.1 in-0.05 in (6.35 mm+2.54 mm-1.27 mm)	0.25 in+0.1 in-0.05 in (6.35 mm+2.54 mm-1.27 mm)
LEADING EDGE CONTOUR	0 to 0.03 in OUT-OF WIND (0 to 0.76 mm)	0 to 0.03 in OUT-OF WIND 0 to 0.76 mm)
TRAILING EDGE CONTOUR	0 to 0.03 in INTO-WIND (0 to 0.76 mm)	0 to 0.03 in INTO-WIND (0 to 0.76 mm)

Table 1 Track Fairing Plate Clearances

(d)Pressurize aircraft hydraulic systems.
(e)Remove safety clips and tags and close SLATS circuit breakers 3CV,4CV, 7CV,8CV,9CV and 45CV.
(f)Make certain that slat and flap travel ranges are clear.
(g)Fully retract slats (Ref. 27-80-00, P. Block 301).
(h)Depressurize aircraft hydraulic systems.
(j)Open, safety and tag SLATS circuit breakers 3CV,4CV,7CV,8CV,9CV and 45CV.
(k)Position the access platform.
(11)Installation using replacement fairing:
(a)Fit the fairing plate (38) to the support bracket (37) with the bolts (42).
(b)Trim the fairing plate as necessary to obtain the clearances shown in Table 2.

POSITION	INBOARD	OUTBOARD	TRAILING EDGE
Screwjack 3	0.05 in to 0.15 in (1.27 mm to 3.81 mm)	0.05 in to 0.15 in (1.27 mm to 3.81 mm)	0.2 in to 0.3 in (5.08 mm to 7.62 mm)
Screwjack 4	0.2 in to 0.3 in (5.08 mm to 7.62 mm)	0.37 in to 0.47 in (9.4 mm to 11.94 mm)	0.2 in to 0.3 in (5.08 mm to 7.62 mm)
Screwjack 5	0.17 in to 0.27 in (4.32 mm to 6.85 mm)	0.11 in to 0.21 in (2.79 mm to 5.33 mm)	0.2 in to 0.3 in (5.08 mm to 7.62 mm)
Screwjack 6	0.25 in to 0.35 in (6.35 mm to 8.89 mm)	0.48 in to 0.58 in (12.19 mm to 14.73 mm)	0.2 in to 0.3 in (5.08 mm to 7.62 mm)

Table 2 Screwjack Fairing Plate Clearances

(c)Remove bolts (42) and separate the fairing plate (38) from the support bracket (37)
(d)Treat bare metal edges of fairing plate with Pretreatment for Painting (Material No. 13-002), then apply Structure Paints (Material No. 16-006) and Structure Paint (Material No. 16-002) to the treated edges (Ref. 51-23-10, P. Block 1).
(e)Install fairing plate (38) to support bracket (37) with bolts (42).

C. Test
(1)Pressurize hydraulic systems (Ref. 29-10-00, P. Block 301).
(2)Remove safety clips and tags and close SLATS circuit breakers 3CV,4CV, 7CV,8CV,9CV and 45CV.
(3)Make certain slat and flap travel ranges are clear.
(4)Extend and retract slats (Ref. 27-80-00, P. Block 301).
(5)Make certain that slats move freely and smoothly and that there is no fouling between moving parts and structure.

D. Close-Up
(1)Depressurize aircraft hydraulic systems.

(2)De-energize aircraft electrical network.
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Remove access platform and warning notices.
(5)Remove from the Captain's and First Officer's instrument panels, the temporary notices that warn pilots of the aircrafts degraded performance.
(6)Make appropriate entries in aircraft technical log.

4. Deactivation Slat Anti-Ice Duct Fairing Door

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 to 6 m (13 to 20 ft)
B.	Warning Notices - Prohibiting Use of Slats Flaps
C.	Circuit Breaker Safety Clips and Tags
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

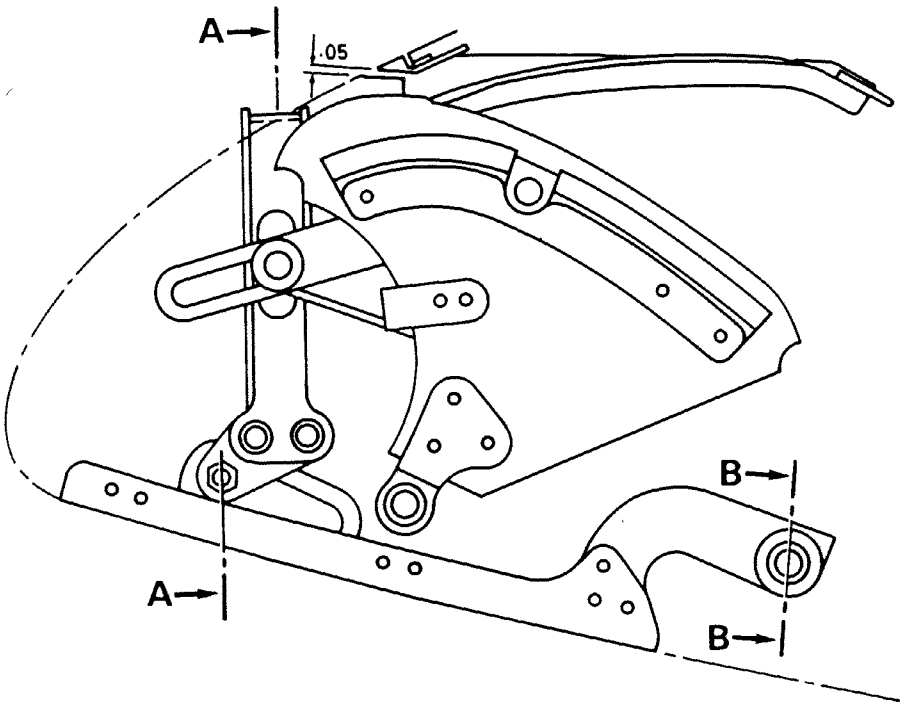
B. Procedure
(Ref. Fig. 903)
(Ref. Fig. 904)
(1)Job Set-Up
(a)Energize aircraft electrical network and make certain flight compartment and electronics racks are ventilated (Ref. 24-41-00, P. Block 301).
(b)Pressurize aircraft hydraulic systems (Ref. 29-10-00, P. Block 301).
(c)Fully extend slats (Ref. 27-80-00, P. Block 301)
(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/26 VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/KRUGER	45CV	333/T61

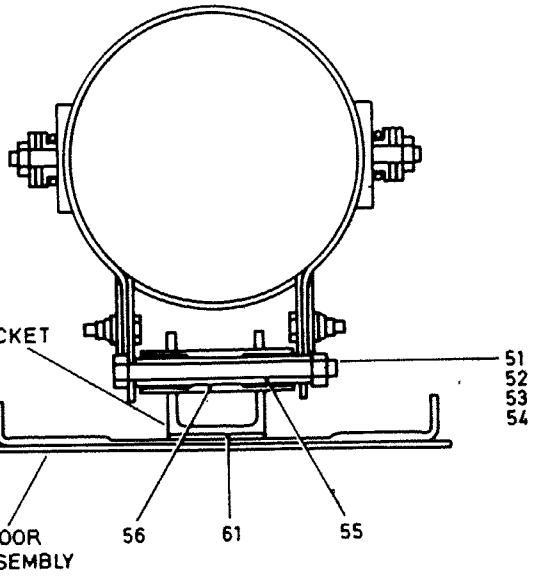
(e)Position warning notices.
(f)Depressurize aircraft hydraulic systems.
(g)Position access platform zone 524(624).
(h)Remove access panels 523(623)MB, 524(624)AB and 524(624)BB.

(2)Remove (Ref. Fig. 903)

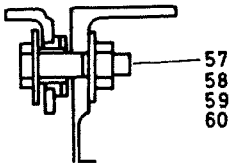
(a)Remove cotter pin (51), nuts (52), washer (53), bolts (54) and bush



SECTION
A-A



SECTION
B-B
(OTHER DOOR HINGE OPPOSITE HAND)



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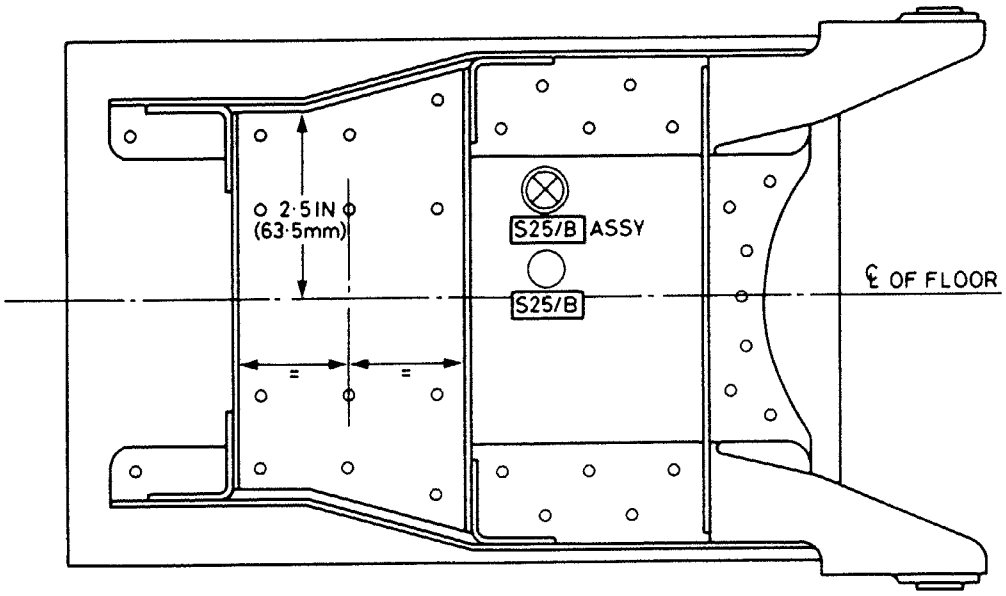
Slat Anti - Ice Telescopic Duct Fairing Door
Figure 903



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Door Assembly Roller Bracket - Installation
Figure 904

(55). Carefully lower the door assembly to avoid damage to underside of leading edge skin. Collect and retain roller assembly (56) from door bracket.

(b)Remove nuts (60), comer washers (59), washers (58) and bolts (57) and remove the door assembly.

(c)Install access panels 523(623)MB, 524(624)AB and 524(624)BB.

(3)Test

(a)Pressurize aircraft hydraulic systems (Ref. 29-10-00, P. Block 301).

(b)Remove safety clips and tags and close SLATS circuit breakers 3CV,4CV, 7CV,8CV,9CV and 45CV.

(c)Fully retract slats (Ref. 27-80-00, P. Block 301).

(d)Make certain slats move freely with no fouling between moving parts and structure.

(4)Close-Up

(a)Depressurize aircraft hydraulic systems.

(b)De-energize aircraft electrical network (Ref. 24-41-00, P. Block 301).

(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(d)Remove access platforms and warning notices.

(e)Install temporary notices on Captain's and First Officer's instrument panels to warn pilots that the telescopic duct fairing door has been removed and that the performance of the aircraft is degraded to the limits given in the CDL.

(f)Package the fairing door and all other parts removed for return to base with the aircraft.

(g)Make appropriate entries in the aircraft technical log.

5. Reactivation - Slat Anti-Ice Duct Fairing Door

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 to 6 m (13 to 20 ft)
B.	Warning Notices, Prohibiting Use of Slats and Flaps
C.	Circuit Breaker Clips and Tags
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

B. Job Set-Up

(1)Energize aircraft electrical network and make certain flight compartment and electronics racks are ventilated (Ref. 24-41-00, P. Block 301).

(2)Pressurize aircraft hydraulic systems (Ref. 29-10-00, P. Block 301).

(3)Fully extend slats (Ref. 27-80-00, P. Block 301).

(4)Open, safety and tag the following circuit breakers.

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/26 VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/KRUGER	45CV	333/T61

(5)Position warning notices.
(6)Depressurize aircraft hydraulic systems.
(7)Position access platform, zone 524(624).
(8)Remove access doors 523(623)MB, 524(624)AB and 524(624)BB.

C. Procedure
(1)Installation (Ref. Fig. 903)
(a)If replacement door assembly or roller bracket is being fitted, refer to step 5.D.(1) thru (10).
(b)Offer the door assembly and at the hinges fit bolts (57), washers (58), comer washers (59) and nuts (60). Tighten the nuts sufficiently to allow the door assembly to pivot on the hinges without being loose then lock the nuts (57) with the comer washers (59).
(c)Assemble the bushes (55) and roller assembly (56) to the roller bracket, close the door assembly and fit the bolt (54), washer (53) and nut (52).
(d)Safety the nut (52) with cotter pin (51).
(e)Install access doors 523(623)MB, 524(624)AB and 524(624)BB.
(2)Test
(a)Pressurize aircraft hydraulic systems (Ref. 29-10-00, P. Block 301).
(b)Remove safety clips and tags and close SLATS circuit breakers 3CV,4CV, 7CV,8CV,9CV, and 45CV.
(c)Retract, extend and retract slats (Ref. 27-80-00, P. Block 301).
(d)Make certain the slats move freely and smoothly and that there is no fouling between moving parts and structure.
(3)Close-Up
(a)Depressurize aircraft hydraulic system.
(b)De-energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(d)Remove access platform.
(e)Remove from the Captain's and First Officer's instrument panels the temporary notices that warn pilots of aircrafts degraded performance.
(f)Make appropriate entries in aircraft technical log.

D. Preparation of Replacement Anti-Ice Duct Fairing Door and/or Roller Bracket (Ref. Fig. 903, 904)

NOTE : The following instructions detail the fitting of all new components. In practice it will be necessary to select the relevant instructions.

NOTE : It will be necessary to refer to the Structural Repair Manual, Chap 51, to assemble replacement anti-ice duct fairing door to roller bracket.

(1)On the damaged assembly drill out the rivets and separate the roller bracket, laminated shim (61) and door assembly.
(2)If the laminated shim washer (61) has been removed without separation of any laminates, retain the shim. If any separation has occurred, discard the shim.
(3)On the new door assembly mark the center line between the forward and center cross stiffeners
(4)In the same area of the door assembly, mark the longitudinal center.
(5)Place the roller bracket in position on the door assembly such that the center of the roller bracket contact face is on the intersection point of the two lines marked in steps D.(3) and (4).
(6)Mark the position of the roller bracket rivet holes on the door assembly.
(7)Drill 0.159 in + 0.004 in -0.000 in (4.039 mm + 0.102 mm-0.000 mm) holes in the positions marked on the door assembly.

NOTE : If any component is being re-used, oversize rivets will be required to complete the task. (If oversize rivets are to be used refer to Structural Repair Manual, Ref. 51-40-30, P. Block 1. for the required hole size).

(8)Countersink the newly drilled holes on the outer face of the door assembly (Refer to Structural Repair Manual, Ref. 51-40-46, P. Block 1).
(9)Drill out and ream the holes in the roller bracket to the same diameter as those in the door assembly, Ref. step D.(7).
(10)Align laminated shim (61) with roller bracket and fairing door and mark rivet holes. Punch holes in shim (61) at positions marked.
(11)Pressurize aircraft hydraulic systems.
(12)Remove safety clips and tags and close SLATS circuit breakers 3CV,4CV, 7CV,8CV,9CV and 45CV.
(13)Fully retract slats (Ref. 27-80-00, P. Block 301).
(14)Depressurize aircraft hydraulic systems.
(15)Open, safety and tag SLATS circuit breakers 3CV,4CV,7CV,8CV,9CV and 45CV.
(16)Assemble the bushes (55) and roller assembly (56) to the roller bracket and install the roller bracket to the aircraft with bolts (54) washer (53) and nut (52).
(17)Install the door assembly to the aircraft with bolts (57) washers (58) and nuts (60).
(18)With the laminated shim washer (61) in position, close the door assembly to the roller bracket and check the into/out-of-wind contour of the leading edge of the door assembly. Increase or decrease the thickness of the laminated shim washer (61) as required.
(19)With this rivet holes in the roller bracket and door assembly aligned make certain that a gap of 0.1 in ± 0.05 in (2.54 mm ± 1.27 mm) exists between each side of the door assembly and the aircraft skin.
(20)Remove the laminated shim (61), nuts (60), washers (58), bolts (57) and the door assembly from the aircraft.
(21)Remove the nuts (52) washers (53) and bolt (54) and remove the roller

bracket from the aircraft.

(22)Remove the roller assembly (56) and bushes (55) from the roller bracket.

(23)Pressurize the aircraft hydraulic systems (Ref. 29-10-00, P. Block 301).

(24)Remove the safety clip and tags and close SLATS circuit breakers 3CV,4CV, 7CV,8CV,8CV and 45CV.

(25)Fully extend the SLATS (Ref. 27-80-00, P. Block 301).

(26)Depressurize aircraft hydraulic systems.

(27)Open, safety and tag SLATS circuit breakers on panel 127VU, Line 704.

(28)Rivet the roller bracket and laminated shim washer (61) to the door assembly, (refer to Structural Repair Manual, Ref. 51-40-20, P. Block 1).

(29)Complete installation of Slat Anti-Ice Duct Fairing Door to the aircraft, ref step 5.C.(1).

E. Test

(1)Complete test, ref. step 5.C.(2).

F. Close-Up

(1)Complete close-up, ref step 5.C.(3).

HYDRAULIC ACTUATION AND POWER TRANSMISSION (SLATS) - DESCRIPTION AND OPERATION

1. General

Two hydraulic motors, supplied by the BLUE and the GREEN hydraulic systems, power the transmission system. The hydraulic motors are incorporated in a Power Control Unit (PCU) installed in the fuselage. Torque shafts and gear-boxes transmit the drive from the PCU to twelve screw jacks installed in the wings. Two screw jacks function each slat. Two torque limiters, installed in the fuselage, protect the transmission system in each wing from overload. A wing-tip brake (Ref. 27-86-00) and an asymmetry position pick-off unit (Ref. 27-86-00) are provided in each outer wing.

2. Component Location

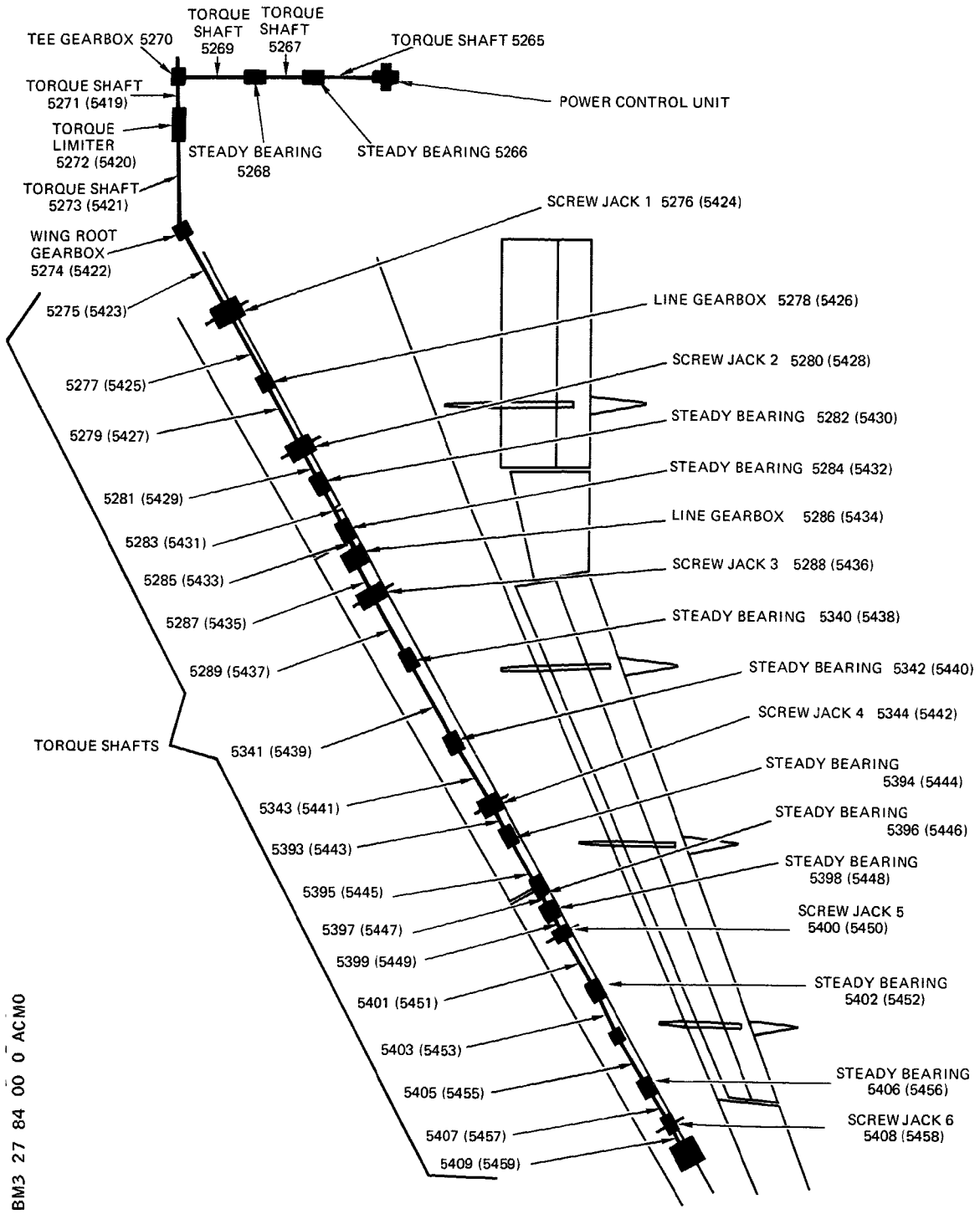
(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE ACCESS DOOR	ATA REF
5264	POWER CONTROL UNIT	148		27-84-11
	MOTOR-HYDRAULIC, BLUE	148		27-84-34
	MOTOR-HYDRAULIC, GREEN	148		27-84-34
	PRESSURE-OFF BRAKE-BLUE	148		27-84-32
	PRESSURE-OFF BRAKE-GREEN	148		27-84-32
	TRANSFER TUBES-BLUE	148		27-84-34
	TRANSFER TUBES-GREEN	148		27-84-34
25CV	VALVE BLOCK-BLUE	148		27-84-33
	VALVE-SOLENOID, EXTEND	148		27-84-33
	VALVE-SOLENOID, RETRACT	148		27-84-33
	VALVE-SOLENOID, ENABLE	148		27-84-33
	VALVE-SOLENOID, HIGH-SPEED	148		27-84-33
	SWITCH-PRESSURE, SUPPLY	148		27-84-33
	SWITCH-PRESSURE, HIGH SPEED	148		27-84-33
	SWITCH-PRESSURE, DRIVE	148		27-84-33
	FILTER	148		27-84-33
26CV	VALVE BLOCK-GREEN	148		27-84-33
	VALVE-SOLENOID, EXTEND	148		27-84-33
	VALVE-SOLENOID, RETRACT	148		27-84-33
	VALVE-SOLENOID, ENABLE	148		27-84-33
	VALVE-SOLENOID, HIGH SPEED	148		27-84-33
	SWITCH-PRESSURE, SUPPLY	148		27-84-33
	SWITCH-PRESSURE, HIGH SPEED	148		27-84-33
	SWITCH-PRESSURE, DRIVE	148		27-84-33
	FILTER	148		27-84-33
	GEARBOX-DIFFERENTIAL	148		
	GEARBOX-INTERMEDIATE	148		27-84-31
5264	POWER CONTROL UNIT	148		27-84-11
	MOTOR-HYDRAULIC, BLUE	148		27-84-34
	MOTOR-HYDRAULIC, GREEN	148		27-84-34
	PRESSURE-OFF BRAKE-BLUE	148		27-84-32
	PRESSURE-OFF BRAKE-GREEN	148		27-84-32
	TRANSFER TUBES-BLUE	148		27-84-34

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE ACCESS DOOR	ATA REF
		TRANSFER TUBES-GREEN	148		27-84-34
	5265	TRANSMISSION SHAFT	144	147BZ	27-84-21
	5266	BEARING-STEADY	144	147BZ	27-84-17
	5267	TRANSMISSION SHAFT	144	147BZ	27-84-21
	5268	BEARING-STEADY	144	147BZ	27-84-17
	5269	TRANSMISSION SHAFT	144	147BZ	27-84-21
	5270	GEARBOX-TEE	144	147BZ	27-84-14
	5271	TRANSMISSION SHAFT-LH	143	147BZ	27-84-21
	5419	TRANSMISSION SHAFT-RH	144	147BZ	27-84-21
	5272	LIMITER-TORQUE, LH	143	147BZ	27-84-12
	5420	LIMITER-TORQUE, RH	144	147BZ	27-84-12
	5273	TRANSMISSION SHAFT-LH	143	147BZ	27-84-21
	5421	TRANSMISSION SHAFT-RH	144	147BZ	27-84-21
	5274	GEARBOX-WING ROOT-LH	143	513RL	27-84-15
R	5422	GEARBOX-WING ROOT-RH	144	613RR	27-84-15
	5275	TRANSMISSION SHAFT-LH	512	512BB	27-84-21
	5423	TRANSMISSION SHAFT-RH	612	612BB	27-84-21
	5276	SCREW JACK 1-LH	512	512CB	27-84-22
	5424	SCREW JACK 1-RH	612	612CB	27-84-22
	5277	TRANSMISSION SHAFT-LH	512	512CB	27-84-21
				512DB	
				512EB	
	5425	TRANSMISSION SHAFT-RH	612	612CB	27-84-21
				612DB	
				612EB	
	5278	GEARBOX-LINE-LH	512	512EB	27-84-16
	5426	GEARBOX-LINE-RH	612	612EB	27-84-16
	5279	TRANSMISSION SHAFT-LH	512	512FB	
				512GB	
				512HB	
	5427	TRANSMISSION SHAFT-RH	612	612FB	27-84-21
				612GB	
				612HB	
	5280	SCREW JACK 2-LH	512	512HB	27-84-22
	5428	SCREW JACK 2-RH	612	612HB	27-84-22
	5281	TRANSMISSION SHAFT-LH	512	512JB	27-84-21
	5429	TRANSMISSION SHAFT-RH	612	612JB	27-84-21
	5282	STEADY BEARING-LH	512	512JB	27-84-17
	5430	STEADY BEARING-RH	612	612JB	27-84-17
	5283	TRANSMISSION SHAFT-LH	512	512KB	27-84-21
			523	523AB	
		TRANSMISSION SHAFT-RH	612	612KB	
			623	623AB	
	5284	STEADY BEARING-LH	523	523AB	27-84-17
	5432	STEADY BEARING-RH	623	623AB	27-84-17
	5285	TRANSMISSION SHAFT-LH	523	523AB	27-84-21
				523BB	
	5433	TRANSMISSION SHAFT-RH	623	523AB	27-84-21

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE ACCESS DOOR	ATA REF
			623BB	
5286	GEARBOX-LINE-LH	523	523BB	27-84-16
5434	GEARBOX-LINE-RH	623	623BB	27-84-16
5287	TRANSMISSION SHAFT-LH	523	523CB	27-84-21
			523DB	
5435	TRANSMISSION SHAFT-RH	623	623CB	27-84-21
			623DB	
5288	SCREW JACK 3-LH	523	523DB	27-84-22
5436	SCREW JACK 3-RH	623	623DB	27-84-22
5289	TRANSMISSION SHAFT-LH	523	523DB	27-84-21
			523EB	
5437	TRANSMISSION SHAFT-RH	623	523DB	27-84-21
			523EB	
5340	STEADY BEARING-LH	523	523EB	27-84-17
5438	STEADY BEARING-RH	623	623EB	27-84-17
5341	TRANSMISSION SHAFT-LH	523	523FB	27-84-21
			523GB	
5439	TRANSMISSION SHAFT-RH	623	523FB	27-84-21
			623GB	
5342	STEADY BEARING-LH	523	523GB	27-84-17
5440	STEADY BEARING-RH	623	523GB	27-84-17
5343	TRANSMISSION SHAFT-LH	523	523HB	27-84-21
			523JB	
			523LB	
5441	TRANSMISSION SHAFT-RH	623	623HB	
			623JB	
			623LB	
5344	SCREW JACK 4-LH	523	523KB	
5442	SCREW JACK 4-RH	623	623KB	27-84-22
5393	TRANSMISSION SHAFT-LH	523	523KB	27-84-21
			523LB	
5443	TRANSMISSION SHAFT-RH	623	623KB	27-84-21
			623LB	
5394	STEADY BEARING-LH	523	523MB	27-84-17
5444	STEADY BEARING-RH	623	623MB	27-84-17
5395	TRANSMISSION SHAFT-LH	523	523MB	27-84-21
		524	524BB	
5445	TRANSMISSION SHAFT-RH	623	623MB	27-84-21
		624	624BB	
5396	STEADY BEARING-LH	524	524AB	27-84-17
5446	STEADY BEARING-RH	624	624AB	27-84-17
5397	TRANSMISSION SHAFT-LH	524	624AB	27-84-21
			524BB	
5447	TRANSMISSION SHAFT-RH	624	624AB	27-84-21
			624BB	
5398	STEADY BEARING-LH	524	524CB	27-84-17
5448	STEADY BEARING-RH	624	624CB	27-84-17
5399	TRANSMISSION SHAFT-LH	524	524CB	27-84-21

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE ACCESS DOOR	ATA REF
5449	TRANSMISSION SHAFT-RH	624	624CB 624DB	27-84-21
5400	SCREW JACK 5-LH	524	524DB	27-84-23
5450	SCREW JACK 5-RH	624	624DB	27-84-23
5401	TRANSMISSION SHAFT-LH	524	524EB 524FB	27-84-21
5451	TRANSMISSION SHAFT-RH	624	624EB 624FB	27-84-21
5402	STEADY BEARING-LH	524	524FB	27-84-17
5452	STEADY BEARING-RH	624	624FB	27-84-17
5403	TRANSMISSION SHAFT-LH	524	524FB 524GB	27-84-21
5453	TRANSMISSION SHAFT-RH	624	624FB 624GB	27-84-21
5405	TRANSMISSION SHAFT-LH	524	624GB 524HB	27-84-21
5455	TRANSMISSION SHAFT-RH	624	624GB 624HB	27-84-21
5406	STEADY BEARING-LH	524	524HB	27-84-17
5456	STEADY BEARING-RH	624	624HB	27-84-17
5407	TRANSMISSION SHAFT-LH	524	524HB 524JB	27-84-21
5457	TRANSMISSION SHAFT-RH	624	624HB 624JB	27-84-21
5408	SCREW JACK 6-LH	524	524JB	27-84-23
5458	SCREW JACK 6-RH	624	624JB	27-84-23
5409	TRANSMISSION SHAFT-LH	524	524KB	27-84-21
5459	TRANSMISSION SHAFT-RH	624	624KB	27-84-21



Transmission System Component Location
Figure 001

3. System Description

A. The slat hydraulic actuation and power transmission system provides and transmits power from the PCU to the screw jacks which function the slats.

B. The PCU, TEE gearbox, two torque limiters and seven torque shafts are installed in the fuselage. One wing-root gearbox, two line gearboxes and nineteen torque shafts are installed in each wing. The torque shafts are supported by self-aligning steady bearings and are provided with sliding or universal joints to accomodate axial or angular deflection of the torque shaft run.

C. Three torque shafts connect the PCU to the TEE gearbox, where the drive is split to provide power for each wing transmission system.

D. The wing-root gearbox, installed at the intersection of each wing with the fuselage, directs the torque shaft run along the wing front spars, connecting with each screw jack in turn.

E. Between the TEE gearbox and the wing-root gearbox in each wing, a torque limiter is installed which prevents overload in the wing transmission system.

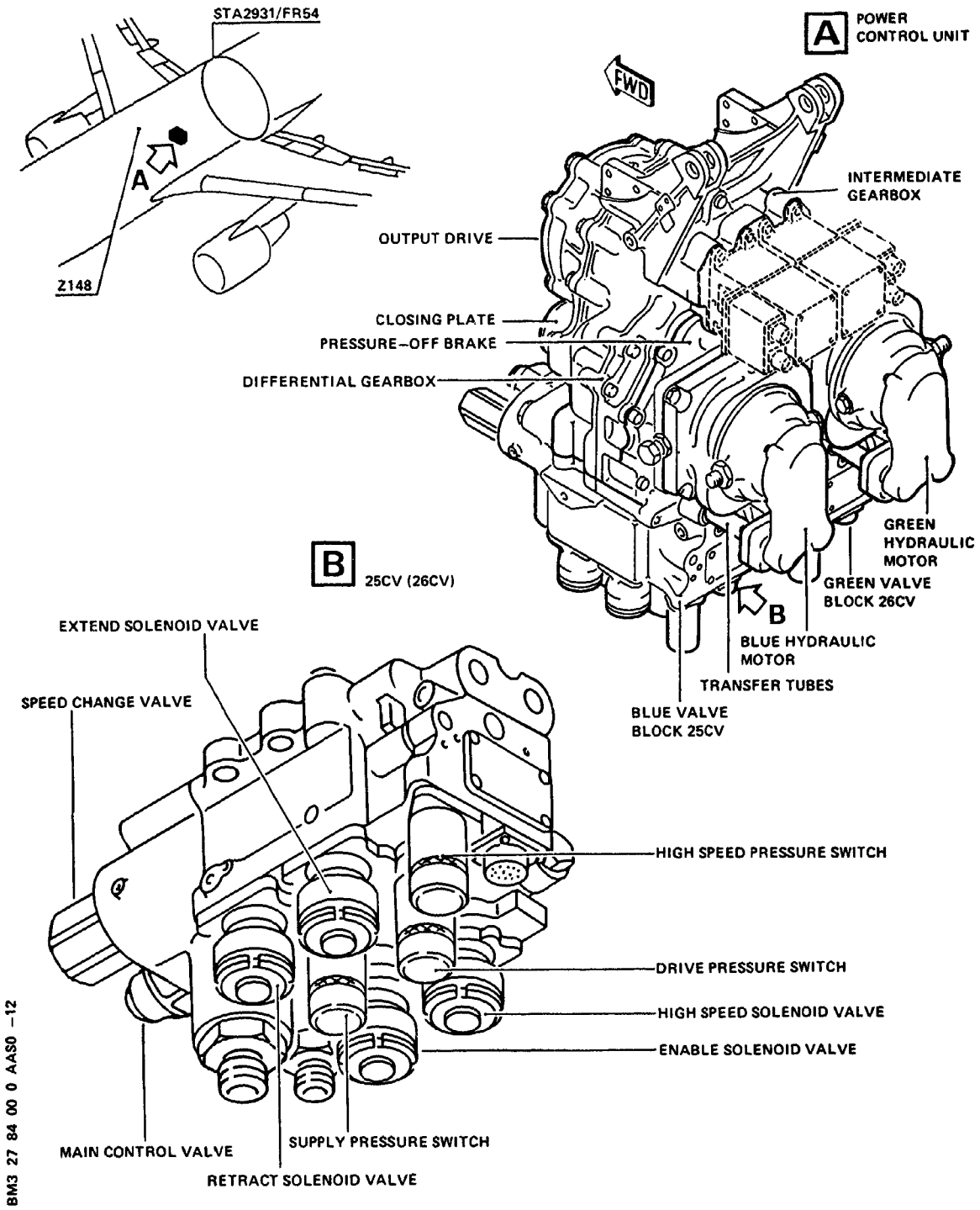
F. Between screw jack 1 and screw jack 2 and between screw jack 2 and screw jack 3 in each wing, a line gearbox is installed which re-aligns the torque shaft run. The internal gearing increases the speed of rotation of the torque shafts downstream of each line gearbox installation.

G. The screw jacks change the rotary motion of the torque shafts into linear motion causing the slats to extend or retract as commanded. Screw jacks 1 and 2, driving the inner slat, have individual strokes. Screw jacks 3, 4, 5 and 6, driving the center and outer slats, have a common stroke which is greater than the stroke of screw jack 1 or 2.

4. Component Description

A. Power Control Unit (5264)
(Ref. Fig. 002)
The PCU, located in the hydraulic compartment on the rear face of FR 47/48 provides the interface between the hydraulic supplies, the Slat Flap Control Computers (SFCC) and the slat transmission system. The PCU is similar in construction and operation to the flap system PCU (Ref. 27-54-00) and includes the following sub-units:
- Valve blocks
- Transfer tubes
- Hydraulic motors
- Pressure-off brakes
- Differential gearbox
- Intermediate gearbox

(1)Valve Blocks (25CV, 26CV)
Two valve blocks are mounted on the underside of the differential



Power Control Unit
Figure 002

gearbox.
- Valve block (25CV) is supplied by the BLUE hydraulic system.
- Valve block (26CV) is supplied by the GREEN hydraulic system.

A typical valve block is fully described in 27-54-00.

(2)Transfer Tubes

The transfer tubes provide the connection between the valve blocks and the hydraulic motors. The maximum rate of flow of hydraulic fluid is controlled by fixed orifices.

(3)Hydraulic Motors

One hydraulic motor is mounted on the rear face of each pressure-off brake.

One hydraulic motor is powered by the BLUE hydraulic system, the other hydraulic motor is powered by the GREEN hydraulic system.

A typical hydraulic motor is fully described in 27-54-00.

(4)Pressure-off Brakes

Two pressure-off brakes are mounted on the rear face of the differential gearbox.

A pressure-off brake is fully described in 27-54-00.

(5)Differential Gearbox

(Ref. Fig. 003)
(Ref. Fig. 004)

(a)The differential gearbox provides the interface between the valve blocks, the hydraulic motors, the pressure-off brakes and the intermediate gearbox. Attachment lugs for mounting the PCU to the aircraft structure are formed on the differential gearbox housing and closing plate.

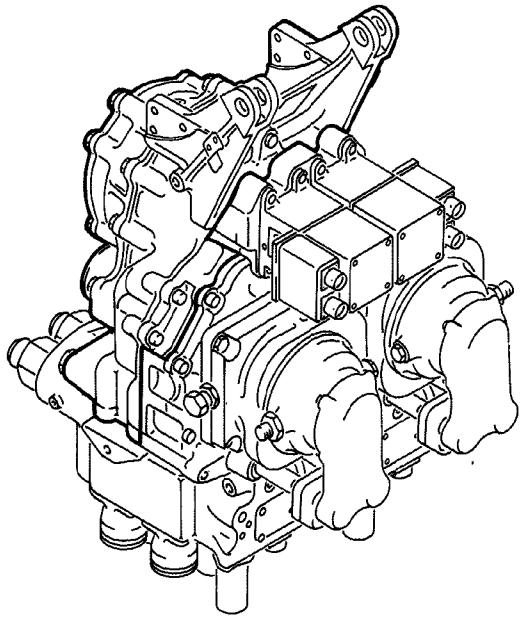
(b)The differential gearbox contains the differential and reduction gearing, and the output drive. The differential and reduction gearing comprises a spur gear, an idler gear, an annulus/ring gear, a sun gear, a planetary carrier housing three planet gears, and a pinion; the drive from the hydraulic motors is transmitted to the gear train by two quill shafts. The output drive comprises an output shaft, a spur gear and an adapter.

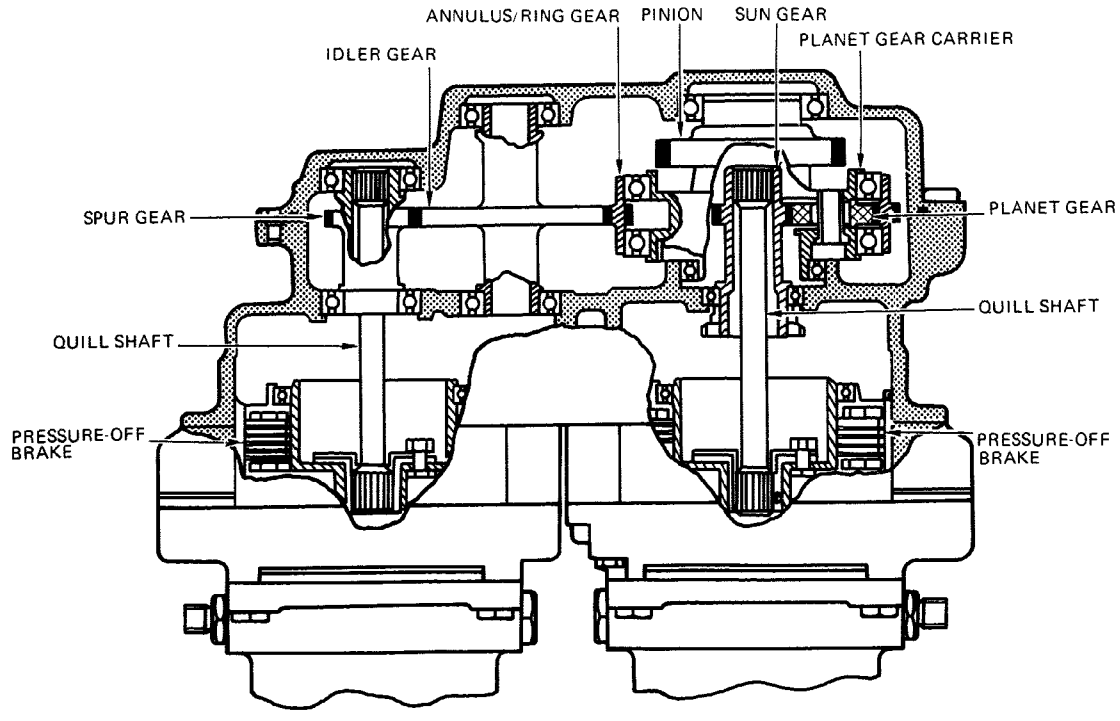
(c)The differential gearbox combines the motive outputs from the two hydraulic motors. One hydraulic motor drives the sun gear direct from one quill shaft. The sun gear provides motive input to the planetary arrangement. The other hydraulic motor drives the annulus/ring gear via the other quill shaft and two spur gears, which mate with the ring gear formed on the outer face of the annulus/ring gear. The annulus/ring gear provides the second motive input to the planetary arrangement.

(d)Motive power from the planetary arrangement is transmitted to the output shaft by a pinion, splined onto the planetary carrier. The pinion meshes with a spur gear attached to the output shaft through a bolted flange.

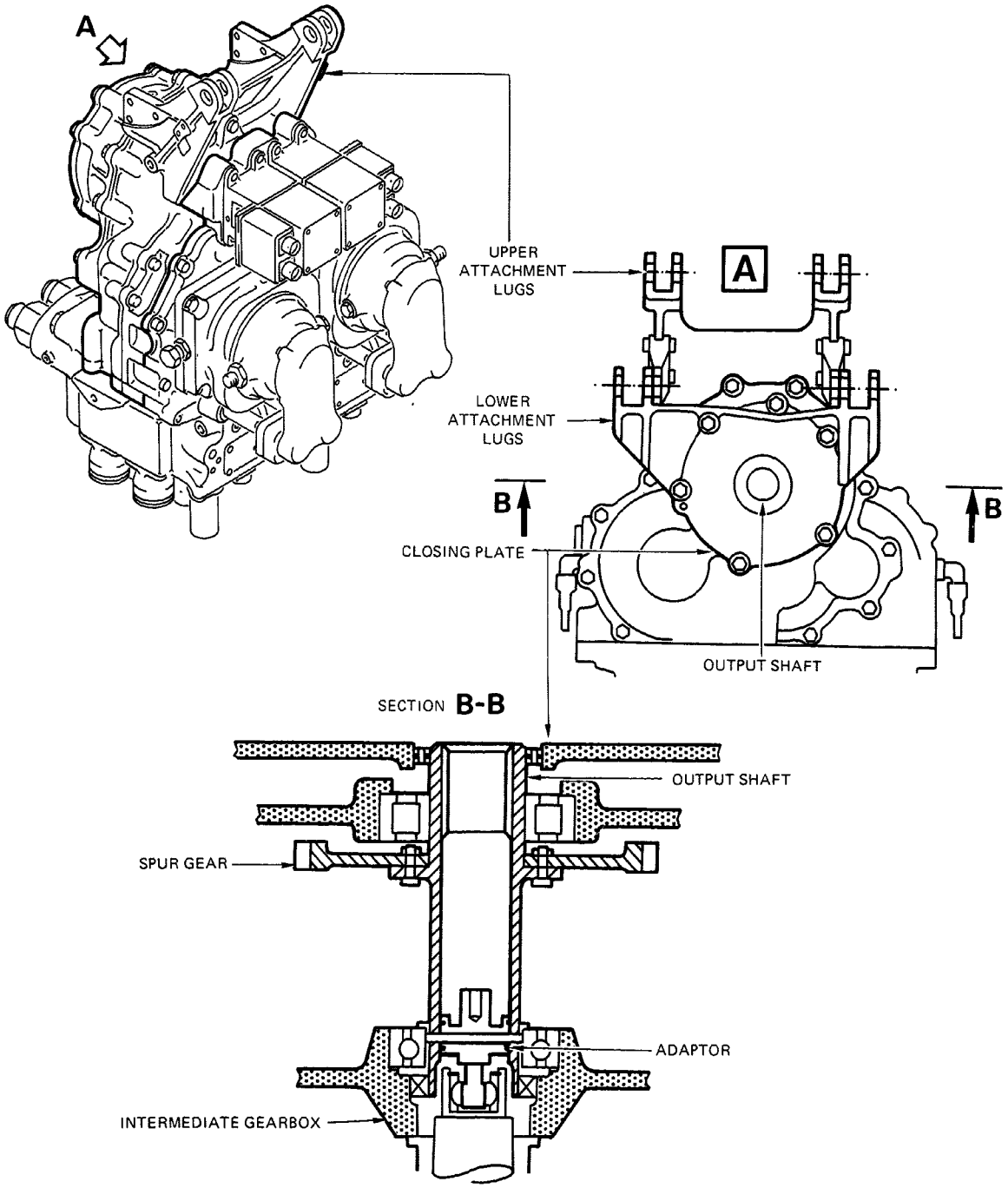
(e)The drive is transmitted to the intermediate gearbox by an adapter located inside the output shaft.

(f)Two upper attachment lugs are formed on the housing and two lower attachment lugs are formed on the closing plate. Secondary mounting brackets are provided as an additional connection between the lower and the upper attachment lugs.





Differential Gearbox - 1
Figure 003



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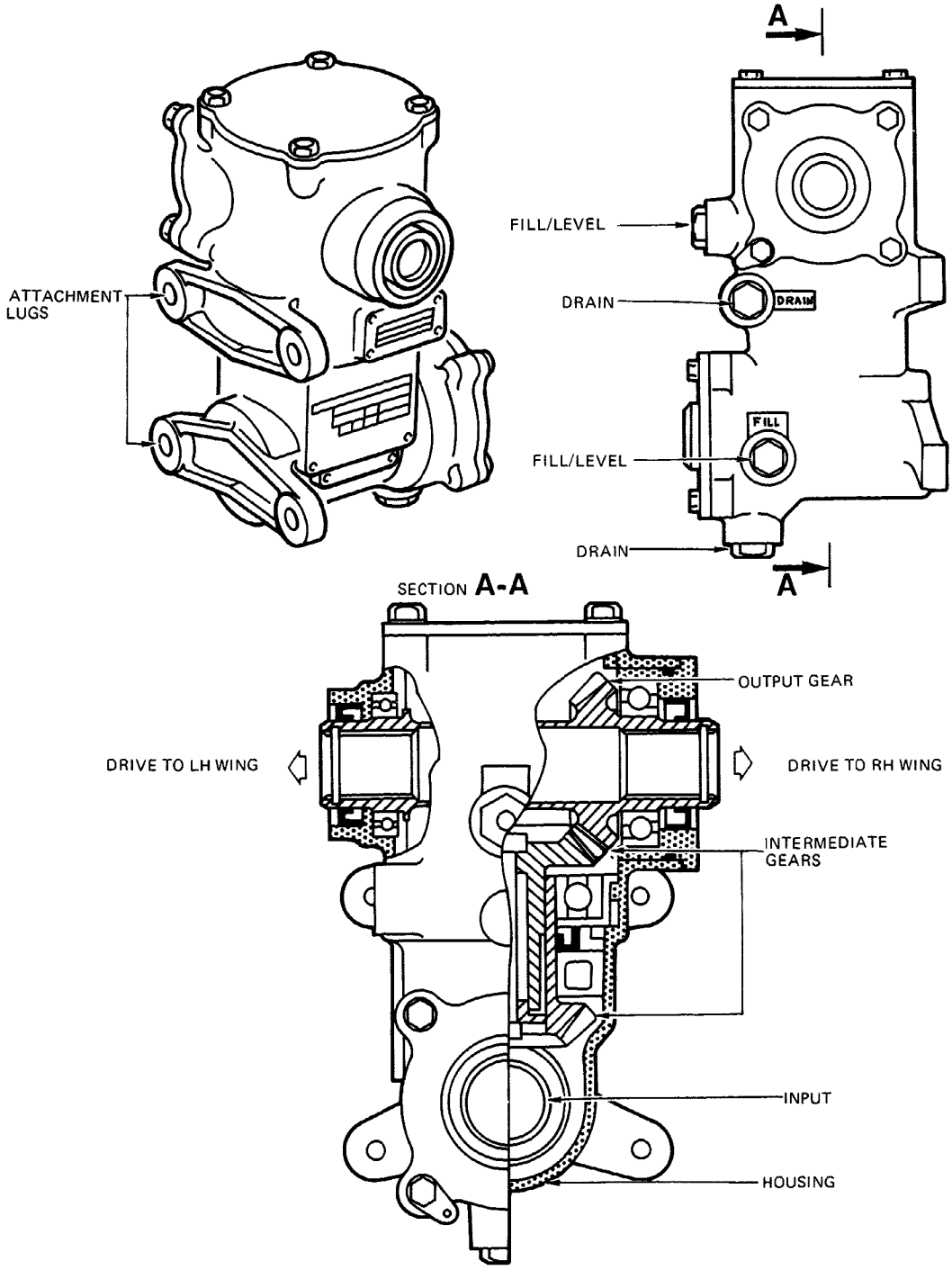
Differential Gearbox - 2
Figure 004

(6)Intermediate Gearbox
The intermediate gearbox is similar in construction and operation to the intermediate gearbox installed in the flap PCU and is fully described in 27-54-00. The reduction ratio of the gearing is different.

B. TEE Gearbox (5270)
(Ref. Fig. 005)
(1)The TEE gearbox, installed in the fuselage between FR 39 and FR 40/41, imparts 90 degrees angular displacement to the torque shaft run in the horizontal plane and displaces the run in the vertical plane to align with the wing leading edges.
(2)The TEE gearbox comprises a housing, one input gear, two intermediate gears and one output gear. The output gear is integral with a horizontal transverse shaft which is provided with splined connections to the transverse torque shafts in the fuselage.
(3)The housing is provided with four mounting lugs. Division into an upper and a lower chamber ensures adequate lubrication of the gears mounted in the upper part of the gearbox. Each chamber is provided with a filler/level plug and a drain plug.
(4)The TEE gearbox is provided with spring washers to counter the effect of differential expansion on bearing positions and gear backlash.
(5)The TEE gearbox increases the speed of rotation of the torque shafts downstream.

C. System Torque Limiters
(Ref. Fig. 006)
(1)The system torque limiters are installed between the PCU and the wing-root gearbox. They consist of a split, cast outer casing with a mounting lug formed on each half, a hardened steel earthing member, an input shaft, an output shaft and a pre-torque assembly consisting of an input and an output torque tube assembled on a torsion bar.
A torque limiter indicator provides lock-out indication. A drain plug and a combined oil filler, level plug are provided for servicing.
The input shaft and the output shaft are splined at their outer ends to accept the transmission torque shafts. The inner end of the output shaft is machine formed into a castellated bearing cage, into which, rollers are placed. The inner end of the input shaft is formed into a regular polygon cam and fits inside the castellated bearing cage making contact with the rollers. Both ends have also been machined to interlock with the associated torque tube whose inner ends have been machined to form a duplex key and socket arrangement.
The outer ends of the torque tubes are machined with differentiated splines for assembly with the torsion bar.
(2)Principle of operation
By a predetermined displacement of the torque tubes on the torsion bar a preloaded torque is contained within the assembly.
The whole assembly is contained within the split cast casing, with the earthing member being installed between the two halves.
If there is a wings system jam, the output shaft is stationary. The input shaft driven by the PCU applies a torque to the stationary output shaft through the pretorqued assembly. Because of the duplex key



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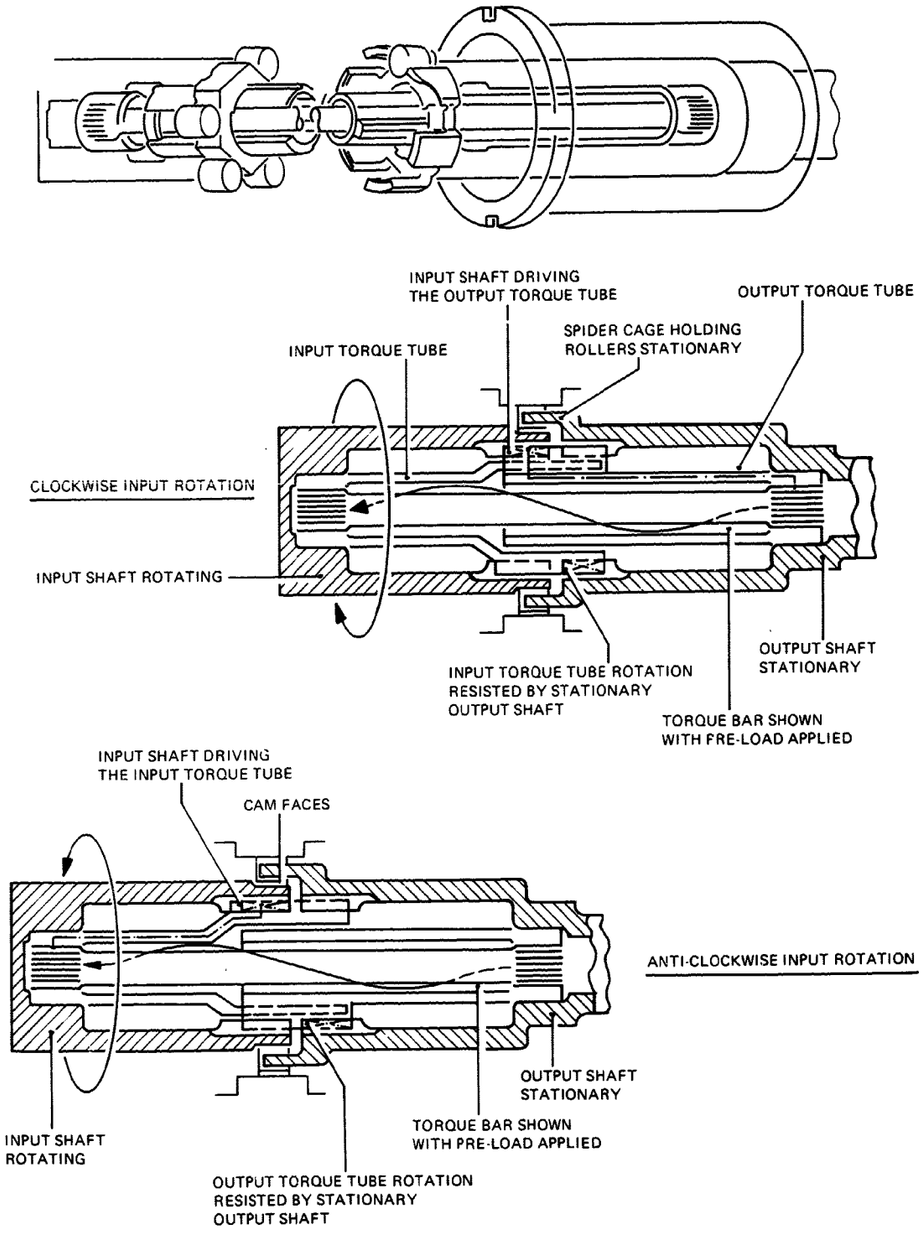
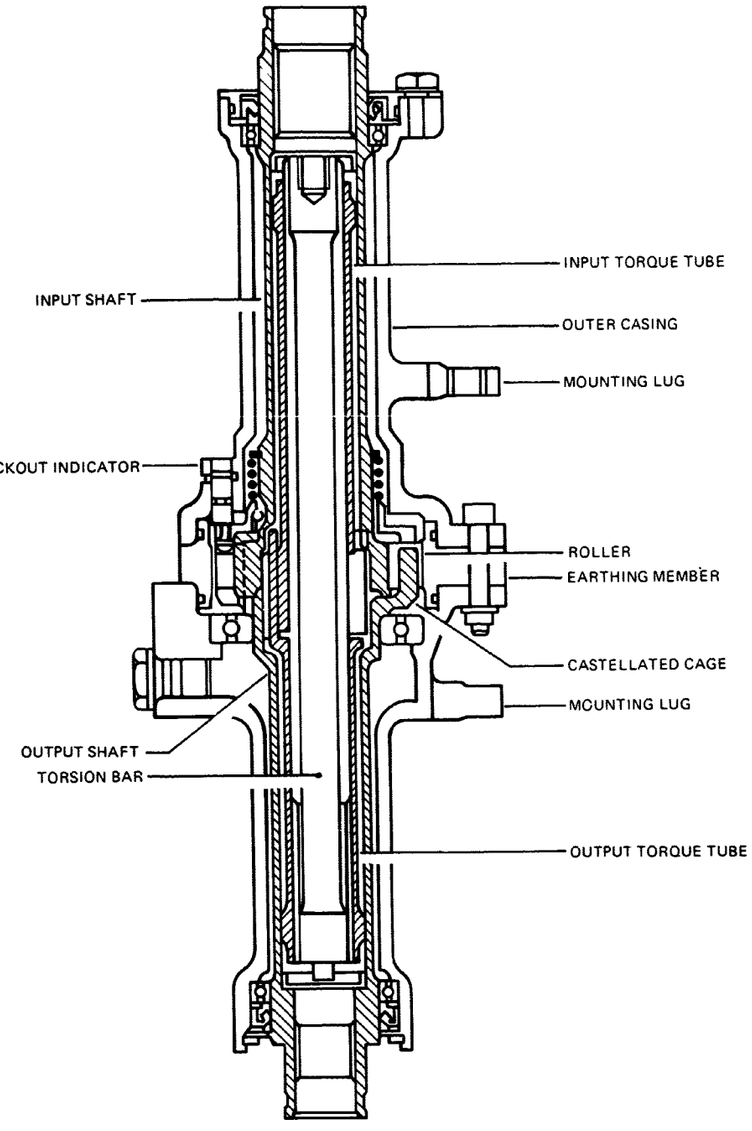
TEE Gearbox
Figure 005


INPUT SHAFT DRIVING THE OUTPUT TORQUE TUBE
OUTPUT TORQUE TUBE
SPIDER CAGE HOLDING ROLLERS STATIONARY
INPUT TORQUE TUBE
CLOCKWISE INPUT ROTATION
INPUT SHAFT ROTATING
INPUT TORQUE TUBE ROTATION RESISTED BY STATIONARY OUTPUT SHAFT
OUTPUT SHAFT STATIONARY
TORQUE BAR SHOWN WITH PRE-LOAD APPLIED
INPUT SHAFT DRIVING THE INPUT TORQUE TUBE
CAM FACES
ANTI-CLOCKWISE INPUT ROTATION
OUTPUT SHAFT STATIONARY
INPUT SHAFT ROTATING
TORQUE BAR SHOWN WITH PRE-LOAD APPLIED
OUTPUT TORQUE TUBE ROTATION RESISTED BY STATIONARY OUTPUT SHAFT



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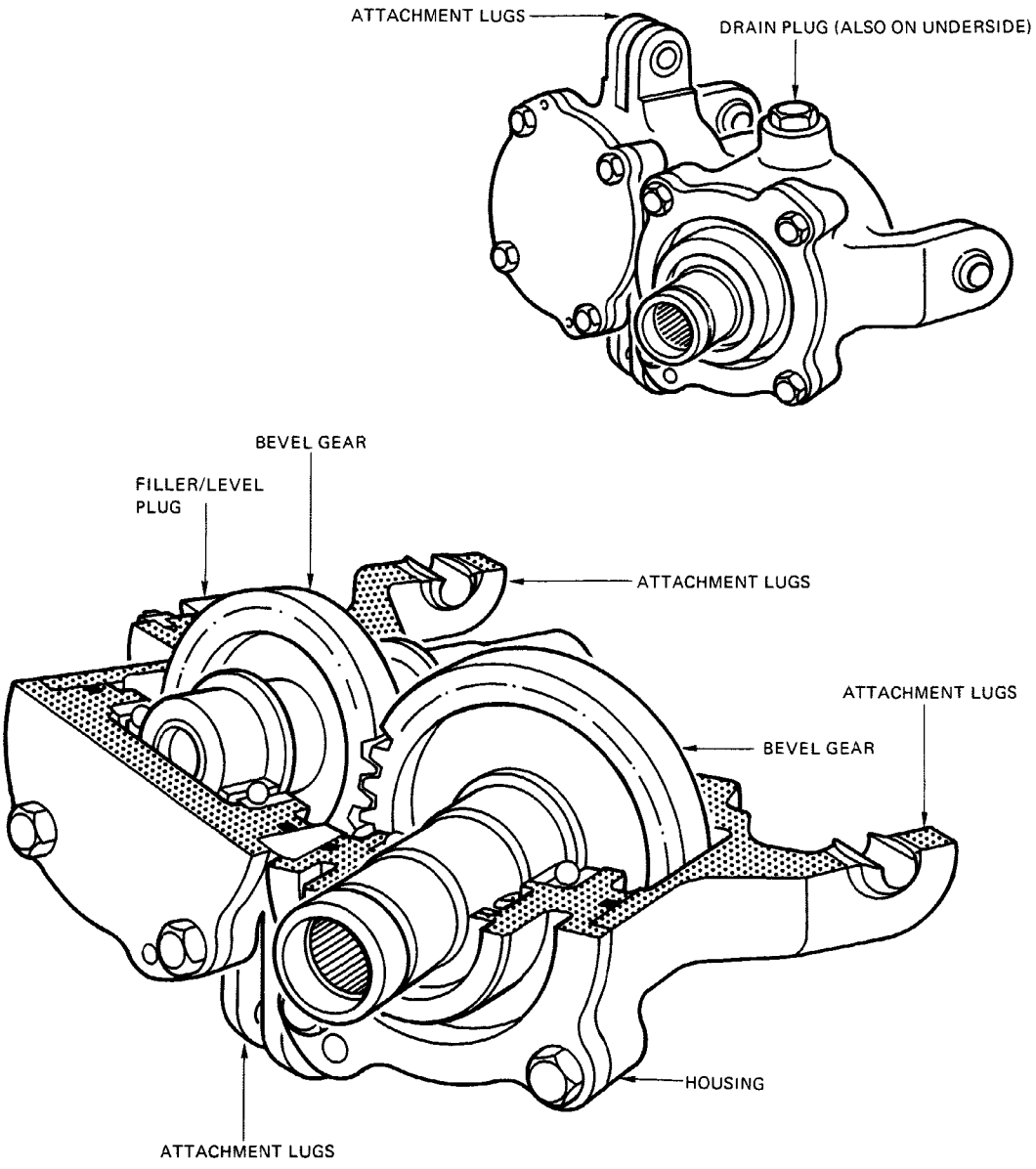
System Torque Limiter
Figure 006

and socket arrangement, the direction of the applied torque will always be in opposition to the pre-loaded torque, regardless of the direction of PCU output shaft rotation. The stationary output shaft prevents the rollers from moving and as the input shaft overcomes the pre-loaded torque the polygon cam makes contact with the rollers. When the input shaft completely overcomes the preload torque the rollers are jammed against the earthing member and the load is transfered from the transmission system to the aircraft structure. At this point the lockout indicator is operated. When the jam or torque is removed the indicator can be reset by thumb pressure.

D. Wing-root Gearboxes (5274, 5422)
(Ref. Fig. 007)
(1)A wing-root gearbox is installed on the outside fuselage skin, at the intersection of each wing with the fuselage, between FR 39 and FR 40/41.
(2)Both wing-root gearboxes are identical in construction. Installation in the LH wing and the RH wing is achieved by mounting in inverted attitudes. One filler level plug and two drain plugs are provided, positioned to permit filling and draining from either installed attitude.
(3)Each wing-root gearbox comprises a housing containing two bevel gears. Four attachment lugs are formed on the housing. The input/output ratio is 1:1.

E. Line Gearboxes (5278, 5426, 5286, 5434)
(Ref. Fig. 008)
(1)Two identical line gearboxes are installed in each wing; the inner line gearboxes (5278, 5426) are installed between screw jacks 1 and 2, the outer line gearboxes (5286), 5434) are installed between screw jacks 2 and 3. The design of the gearbox permits installation in either wing.
(2)Each line gearbox comprises a housing, an input gear, an idler gear and an output gear. The housing is provided with four mounting lugs. One filler level plug and two drain plugs are provided, positioned to facilitate servicing in all installed positions.
(3)The line gearboxes realign the torque shaft run to satisfy the requirements of the wing contour. They also maintain the wing contour when the slats are extended. This is achieved by changing the speed of rotation of screwjacks shafts 1 and 2 so providing a conical extension of the inner slat. Use of this method permits standardisation of the screwjack threads.
(4)Spring washers are provided to counter the effect of differential expansion on bearing positions and gear backlash.
(5)The input gear shaft and the output gear shaft are provided with internal splines to connect with the torque shaft run.

F. Screw Jacks (5276, 5424, 5280, 5428, 5288, 5436, 5344, 5442, 5400, 5450, 5408, 5458)
(Ref. Fig. 009)
(1)The screw jacks are of the translating screw type. Each screw jack is provided with a recirculating ball-nut, contained in the jack head and driven by spur and bevel gears.
(2)The ball-nut contains four independent ball circuits; any three ball



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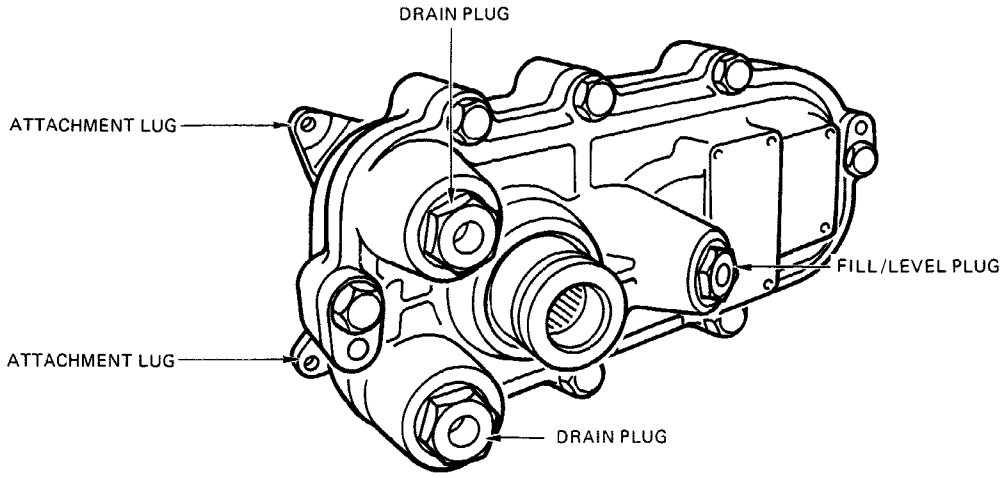
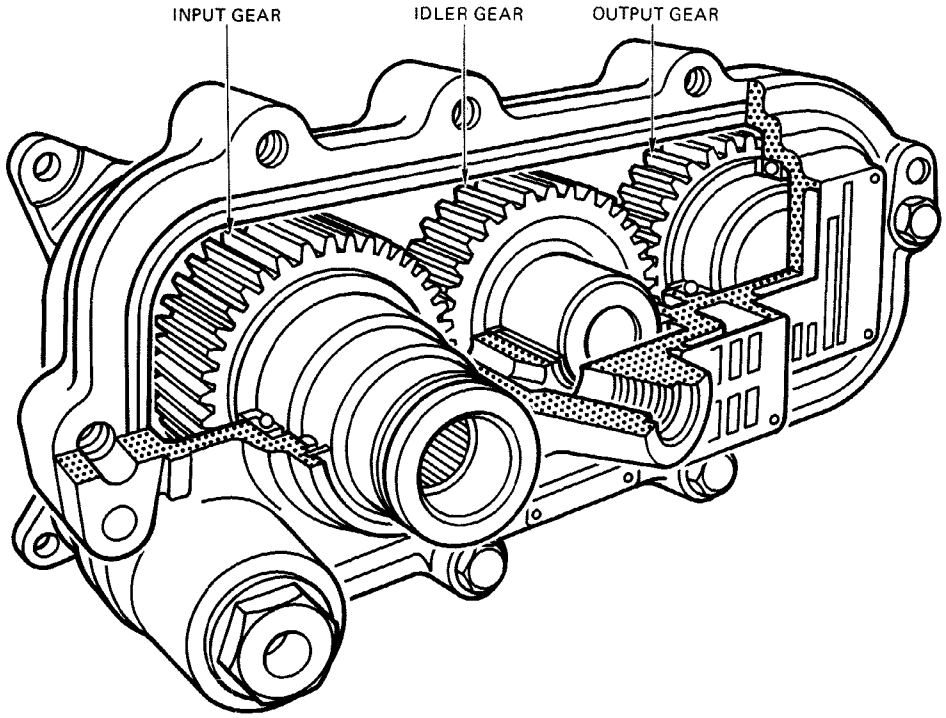
Wing-root Gearbox
Figure 007





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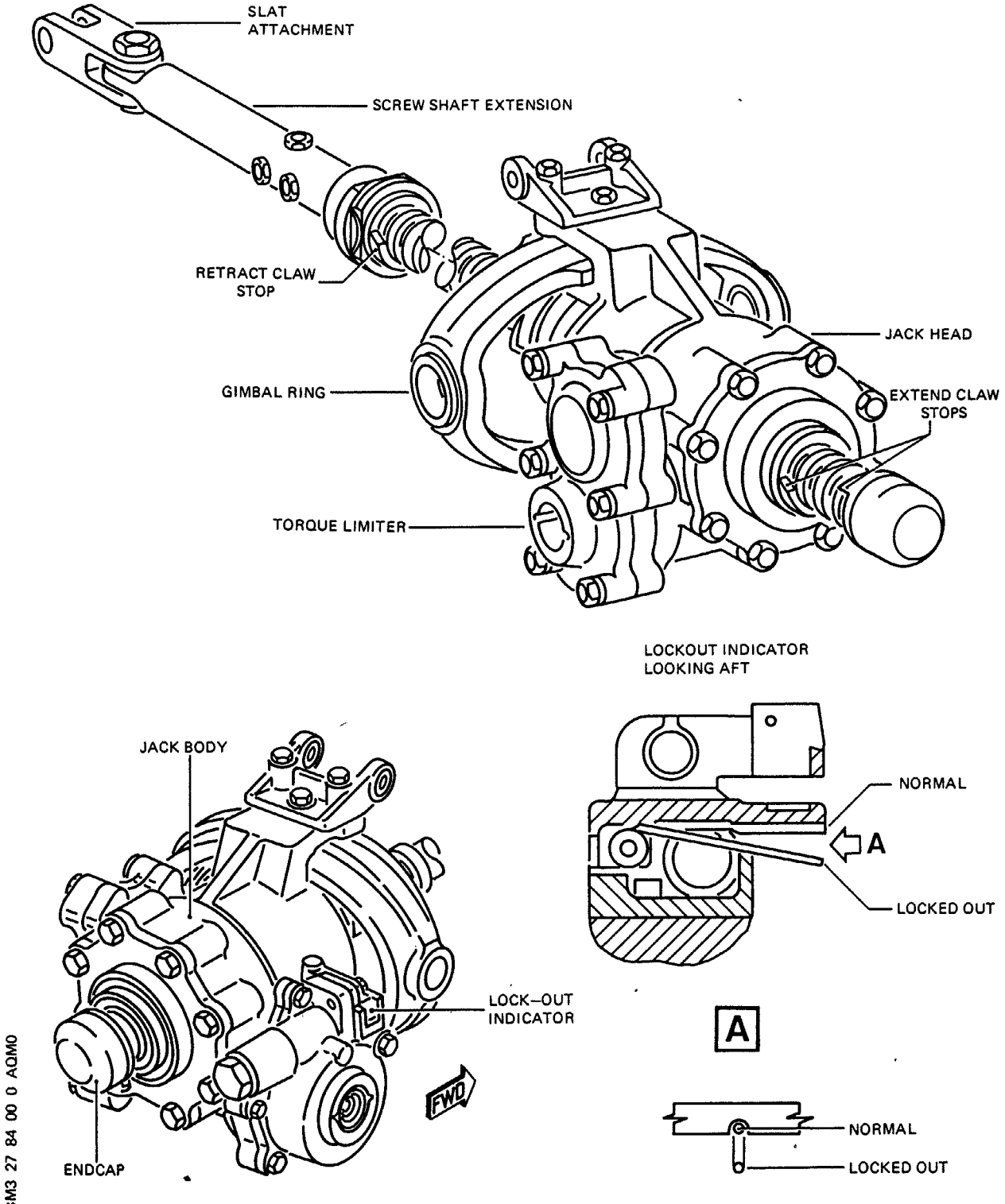
Line Gearbox
Figure 008



Screw Jacks
Figure 009

circuits will transmit the maximum load to be applied.
(3)A torque limiter is installed in each screw jack head. The torque limiter setting for screw jacks 1, 2, 3 and 4 is higher than the torque limiter setting for screw jacks 5 and 6. An operation lockout indicator is provided. The lockout indicator must be reset manually (refer para C for principle of operation of torque limiter).
(4)Wiper seals are provided to retain the lubricant and prevent ingress of contaminants. Scrapers are provided to remove solid deposits from the screw shaft. The scrapers also function as ice chippers. Claw stops, formed integrally with the scrapers, prevent overtravel in the extension or retraction mode.
(5)Connection to the fixed leading edge is achieved by a gimbal ring mounted on each screw jack body. The gimbal ring permits movement of the screw jack during extension or retraction.
(6)Connection to the slat structure is achieved by an attachment block, slotted at each end, mounted on the screw shaft extension; the slots are opposed 90 degrees.
(7)Two types of attachment block are provided, differing in the dimensions of the slots. One type of block will only attach to screw jack 1, 2, 3 or 4 and an inner or center slat, the other type of block will only attach to screw jack 5 or 6 and an outer slat. This ensures foolproof installation of the screw jacks.
(8)A filler/level plug and drain plug are provided for replenishing lubricants.

G. Torque Shafts
(Ref. Fig. 010)
(1)The torque shafts are fabricated from stainless steel tube with fittings welded to both ends of each section. The length of each torque shaft and the types of end fitting provided are dictated by assembly requirements.
(2)The torque shafts installed upstream of the fuselage mounted torque limiters are larger in diameter than the torque shafts mounted downstream.
(3)The torque shafts are supported by a series of steady bearings and connected by splined sliding joints and universal joints, to ensure that the required axial and angular deflections are achieved.
(4)Torque shafts 5271 and 5419, located between the tee-gearbox and the system torque limiters incorporate torsion dampers. These absorb any torque peaks developed on system acceleration/deceleration.

5. Operation
(Ref. Fig. 011)

A. Hydraulic Actuation
The BLUE valve block is controlled by SFCC1, the GREEN valve block is controlled by SFCC2. The valve blocks are similar in construction and operation.
NOTE: Slat hydraulic actuation is similar to flap hydraulic actuation which is fully described in 27-54-00.

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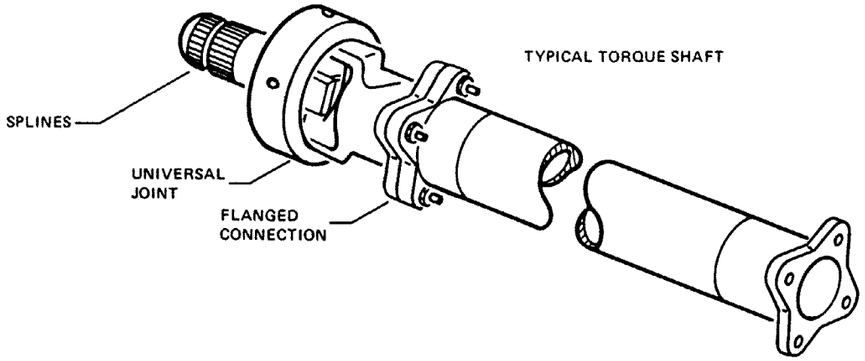

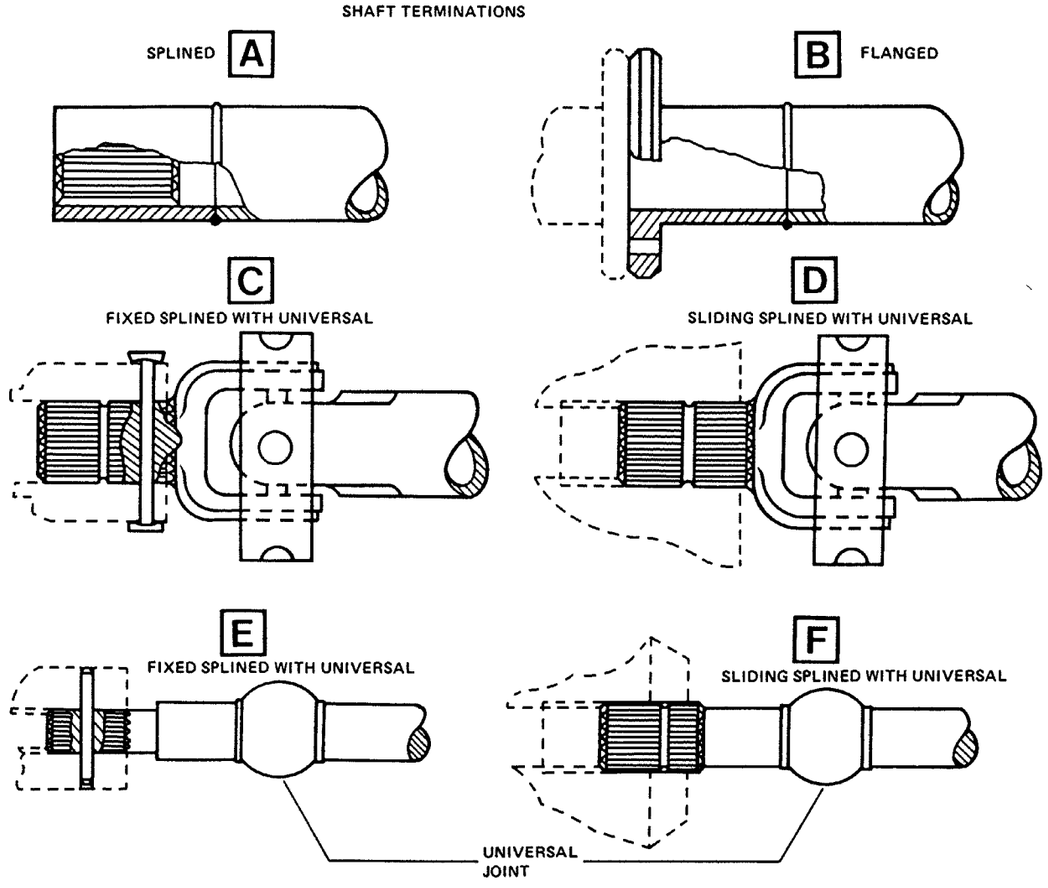

	TORQUE SHAFT NUMBER	SHAFT TERMINATION UP STREAM END	SHAFT TERMINATION DOWN STREAM END	LOCATION
FUSELAGE	5265	D	B	PCU - STEADY BEARING FR 45
	5267	A	B	STEADY BEARING FR 45 - STEADY BEARING FR 43
	5269	B	D	STEADY BEARING FR 43 - TEE GEARBOX
	5271	D	C	TEE GEARBOX - LH TORQUE LIMITER
	5419	D	C	TEE GEARBOX - RH TORQUE LIMITER
	5273	C	D	LH TORQUE LIMITER - WING ROOT GEARBOX
	5421	C	D	RH TORQUE LIMITER - WING ROOT GEARBOX
LH WING	5275	C	D	WING ROOT GEARBOX - SCREW JACK 1
	5277	D	C	SCREW JACK 1 - LINE GEARBOX
	5279	C	D	LINE GEARBOX - SCREW JACK 2
	5281	D	B	SCREW JACK 2 - STEADY BEARING
	5283	A	B	STEADY BEARING - STEADY BEARING
	5285	A	C	STEADY BEARING - LINE GEARBOX
	5287	C	D	LINE GEARBOX - SCREW JACK 3
	5289	D	B	SCREW JACK 3 - STEADY BEARING
	5341	A	B	STEADY BEARING - STEADY BEARING
	5343	B	D	STEADY BEARING - SCREW JACK 4
	5393	D	B	SCREW JACK 4 - STEADY BEARING
	5395	B	A	STEADY BEARING– STEADY BEARING
	5397	B	A	STEADY BEARING - STEADY BEARING
	5399	B	D	STEADY BEARING - SCREW JACK 5
	5401	D	B	SCREW JACK 5 - STEADY BEARING
	5403	B	D	STEADY BEARING - WING-TIP BRAKE
	5405	D	B	WING-TIP BRAKE - STEADY BEARING
	5407	B	D	STEADY BEARING - SCREW JACK 6
	5409	F	E	SCREW JACK 6 - ASYMMETRY PPU
RH WING	5423	C	D	WING ROOT GEARBOX - SCREW JACK 1
	5425	D	C	SCREW JACK 1 - LINE GEARBOX
	5427	C	D	LINE GEARBOX - SCREW JACK 2
	5429	D	B	SCREW JACK 2 - STEADY BEARING
	5431	A	B	STEADY BEARING - STEADY BEARING
	5433	A	C	STEADY BEARING - LINE GEARBOX
	5435	C	D	LINE GEARBOX - SCREW JACK 3
	5437	D	B	SCREW JACK 3 - STEADY BEARING
	5439	A	B	STEADY BEARING - STEADY BEARING
	5441	B	D	STEADY BEARING - SCREW JACK 4
	5443	D	B	SCREW JACK 4 - STEADY BEARING
	5445	B	A	STEADY BEARING - STEADY BEARING
	5447	B	A	STEADY BEARING - STEADY BEARING
	5449	B	D	STEADY BEARING - SCREW JACK 5
	5451	D	B	SCREW JACK 5 - STEADY BEARING
	5453	B	D	STEADY BEARING - WING-TIP BRAKE
	5455	D	B	WING-TIP BRAKE - STEADY BEARING
	5457	B	D	STEADY BEARING - SCREW JACK 6
	5459	F	E	SCREW JACK 6 - ASYMMETRY PPU

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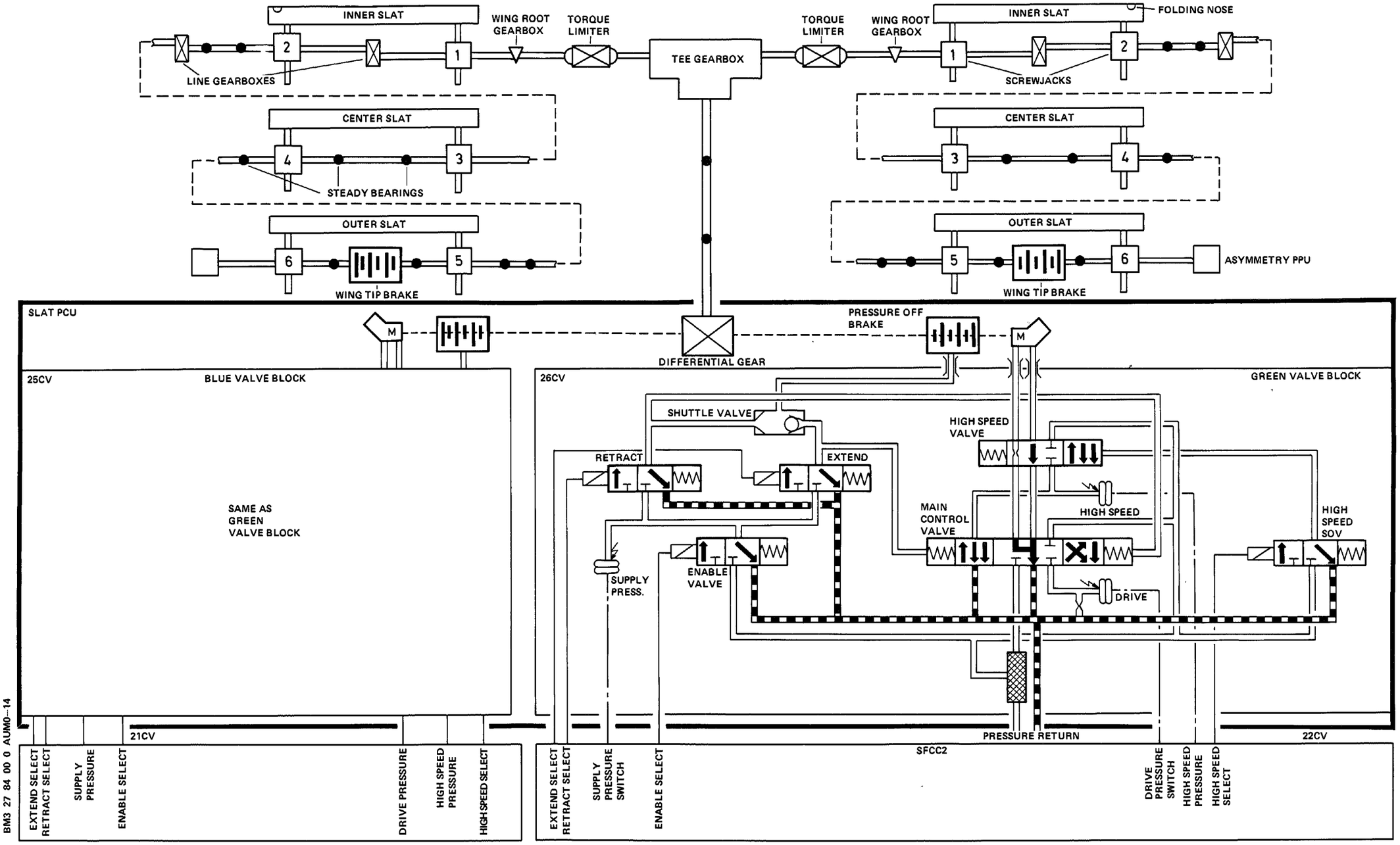
Torque Shafts
Figure 010



Hydraulic Actuation and Power Transmission -
Schematic Diagram
Figure 011

B. Power Transmission

(1)The outputs from the two hydraulic motors drive the differential gearbox which combines the two output drives, reduces the speed of rotation, and transmits a single drive output to the slat transmission.

(2)The transmission runs forward along the fuselage to the TEE gearbox which rotates the direction of the drive through 90 degrees and directs the torque shaft run to the LH wing and the RH wing.

(3)The transmission passes through the torque limiters to the wing-root gearboxes. The operation of the slat torque limiters is similar to the operation of the flap torque limiters which is fully described in 27-54-00.

(4)The wing-root gearbox installed in each wing fillet aligns the torque shaft run with the wing leading edge.

(5)The inner line gearbox, installed between screw jack 1 and screw jack 2, increases the speed of rotation of the torque shaft which increases the stroke of screw jack 2.

(6)The outer line gearbox, installed in each wing between screw jack 2 and screw jack 3, increases the speed of rotation of the torque shaft which increases the stroke of screw jacks 3, 4, 5 and 6.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
WARNING : FLIGHT CONTROLS - MAKE CERTAIN GROUND SAFETIES AND NOTICES ARE IN POSITION.

1. Operational Test

A. Reason for the Job

General operational test after removal/installation of components specified in the maintenance manual.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Safety Barriers
(2)	Circuit Breaker Safety Clips and Tags

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control	D
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization	D
- 29-21-00, P. Block 301	Green Auxiliary Power	D

C. Procedure

(1)Job Set-Up
(a)Open access door 211PZ or 121BL.
(b)Position safety barriers.
(c)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(d)Make certain that electronics racks ventilation is correct.
(e)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301 or 29-10-00, P. Block 301).
NOTE : If required, BLUE system may be used if GREEN system is unavailable. However Krueger flaps and aileron droop are then inoperative. As only one system is utilized slats will moveat half normal speed.
(f)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61

NOTE : On overhead panel 428VU, FLAPS/SYS1/FAULT and FLAPS/SYS2/FAULT lights come on.

(g)Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM/FLT WARN MONITOR	24WW	108/B7
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/FLAPS & SLATS/POS/IND	1CN	334/S66
133VU	FLT CTL/SLATS/26VAC/SYS2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SLATS/WTB 2	14CV	336/Q64
133VU	FLT CTL/SLATS/WTB 1	13CV	336/Q65

(2)Test

NOTE : If the GREEN hydraulic E-pumps are used to operate the slats, the SLATS/SYS/FAULT light, on overhead panel 428VU, may flash on and off. This is due to low pump capacity and can be ignored.

ACTION	RESULT
1. On maintenance panel 472VU - set ANN LT switch to READ position.	On maintenance panel 471VU, section FLIGHT CONTROLS - annunciators SFCC1 and SFCC2/ BITE DISPLAY are off.
2. On avionics rack 90VU - check fault code indicators on SFCC1 and SFCC2, if necessary reset (record any fault codes).	- SFCC1 and SFCC2 fault code indicators are black
3. Move flap/slat control lever on center pedestal to second notch (SLATS 15/FLAPS 0).	- Slats extend - Krueger flaps extend fully - Ailerons droop if servocontrols are activated. On flap/slat position indicator 5CN, - Slat position indicator band moves to SLATS 15.

ACTION	RESULT
4. Move flap/slat control lever to third notch (SLATS 15/FLAPS 15).	- Slats and slat position indicator band should not move.
5. Move flap/slat control lever to fourth and fifth notch (SLATS 20/FLAPS 20 and SLATS 30/FLAPS 40), in turn checking that slats move to selected position before making next selection.	- Slat position indicator band moves to SLATS 20, then to SLATS 30 position on further selection.
6. Return flap/slat control lever to second notch (SLATS 15/FLAPS 0), stopping at intermediate positions and checking that slats move to selected position before making next selection.	- Slat position indicator band moves to SLATS 20, then to SLATS 15 position on further selection.
7. Move flap/slat control lever to first notch.	- Slats retract to 0° - Slat position indicator band moves to SLATS 0 - Krueger flaps retract fully - Ailerons return to datum position.
8. On maintenance panel 471VU, section FLIGHT CONTROLS - check annunciators SFCC1 and SFCC2/BITE DISPLAY.	- Annunciators SFCC1 and SFCC2/BITE DISPLAY are off.
9. On maintenance panel 472VU - set ANN LT switch to OFF.	

(3)Close-Up

(a)Remove safety clips and tags and close circuit breakers 1CV and 2CV.

NOTE : On overhead panel 428VU, FLAPS/SYS1/FAULT and FLAPS/SYS2/FAULT lights go off.

(b)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301 or 29-10-00, P. Block 301).

(c)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(d)Close access door 211PZ or 121BL.

(e)Remove safety barriers, notices and ground equipment.

(f)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

2. System Test

A. Reason for the Job

NOTE : Test the slat operating times only for trouble shooting purposes.

(1)Test of slat system 1 and Krueger flap operating time and measurement of slat deflection angles.
(2)Test of slat system 2 operating time.
(3)Test of slat systems 1 and 2 and Krueger flap operating time and measurement of slat deflection angles.
(4)Test of GREEN low hydraulic pressure function.
(5)Test of BLUE low hydraulic pressure function.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.8 m (12.5 ft.)
(2)	2 Clinometers
(3)	Clinometer Support Strips
(4)	Stopwatch
(5)	Circuit Breaker Safety Clips and Tags

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control	D
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization	D

C. Procedure

(1)Job Set-Up
(a)Make certain that slats and Krueger flaps are fully retracted and flap/slat control lever on center pedestal is in first notch position (SLATS 0/FLAPS 0).
(b)Position access platform.
(c)Install clinometer support strips on center slats.
(d)Using clinometers measure zero position of surfaces and record for use as datum for deflection measurements.
(e)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(f)Make certain that electronics racks ventilation is correct.
(g)Connect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).

(h)Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/FLAPS & SLATS/POS/IND	1CN	334/S66
133VU	FLT CTL/SLATS/26VAC/SYS2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SLATS/WTB 2	14CV	336/Q64
133VU	FLT CTL/SLATS/WTB 1	13CV	336/Q65

(i)Open safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61

NOTE : On overhead panel 428VU, FLAPS/SYS1/FAULT and FLAPS/SYS2/FAULT lights come on.

(k)Make certain that aircraft is in ground condition.

D. Test

(1)Slat System 1 and Krueger Flap Operating Time and Measurement of Slat Deflection Angles

ACTION	RESULT
1. Pressurize BLUE and GREEN hydraulic systems (Ref. 29-10-00, P. Block 301).	
2. Open, safety and tag circuit breakers 4CV and 8CV.	- On overhead panel 428VU, SLATS/ SYS2/FAULT light comes on.
3. Move flap/slat control lever on center pedestal to second notch (SLATS 15/FLAPS 0).	- On flap/slat position indicator 5CN, slat position indicator band moves to SLATS 15 - Krueger flaps extend fully - Slats deflects to an angle of 17 $\pm 1^{\circ}$ - Krueger flap operation time is 5 ±1 s - Slat operation time is . 16.9 ±1.7 s
4. Move flap/slat control lever	- Slat position indicator band

ACTION	RESULT
to third notch (SLATS 15/FLAPS 15).	does not move.
5. Move flap/slat control lever to fourth notch (SLATS 20/FLAPS 20).	- Slat position indicator band moves to SLATS 20 - Slats deflect to an angle of 21 ±1° - Slat operation time is 4 ±0.5 s.
6. Move flap/slat control lever to fifth notch (SLATS 30/FLAPS 40).	- Slat position indicator band moves to SLATS 30 - Slats deflect to an angle of 25.4 ±1° - Slat operation time is 4.5 ±0.5 s.
7. Return flap/slat control lever to fourth notch.	- Slat position indicator band moves to SLATS 20 - SLAT operation time is 4.5 ±0.5 s.

ACTION	RESULT
8. Return flap/slat control lever to third notch.	- Slat position indicator band moves to SLATS 15 - Slat operation time is 4.1 ±0.5 s.
9. Return flap/slat control lever to first notch.	- Slat position indicator band moves to SLATS 0 - Slats retract to zero position - Krueger flaps retract fully - Slat operation time is 16.9 ±1.7 s - Krueger flap operation time is 5 ±1 s.
10. Depressurize BLUE and GREEN hydraulic systems (Ref. 29-10-00, P. Block 301).	
11. Remove safety clips and tags and close circuit breakers 4CV and 8CV.	- On overhead panel 428VU, SLATS/SYS2/FAULT light goes off.

(2)Slat System 2 Operating Time

ACTION	RESULT
1. Open, safety and tag circuit breakers 3CV, 7CV and 9CV.	- On overhead panel 428VU, SLATS/SYS1/FAULT light comes on.
2. Pressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301).	
3. Perform work steps as detailed in (1) 3. thru 9. above and check slat operating time.	- As in (1) 3. thru 9. above.
4. Depressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301).	
5. Remove safety clips and tags and close circuit breakers 3CV, 7CV and 9CV.	- On overhead panel 428VU, SLATS/SYS1/FAULT light goes off.

(3)Slat Systems 1 and 2 and Krueger Flap Operating Time and Measurement of Slat Deflection Angles

ACTION	RESULT
1. Pressurize **GREEN** and **BLUE** hydraulic systems (Ref. 29-10-00, P. Block 301).	
2. Move flap/slat control lever to second notch (**SLATS 15/FLAPS 0**).	- On flap/slat position indicator **5CN**, slat position indicator band moves to **SLATS 15** - Krueger flaps extend fully - Slats deflect to an angle of 17 ±1° - Slat operation time is **8.5 ±1 s** - Krueger flap operation time is **5 ±1 s.**
3. Move flap/slat control lever to third notch (**SLATS 15/FLAPS 15**).	- Slat position indicator band does not move.
4. Move flap/slat control lever to fourth notch (**SLATS 20/FLAPS 20**).	- Slat position indictor band moves to **SLATS 20** - Slats deflect to an angle of 21 ±1° - Slat operation time is **2 ±0.5 s.**
5. Move flap/slat control lever to fifth notch (**SLATS 30/FLAPS 40**).	- Slat position indicator band moves to **SLATS 30** - Slats deflect to an angle of 25.4 ±1° - Slat operation time is **2.2 ±0.5 s.**
6. Return flap/slat control lever to fourth notch.	- Slat position indicator band moves to **SLATS 20** - Slat operation time is **2.2 ±0.5 s.**
7. Return flap/slat control lever to third notch.	- Slat position indicator band moves to **SLATS 15** - Slat operation time **2 ±0.5 s.**
8. Return flap/slat control lever to second notch.	- Slat position indicator band does not move.

ACTION	RESULT
9. Return flap/slat control lever to first notch.	- Slat position indicator band moves to SLATS 0 - Slats retract to zero position - Krueger flaps retract fully - Slat operation time is 8.5 ±1 s - Krueger flap operation time is 5 ±1 s.
10. Depressurize GREEN and BLUE hydraulic systems (Ref. 29-10-00, P. Block 301).	

(4)Slat GREEN Low Hydraulic Pressure Function

ACTION	RESULT
1. Pressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301) to check slat system 2.	
2. Move flap/slat control lever from first notch (SLATS 0/FLAPS 0) to fifth notch (SLATS 30/FLAPS 40) and during slat movement gradually decrease hydraulic pressure output from hydraulic supply.	- Slats start moving and stop at decreasing pressure of approx. 140 bars (2030 psi). After slats have stopped SLATS/SYS2/FAULT light on panel 428VU comes on.
3. Return flap/slat control lever to first notch (SLATS 0/FLAPS 0) and gradually increase hydraulic pressure output from hydraulic supply.	- At approx. 160 bars (2320 psi), slats start moving and SLATS/SYS2/FAULT light on panel 428VU goes off
4. Depressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301).	

(5)Slat BLUE Low Hydraulic Pressure Function

ACTION	RESULT
1. Pressurize BLUE hydraulic system (Ref. 29-10-00, P. Block 301) to check slat system 1.	
2. Move flap/slat control lever from first notch (SLATS 0/FLAPS 0) to fifth notch (SLATS 30/FLAPS 40) and during slat movement gradually decrease hydraulic pressure output from hydraulic supply.	- Slats start moving and stop at decreasing pressure of approx. 140 bars (2030 psi). After slats have stopped SLATS/SYS1/FAULT light on panel 428VU comes on.
3. Return flap/slat control lever to first notch (SLATS 0/FLAPS 0) and gradually increase hydraulic pressure output from hydraulic supply.	- At approx. 160 bars (2320 psi), slats start moving and SLATS/SYS1/FAULT light on panel 428VU goes off
4. Depressurize BLUE hydraulic system (Ref. 29-10-00, P. BLock 301).	

E. Close-Up

(1)Remove safety clips and tags and close circuit breakers 1CV and 2CV.

NOTE : On overhead panel 428VU, FLAPS/SYS1/FAULT and FLAPS/SYS2/FAULT lights go off.

(2)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(3)Shut down and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).

(4)Remove clinometer support strips.

(5)Remove access platform.

HYDRAULIC ACTUATION AND POWER TRANSMISSION (SLATS) - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Detailed Visual Inspection of Slats Screwjacks No.1 to 6 for General Condition and Security

A. Reason for the Job

(1)General Visual Inspection of Screwjack Assemblies

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 3.2 to 4.5 m (10 to 15 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)	Safety Barriers
	(4)	Circuit Breaker Safety Clips and Tags

Referenced Procedure

- 12-13-27, P. Block 001 Flight Controls
- 27-80-00, P. Block 301 Lift Augmenting (Slats and Krueger Flaps)

C. Procedure

(1)Job Set-Up

(a)Position safety barriers.

(b)Extend slats to 30° position (Ref. 27-80-00, P. Block 301).

R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

(e)Position access platform.
(f)Open access doors 512CB, 512HB, 523DB, 523KB, 524DB and 524JB (612CB, 612HB, 623DB, 623KB, 624DB and 624JB).

(2)Inspection

R (a)Inspect screwjack body and attachments for corrosion, cracks, or other damage. None of these are permitted.
R (b)Inspect the screwjack body for signs of leakage. If you find signs of leakage, do the check of Component Lubricant Capacities (Ref. 12-13-27, P. Block 001).
R (c)Inspect screwjack spindle and screwnut for cracks, corrosion or other damage. None of these are permitted.
R (d)Make certain that safetying devices are intact.
R (e)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
R (f)Remove safety guard from flap/slat control lever quadrant.
R (g)Retract slats to 15°. (Ref. 27-80-00, P. Block 301).
R (h)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
R (j)Inspect section of screwjack spindle previously obscured by screwnut for corrosion, cracks or other damage. None of these are permitted.
R (k)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
R (l)Fully retract slats (Ref. 27-80-00, P. Block 301).

(3)Close-Up

(a)Close access doors 512CB, 512HB, 523DB, 523KB, 524DB and 524JB (612CB, 612HB, 623DB, 623KB, 624DB and 624JB).
(b)Remove access platform.
(c)Remove safety barriers.

2. Slat Screwjacks 1 thru 6 - Backlash and Play Check

A. Reason for the Job
(1)To check for backlash between screwjack spindle and screwnut.
(2)To check for play at jack end fitting, mounting and gimbal.

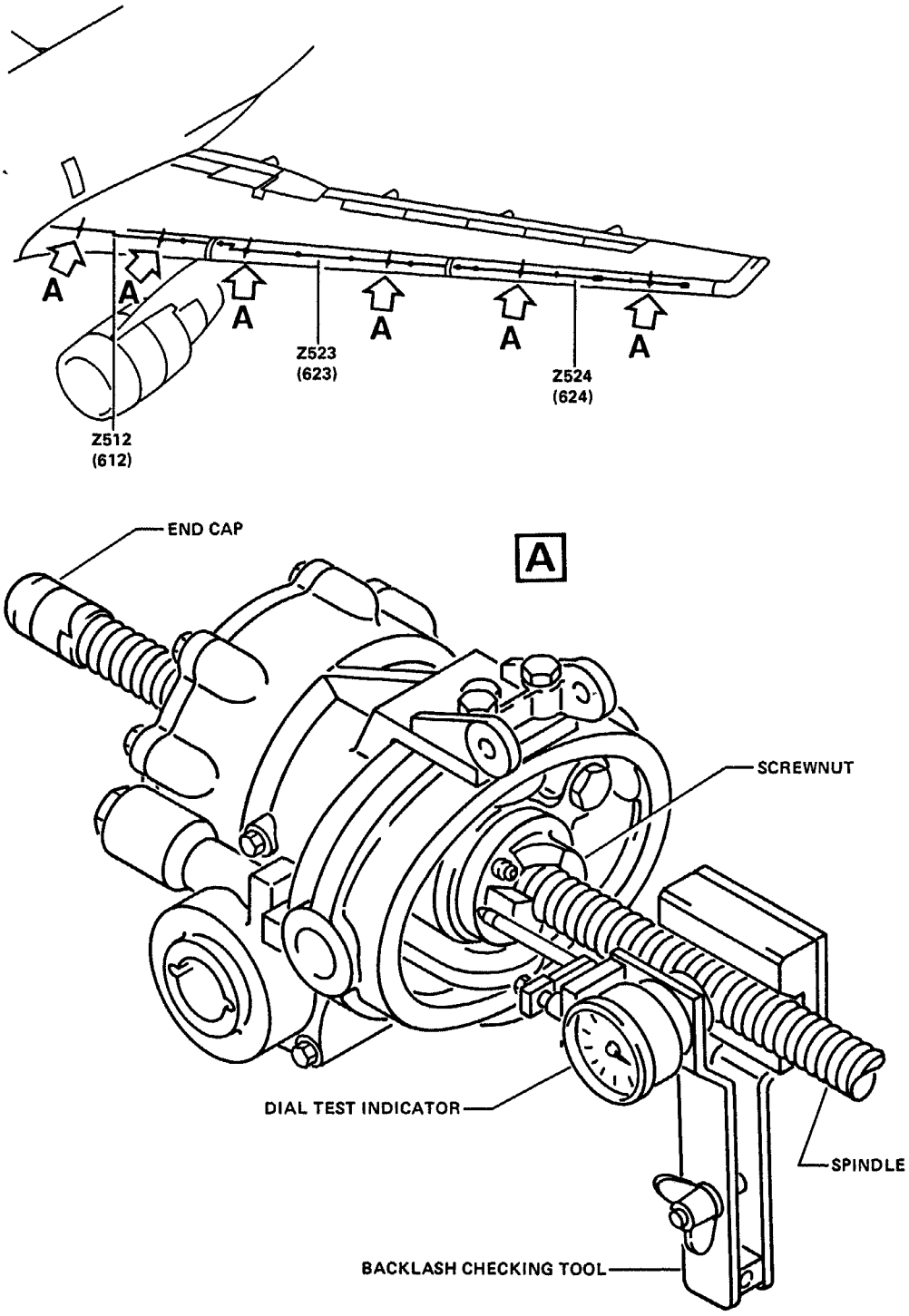
B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 3.2 to 4.5 m (10 to 15 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)55771S0000	Backlash Checking Tool - Slat Screwjacks
	(4)	Circuit Breaker Safety Clips and Tags

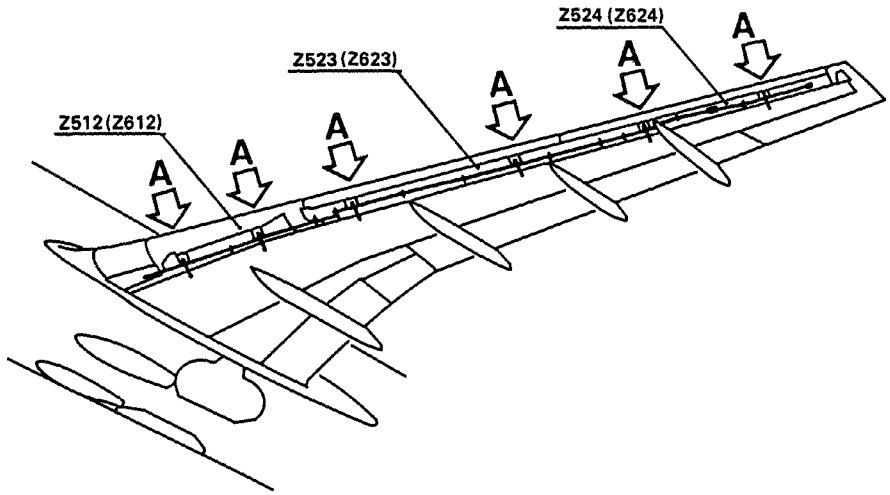
Referenced Procedures

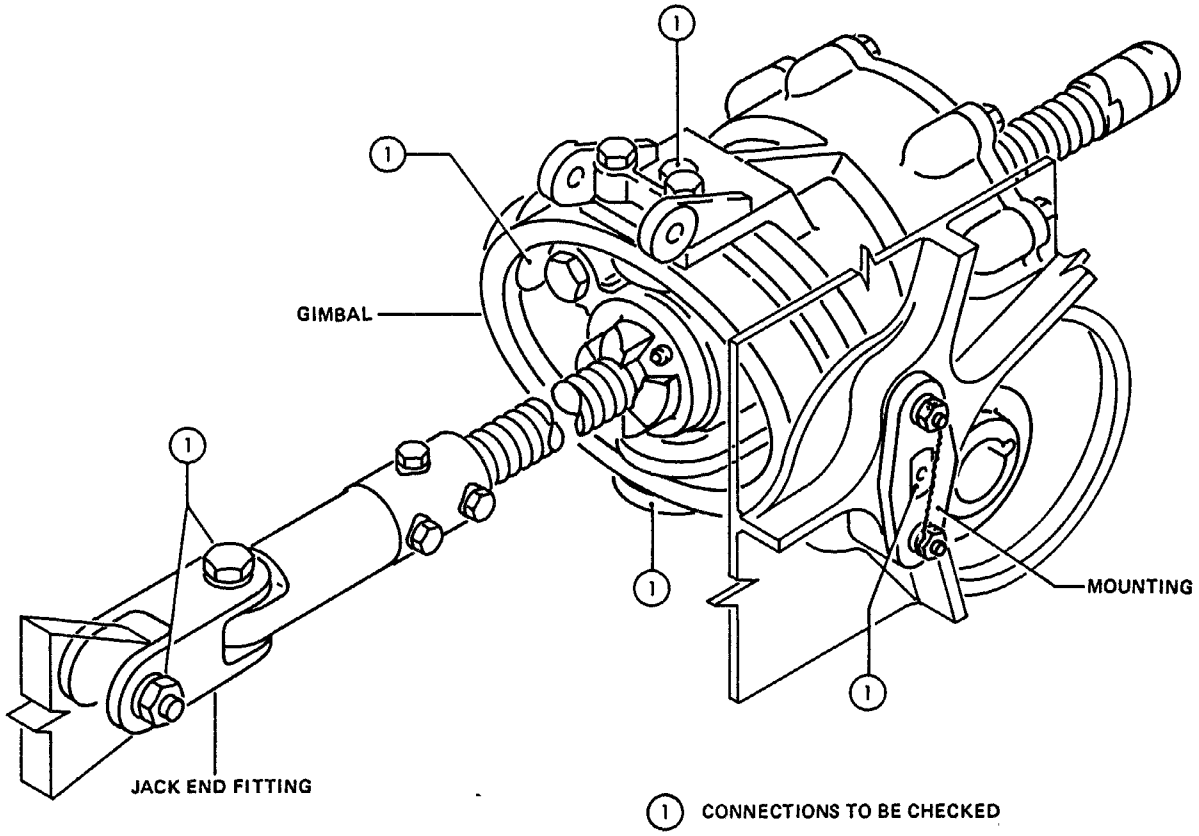
- 12-13-27, P. Block 001	Flight Controls
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-22, P. Block 601	Screwjacks 1 thru 4
- 27-84-23, P. Block 601	Slat Screwjacks 5 and 6

C. Procedure
(Ref. Fig. 601)
(Ref. Fig. 602)
(1)Job Set-Up
(a)Extend slats to 15° position (Ref. 27-80-00, P. Block 301).
R (b)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(c)Position access platform.
(d)Remove access panels:
512CB and 612CB - screwjacks 1
512HB and 612HB - screwjacks 2
523DB and 623DB - screwjacks 3
523KB and 623KB - screwjacks 4
524DB and 624DB - screwjacks 5
524JB and 624JB - screwjacks 6



Installation of Backlash Checking Tool
Figure 601





Play Check - Location of Components
Figure 602

(e)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

(2)Check for backlash between screwjack spindle and screwnut.
NOTE : Procedure is similar for all slat screwjacks.
(a)Clean section of spindle where checking tool will be installed and face of screwjack where indicator probe will be in contact using a dry cloth. Do not use any solvents.
(b)Clamp backlash checking tool to the spindle adjacent to the front face of the screwnut.
(c)Position dial test indicator such that actuating rod contacts front face of screwnut.
(d)Manually apply a force to slat in retract direction to take up backlash in nut assembly and set the indicator to zero.
(e)Allow slat to return to the position where it was before, and record indicator reading.
(f)The measurement must not exceed 0.4 mm (0.0157 in.).
(g)Repeat steps (d) thru (f) 3 times to ensure consistent results.
(h)Remove backlash checking tool from screwjack.

(3)Check for play at jack end fitting, mounting and gimbal.
(a)Remove safety clips and tags and close circuit breakers 3CV, 7CV and 9CV.
(b)Remove safety guard from flap/slat control lever quadrant.
(c)Extend slats to 30° position (Ref. 27-80-00, P. Block 301).
(d)Open safety and tag circuit breakers 3CV, 7CV and 9CV.
(e)Install safety guard on flap/slat control lever quadrant.
R (f)Manually apply a force to slat surface in retract direction to take
R up the backlash in the connections and allow slat to return to the
R the position where it was before.
R Check jack end fitting, mounting and gimbal for exessive play.
NOTE : When applying force to the slat surface, a second person should put a finger tip on the connections in turn to find
R the location of any excessive play. Excessive play can be
R determined by comparision with other stations. Note that a
R certain amount of play will always be present.
(g)If excessive play is found, check fits and clearances (Ref. 27-84-22 or 27-84-23, P. Block 601).
(4)Close-Up
(a)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(b)Close access panels.
(c)Remove access platform.
(d)Remove safety clips and tags and close circuit breakers 3CV, 7CV, 9CV, 8CV and 4CV.
(e)Remove safety guard from flap/slat control lever quadrant.
(f)Fully retract slats (Ref. 27-80-00, P. Block 301).

3. Check of Slat Tracks and Rollers for General Condition and Wear and Slat to Track Attachments for Security

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.2 to 4.5 m (10 to 15 ft.)
R (2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
(3)	Circuit Breaker Safety Clips and Tags
(4)	Lint Free Cloth
(5)Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 12-22-27, P. Block 1	Flight Controls Lubrication
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-80-13, P. Block 401	Tracks - Slat 1
- 27-80-14, P. Block 401	Tracks - Slat 2 and 3
- 57-41-34, P. Block 601	Attach Fittings
- SRM 57-40-00, P. Block 101	

B. Procedure

(Ref. Fig. 603)

(1)Job Set-Up

(a)Extend slats to 30° position (Ref. 27-80-00, P. Block 301).

R (b)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

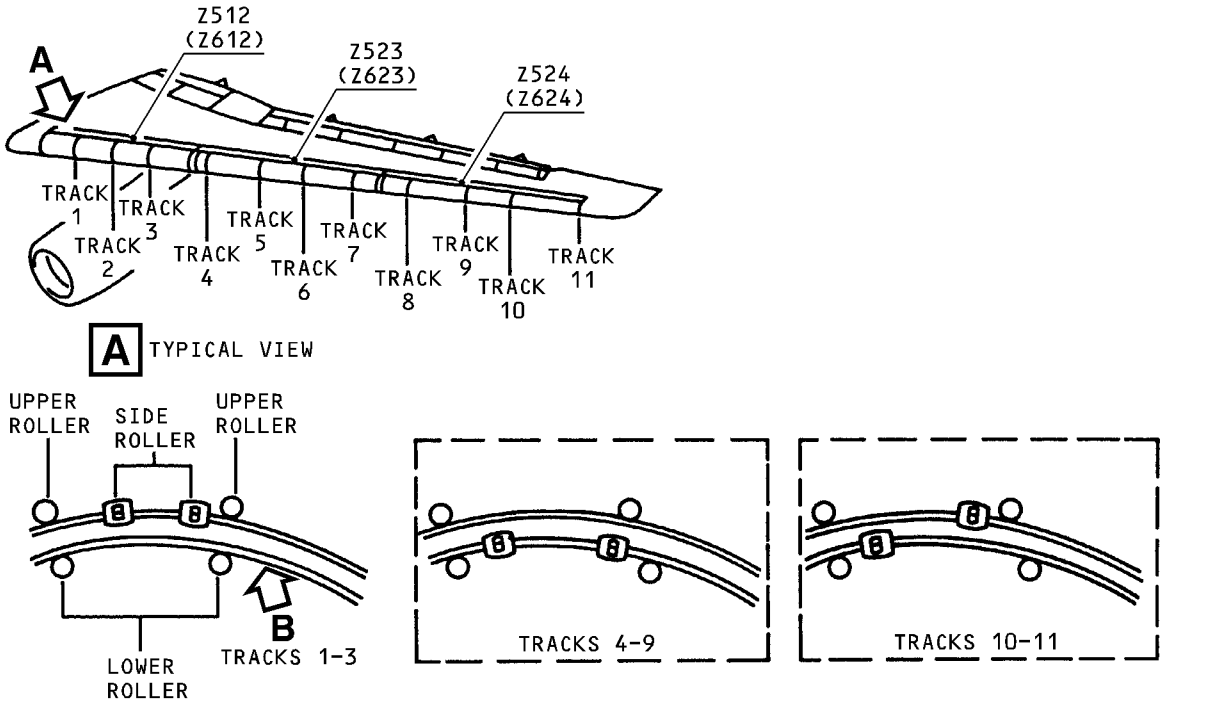
(c)Position access platform.

(d)Remove access panels:

512CB and 612CB	Track 1
512EB, 512FB, 612EB and 612FB	Track 2
512HB and 612HB	Track 3
523BB, 523CB, 623BB and 623CB	Track 4
523EB, 523FB, 623EB and 623FB	Track 5
523HB and 623HB	Track 6
523LB, 523MB, 623LB and 623MB	Track 7
524BB, 524CB, 624BB and 624CB	Track 8
524EB, 524FB, 624EB and 624FB	Track 9
524GB, 524HB, 624GB and 624HB	Track 10
524KB and 624KB	Track 11

(e)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66



NOTES:

1. THE DEPTH OF DAMAGE 'D' ON ONE OR THE SUM OF BOTH SIDES MUST NOT EXCEED 1.0mm(0.04in.) AFTER BEING BLENDED OUT AND POLISHED.
2. DAMAGE IN A ROLLER PATH IS TO BE REMOVED BY BLENDING OUT TO AN EVEN DEPTH ACROSS THE WHOLE WIDTH OF THE CONTACT SURFACE (DETAIL E).
3. THE DEPTH OF DAMAGE 'F' ON ONE OR THE SUM OF BOTH SIDES MUST NOT EXCEED 0.5mm(0.02in.) AFTER BEING BLENDED OUT AND POLISHED.
4. BLEND OUT ANY DAMAGE TO A SMOOTH POLISHED CONTOUR OVER A MINIMUM DISTANCE OF 20 TIMES THE DEPTH OF DAMAGE.

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R Slat Tracks - Allowable Damage
Figure 603

(f)Clean the entire length of all slat tracks with a lint-free cloth and with white spirit (Material No. 11-002).

(2)Check of the Slat Tracks and Rollers

(a)Check the roller paths of the slat tracks 1 thru 11 (as far as visible) for signs of scoring, scuffing and for evidence of wear.

NOTE : Signs of scoring or scuffing could refer to seized rollers.

1 If damage is present, it should be blended out. The depth of damage
R on one or the sum of both roller path sides must not exceed
R 1.0 mm (0.04 in.) after blending-out (Ref. Fig. 603)
(for more details refer to SRM 57-40-00, P. Block 101).

2 If the damage is greater than the given limits, proceed as follows:

a Remove the appropriate slat track (Ref. 27-80-13, P. Block 401 or 27-80-14, P. Block 401).

b Check all of the rollers for easy movement, evidence of wear and for slackness.

c If damage is found, check the fits and clearances of the appropriate rollers (Ref. 57-41-34, P. Block 601) or replace the rollers.

d Install a serviceable slat track (Ref. 27-80-13, P. Block 401 or 27-80-14, P. Block 401).

3 If damage is found, but is not greater than the given limits, proceed as follows:

a Remove the appropriate rollers and check the fits and clearances (Ref. 57-41-34, P. Block 601).

R (b)Check the track web of the slat tracks 1 thru 11 (as far as visible)
R for damage.
R 1 If damage is present, it should be blended out. The depth of damage
R one one or the sum of both track webs must not exceed
R 0.5 mm (0.0197 in.) after blending-out (Ref. Fig. 603)
R (for more details refer to SRM 57-40-00, P. Block 101).
R 2 If the damage is greater than the given limits, proceed as follows:
R a Remove the appropriate slat track (Ref. 27-80-13, P. Block 401
R or 27-80-14, P. Block 401).

R (c)Check the lower and upper slat track rollers (as far as visible) for evidence of wear.

NOTE : The upper aft rollers are only visible in some places through holes in the ribs.

R (d)Check the side rollers for correct attachment and for evidence of wear.

R (d)If there is excessive damage, remove the appropriate rollers and check the fits and clearances of the rollers (Ref. 57-41-34, P. Block 601).

(3)Close-Up

(a)Apply lubricant to the slat tracks (Ref. 12-22-27, P. Block 1).

(b)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(c)Close the access panels removed above.

(d)Remove access platform.

(e)Remove safety clips and tags and close circuit breakers 3CV, 7CV, 9CV, 8CV and 4CV.

(f)Remove safety guard from flap/slat control lever quadrant.

(g)Fully retract slats (Ref. 27-80-00, P. Block 301).

4. Inspection of Universal Joints

A. Reason for the Job

To inspect universal joints for the presence of non-metalic bushes.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.2 to 4.5 m (10 to 15 ft.)
R (2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
(3)	Safety Barriers
(4)	Circuit Breaker Safety Clips and Tags
(5)	Ohmmeter

Referenced Procedures

- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-21, P. Block 401	Transmission Shafts
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure

(1)Job Set-Up

(a)Position safety barriers.

(b)Make sure that the slats are fully retracted (Ref. 27-80-00, P. Block 301).

R (c)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

(e)Position adjustable access platform below wing.

(f)Remove the access panels:
512BB, 512CB, 512DB, 512EB, 512FB, 512GB, 512HB, 512JB, 512KB, 513BL, 523AB, 523BB, 523CB, 523DB, 523EB, 523FB, 523GB, 523HB, 523JB, 523KB, 523LB, 523MB, 524AB, 524BB, 524CB, 524DB, 524EB, 524FB, 524GB, 524HB, 524JB, 524KB, 612BB, 612CB, 612DB, 612EB, 612FB, 612GB, 612HB, 612JB, 612KB, 613BR, 623AB, 623BB, 623CB, 623DB, 623EB, 623FB, 623GB, 623HB, 623JB, 623KB, 623LB, 623MB, 624AB, 624BB, 624CB, 624DB, 624EB, 624FB, 624GB, 624HB, 624JB, and 624KB.

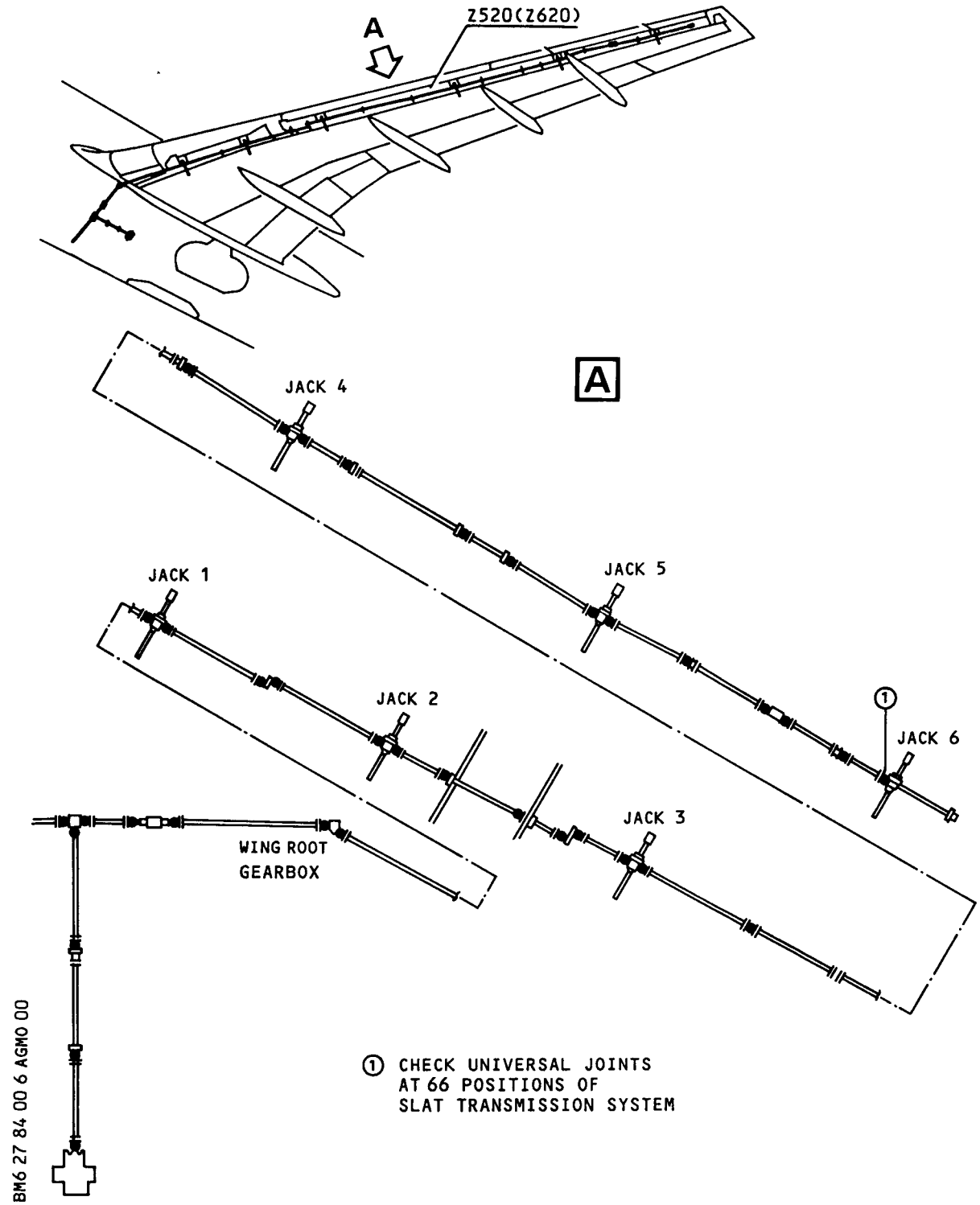
(j)Open the main gear main doors (Ref. 32-12-11, P. Block 301).

(h)Open the access door 147BZ.

(2)Inspection of the Universal Joints (Ref. Fig. 604, 605)

(a)Check each universal joint for the presence of the non-metalic bush by a continuity test using an ohmmeter as follows:

NOTE : The absence of the non-metalic bush will result in

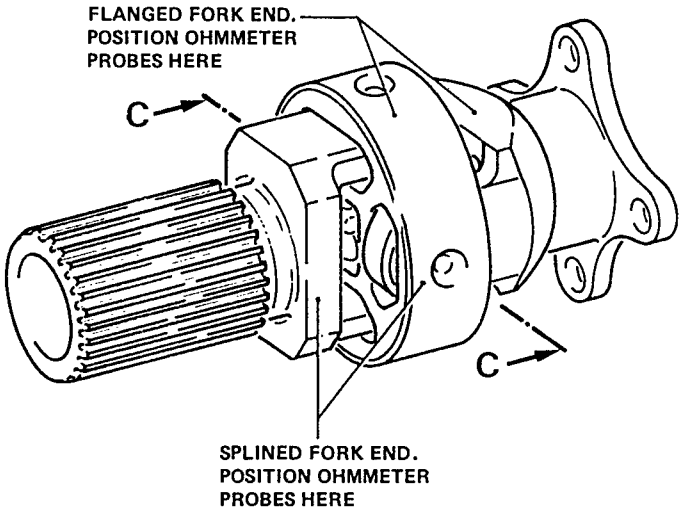


Location of Universal Joints
Figure 604

R

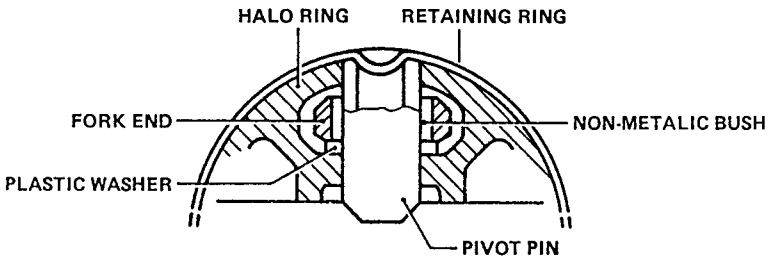
B

TYPICAL FOR ALL UNIVERSAL JOINTS



SECTION

C—C



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Checking Procedure of Universal Joints
Figure 605

excessive rotational and lateral backlash.

NOTE : As the non-metalic bush is made of a nonconductive material, an electrical continuity test using an ohmmeter is possible to find a damaged non-metalic bush.

1 Position the ohmmeter probes on the flanged fork end and the outer ring of the halo ring and test for electric continuity.

NOTE : Move the flanged fork end slightly for optimal contact between fork end and halo ring.

- No fault exists, if there is no current flow.
- The non-metalic bushes between the flanged fork end and the halo ring are damaged or lost, if there is a current flow.

2 Position the ohmmeter probes on the splined fork end and the outer ring of the halo ring and test for electric continuity.

NOTE : Move the splined fork end slightly for optimal attachment contact between fork end and halo ring.

- No fault exists, if there is no current flow.
- The non-metalic bushes between the splined fork end and the halo ring are damaged or lost, if there is a current flow.

(b)If the test fails, clean the universal joint very carefully, using a lint free cloth and do the continuity test again.

(c)Replace the universal joints which failed during test (Ref. 27-84-21, P. Block 401).

(3)Close-Up

(a)Make certain that the work area is clean and clear of tools and miscellaneous items of equipment.

(b)Close access door 147BZ.

(c)Close the main gear main doors (Ref. 32-12-11, P. Block 301).

(d)Install the access panels:
512BB, 512CB, 512DB, 512EB, 512FB, 512GB, 512HB, 512JB, 512KB, 513BL, 523AB, 523BB, 523CB, 523DB, 523EB, 523FB, 523GB, 523HB, 523JB, 523KB, 523LB, 523MB, 524AB, 524BB, 524CB, 524DB, 524EB, 524FB, 524GB, 524HB, 524JB, 524KB, 612BB, 612CB, 612DB, 612EB, 612FB, 612GB, 612HB, 612JB, 612KB, 613BR, 623AB, 623BB, 623CB, 623DB, 623EB, 623FB, 623GB, 623HB, 623JB, 623KB, 623LB, 623MB, 624AB, 624BB, 624CB, 624DB, 624EB, 624FB, 624GB, 624HB, 624JB, and 624KB.

(e)Remove adjustable access platform.

(f)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.

**ON A/C 001-005,

Post SB 27-2061 For A/C 001-005,

5. Inspection of Steady Bearings and Universal Joints

A. Reason for the Job
To inspect each steady bearing for damage and correct spline engagement of universal joints.

B. Equipment and Materials

	ITEM	DESIGNATION
	(1)	Access Platform, 3 to 5 m (11 to 14 ft.)
R	(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(3)	Safety Barriers
	(4)	Circuit Breaker Safety Clips and Tags
	Referenced Procedures	
	- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
	- 27-84-17, P. Block 401	Steady Bearing

C. Procedure
(1)Job Set-Up
(a)Position safety barriers.
R (b)Install safety guard PN 98A27503003000 on flap /slat control lever quadrant.
(c)Open, safety and tag the following circuit breakers:

**ON A/C 001-005,

Post SB 27-2061 For A/C 001-005,

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY	9CV	335/R66

**ON A/C 001-005,

Post SB 27-2061 For A/C 001-005,

(d)Position access platform.
(e)Remove access panels:
LH wing: 512JB, 523AB, 523BB, 523FB, 523MB, 524AB, 524BB, 524FB, 524GB.
RH wing: 612JB, 623AB, 623BB, 623FB, 623MB, 624AB, 624BB, 624FB, 624GB.
(2)Inspection of the Steady Bearings and Universal Joints of the RH and LH slat Transmission System.

**ON A/C 001-005,

Post SB 27-2061 For A/C 001-005,

(Ref. Fig. 606) (Sheet 1 of 3)

**ON A/C 001-005,

Post SB 27-2061 For A/C 001-005,

(Ref. Fig. 606) (Sheet 2 of 3)

**ON A/C 001-005,

Post SB 27-2061 For A/C 001-005,

(Ref. Fig. 606) (Sheet 3 of 3)

**ON A/C 001-005,

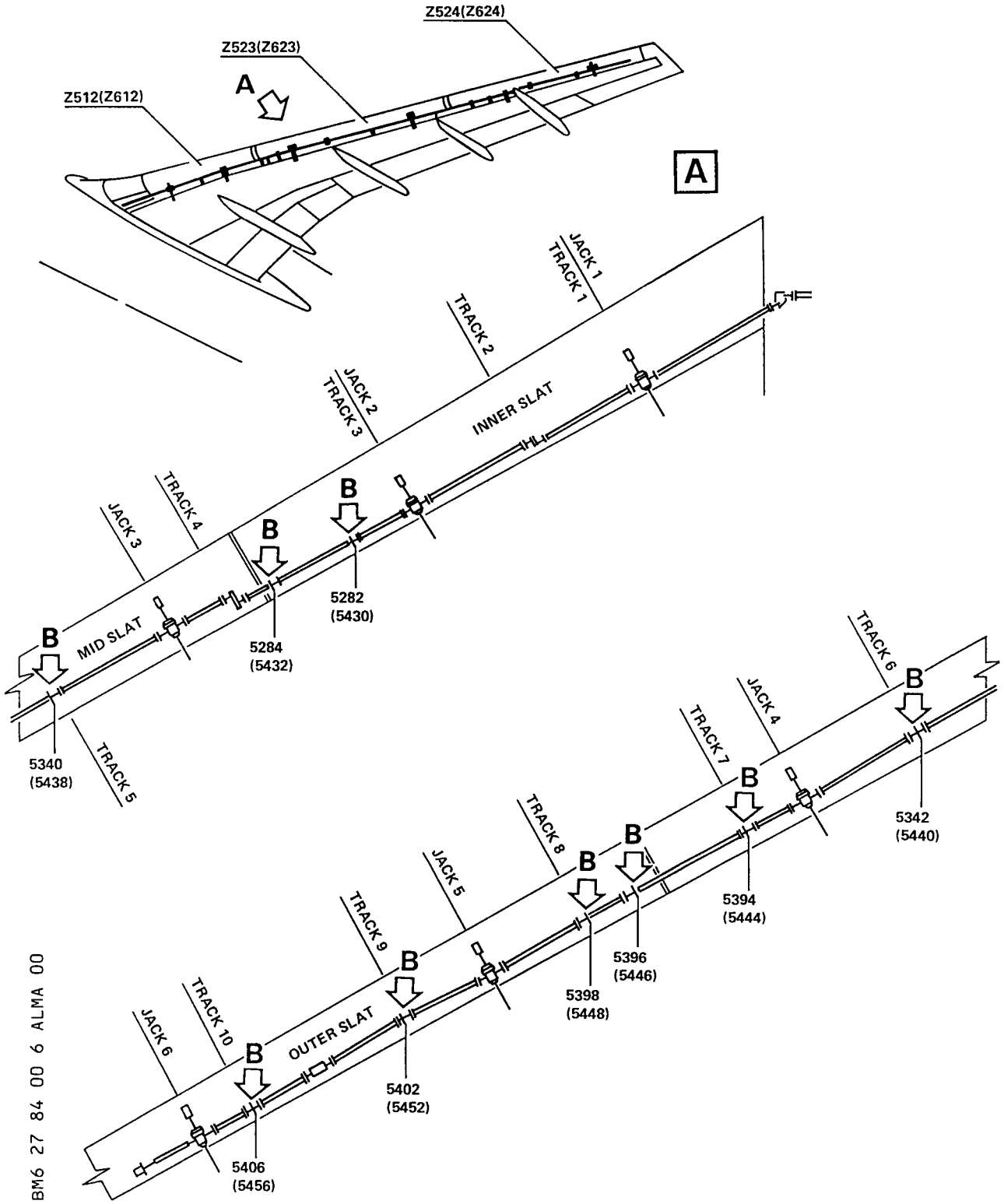
Post SB 27-2061 For A/C 001-005,

(a)Inspect each steady bearing for broken or missing inner race.
(b)Inspect the shaft for any grooves or damage.
(c)Inspect each universal joint for correct spline engagement.

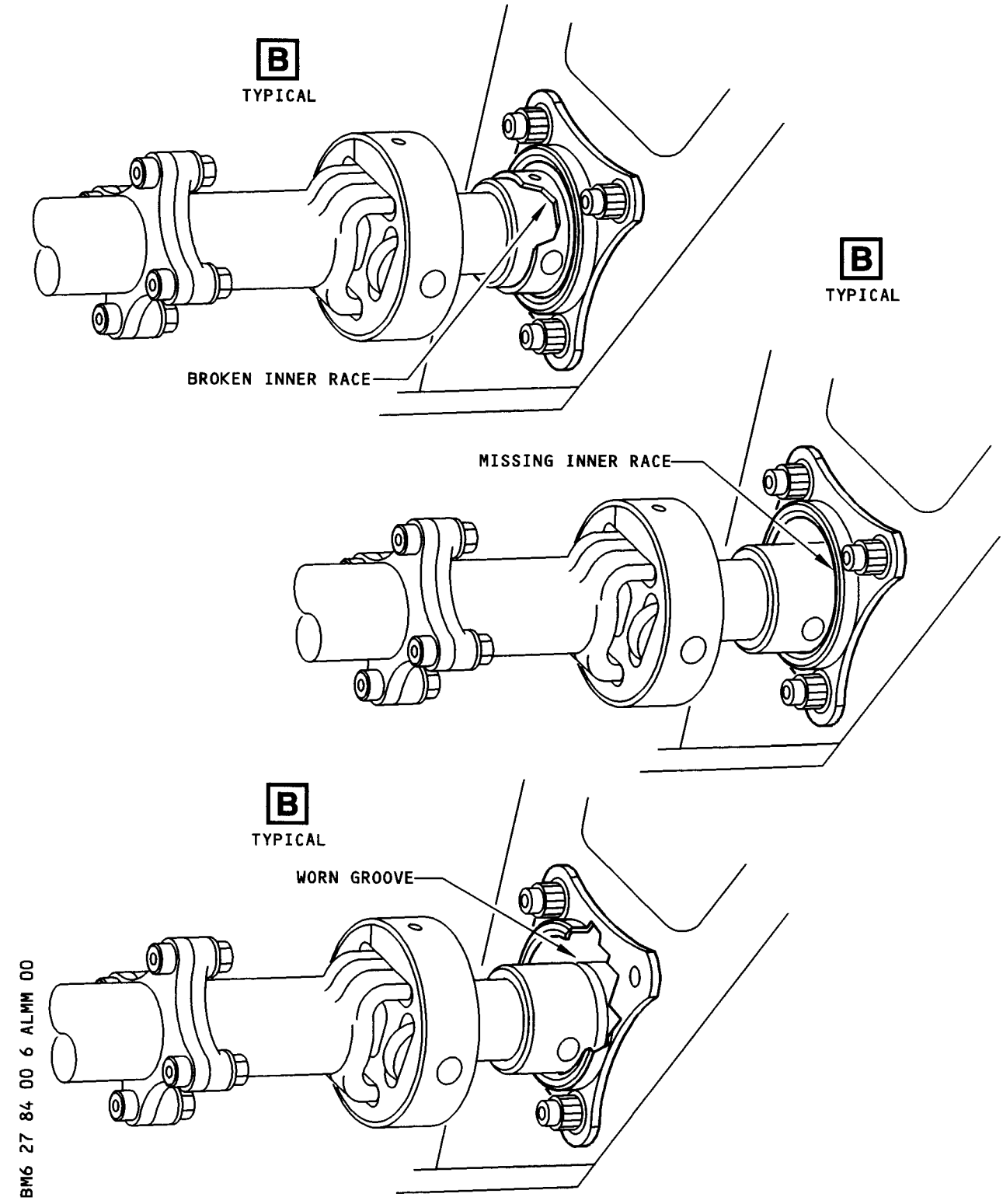
NOTE : Incorrect spline engagement points at damaged steady bearings.

(d)If any damage or grooves are found on a steady bearing, replace the steady bearing (Ref. 27-84-17, P. Block 401).

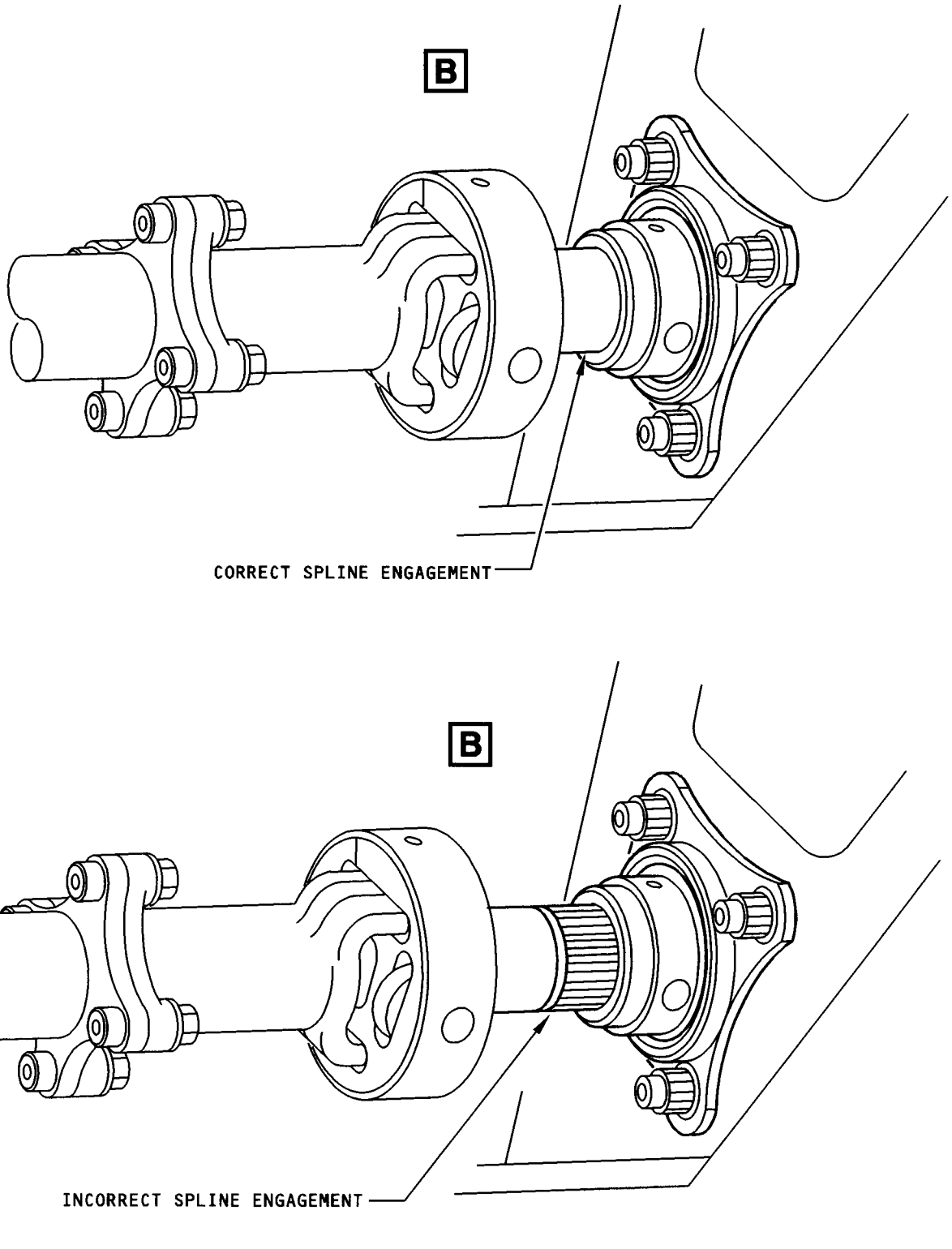
(3)Close-Up
(a)Close access panels:
LH wing: 512JB, 523AB, 523BB, 523FB, 523MB, 524AB, 524BB, 524FB, 524GB.
RH wing: 612JB, 623AB, 623BB, 623FB, 623MB, 624AB, 624BB, 624FB, 624GB.
(b)Remove access platform.
(c)Remove safety barriers.
(d)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
(e)Remove safety guard from flap/slat control lever quadrant.



Location of Steady Bearings
Figure 606



Steady Bearing - Inner Race Defect
and Groove Damage
Figure 606



Slat Universal Joint and Steady Bearing - Spline Engagement
Figure 606

R

SLATS POWER CONTROL UNIT (5264) - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 4 m (13.1 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27801000000	Equipment - Installation/Removal, Slat Control Unit
	D. 98A27808007000	Locking Device - Slat Drive Shaft
	E. LL550A017	Alignment Plug
	F.	Torque Wrench, 0-1.5 m.daN (0-133 lbf.in.)
	G.	Electrical Connector Blanking Caps and Tags
	H.	Hydraulic Blanking Caps/Plugs
	I.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	J.	Container for Collecting Spilt Fluid
	K.	Warning Notices Prohibiting Pressurization of Green and Blue Hydraulic Systems
	L.	Circuit Breaker Safety Clips and Tags
	M. Material No. 04-004	Common Greases (Ref. 20-31-00)
	N. Material No. 05-005	Special Materials (Ref. 20-31-00)

Referenced Procedures

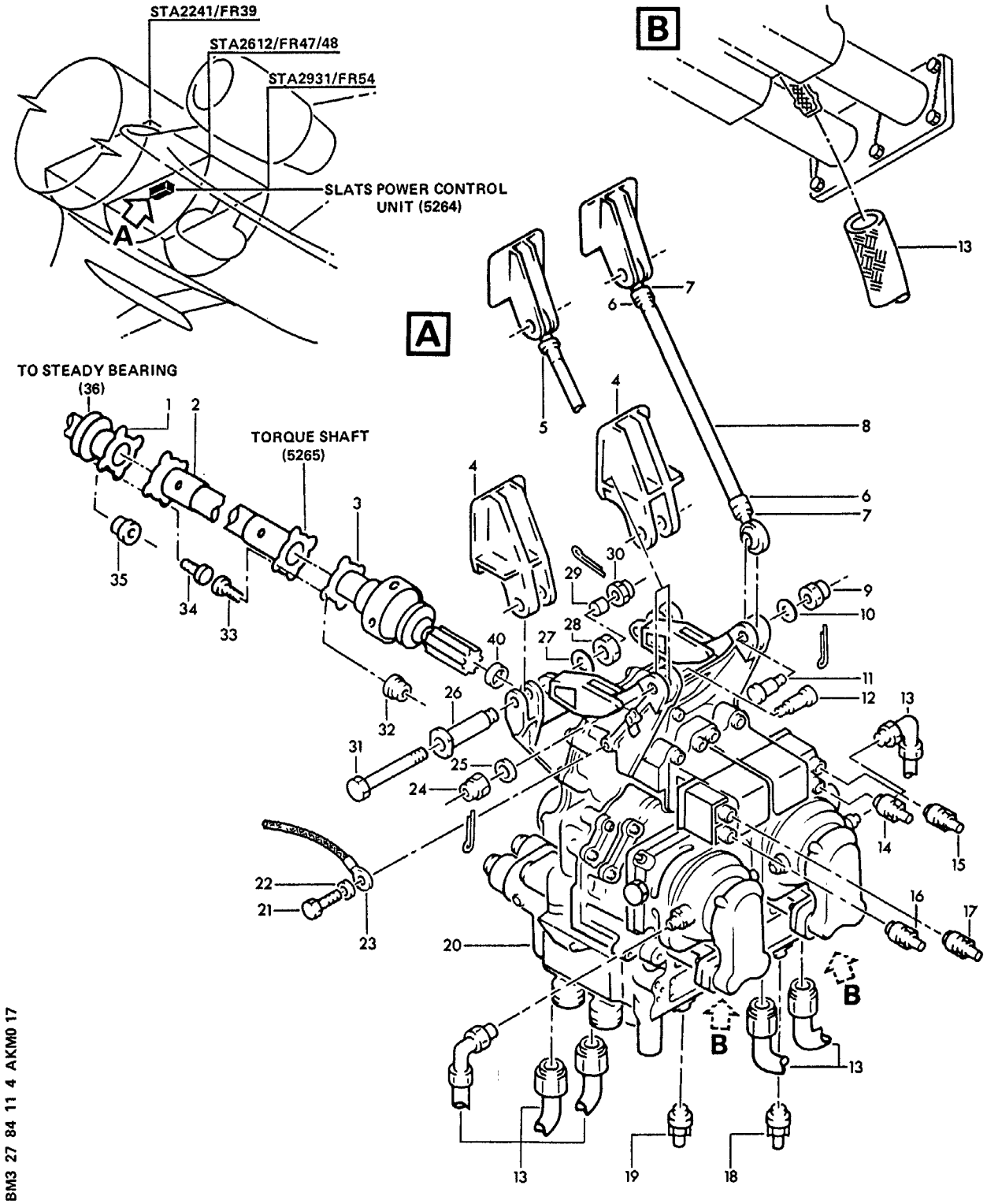
- 12-12-29, P. Block 1	Hydraulics
- 12-13-27, P. Block 1	Flight Controls Replenishing
- 20-28-11, P. Block 1	Electrical Bonding
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Retract slats to 0° position (Ref. 27-80-00, P. Block 301).



Slats Power Control Unit
Figure 401

(2)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY SLATS/SYS 1	9CV	335/R66

CAUTION : MAKE CERTAIN THAT SLAT POWER CONTROL UNIT OUTPUT SHAFT IS STABILIZED AND HYDRAULIC SYSTEMS ARE DEPRESSURIZED.

(4)Display warning notices prohibiting pressurization of hydraulic systems:
- on HYD PWR panel 427VU in flight compartment
- on ground connectors.

(5)Depressurize Green and Blue hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(6)Put access platform in position.
(7)Open access door 512DB.
(8)Install locking device PN 98A27808007000.
(9)Open one main gear main door (Ref. 32-12-11, P. Block 301).
(10)Open access door 147BZ.
(11)Position an hydraulic fluid recovery container under Power Control Unit (PCU) to be removed.

B. Removal

R (1)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can move the transmission shafts with your hands.
R (2)Remove torque shaft (2) as follows:
(a)Remove nuts (32) and bolts (33) connecting torque shaft (2) to universal joint (3).
(b)Support torque shaft (2).
(c)Remove nuts (35) and bolts (34) connecting torque shaft (2) to steady bearing (36).
(d)Remove torque shaft (2).
R (3)Withdraw universal joint (3) from its housing in the PCU and remove.
R (4)Disconnect hydraulic lines (13) and plug open line ends and ports of PCU (20).
R (5)Disconnect electrical connectors 4CN-A (14), 4CN-B (15), 25CV-A (19) 26CV-A (18), 28CV-A (17) and 28CV-B (16) and install blanking plugs.
R (6)Install removal/installation equipment PN 98A27801000000.
R (7)Remove cotter pins and nuts (9),(24), retain washers (10),(25), remove bolts (11),(12) connecting rods (5),(8) to PCU (20).
R (8)Remove cotter pins and nuts (30), retain spacers (29). Remove bolts (31) attaching PCU (20) to structural brackets (4).
R (9)Cut and remove lockwire, remove nuts (28), retain washers (27) and remove bolts (26).

R (10)Remove screw (21), retain washer (22) and disconnect bonding lead (23).
R (11)Remove removal/installation equipment.

C. Preparation of Replacement Component

NOTE : Power Control Unit is adjusted to zero.

CAUTION : SLATS POWER CONTROL UNIT IS EQUIPPED WITH A WIPER RING (36) INSTALLED INSIDE THE GEARBOX OUTPUT SHAFT.

(1)Position replacement PCU (20) on removal/installation equipment.

(2)Make sure that replacement PCU (20) is equipped with bushes on upper fork fittings and on bearings.

D. Installation

NOTE : Apply grease (Material No. 04-004) to splined ends.

(1)Using removal/installation equipment PN 98A27801000000, put replacement PCU (20) in position on structural support.
(2)Secure PCU (20) on structural fork ends (4) at upper section with bolts (26).
(3)On bolts (26), install washers (27) and nuts (28).
(4)TORQUE nuts (28) to 0.5 m.daN (3.69 lbf.ft.) and safety with lockwire.
(5)Install bolts (31), spacers (29) and nuts (30).
(6)TORQUE nuts (30) to between 0.7 and 0.8 m.daN (5.16 and 5.90 lbf.ft.) and safety with cotter pins.
(7)Connect rod (5) to PCU (20) using bolt (12). On bolt (12), install washer (25) and nut (24). Safety with cotter pin.
(8)Connect adjusting rod (8) to PCU (20) with bolt (11).
(9)If required, cut and remove lockwire and remove nuts (7), disengage lockwashers (6) and adjust rod (8) body in order to engage bolt (11). Engage lockwashers (6), tighten nuts (7) and safety with lockwire.
(10)On bolt (11), install washer (10) and nut (9) and safety with cotter pin.
(11)Attach bonding lead (23) to PCU (20) with washer (22) and screw (21) (Ref. 20-28-11, P. Block 1).
(12)Align wiper ring (40) in splines, using alignment plug LL550A017. Remove alignment plug. Engage universal joint (3) in its housing on PCU (20).
(13)Install torque shaft (2) as follows:
(a)Position torque shaft (2).
(b)Connect torque shaft (2) to output universal joint (3) of PCU (20) using bolts (33).
(c)In this position check that torque shaft (2) can be connected to steady bearing (36) with bolts (34).
If not, remove bolts (33), remove torque shaft (2) and universal joint (3). Rotate universal joint (3) by the appropriate number of splines, then re-engage in housing. Connect torque shaft with bolts (33).
(d)On bolts (33), install nuts (32).
(e)TORQUE nuts (32) to between 1.3 and 1.5 m.daN (115 and 133 lbf.in.).
(f)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.
(g)Connect torque shaft (2) to steady bearing (36) with bolts (34).
(h)On bolts (34), install nuts (35).
(i)TORQUE nuts (35) to between 1.3 and 1.5 m.daN (115 and 133 lbf.in.).

(j)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.
(14)Disengage removal/installation equipment.
(15)Remove blanking plugs and connect hydraulic lines (13).
(16)Remove blanking caps and connect electrical connectors 4CN-A (14), 4CN-B (15), 25CV-A (19), 26CV-B (18), 28CV-A (17) and 28CV-B (16).
(17)Check lubricant level in PCU and replenish if necessary (Ref. 12-13-27, P. Block 1).
(18)Remove warning notices.
(19)Remove locking device PN 98A27808007000. Close access door 512DB.
(20)Remove access platform.
(21)Pressurize Green and Blue hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(22)Check level of hydraulic fluid in GREEN and BLUE reserovirs and top up if required (Ref. 12-12-29, P. Block 1).
(23)Remove safety clips and close slats circuit breakers 3CV, 4CV, 7CV, 8CV and 9CV.
(24)Remove safety guard from slat/flap control lever quadrant.
(25)Bleed hydraulic lines by operating ten times the flap and slat control lever (without reaching end of travel limits) (Ref. 27-80-00, P. Block 301).
(26)Check power control unit for leakage.

E. Test
(1)Carry out operational test of slat system (Ref. 27-84-00, P. Block 501).
(2)Repeat leakage check at hydraulic line connections of PCU.

F. Close-Up
(1)Remove hydraulic fluid recovery container.
(2)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(3)Close access door 147BZ.
(4)Close main gear main door (Ref. 32-12-11, P. Block 301).

TORQUE LIMITER 5272 (5420) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 4 m (13.1 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27808007000	Locking Device - Slat Drive Shaft
	D.	Torque Wrench, 0-1.5 m.daN (0-133 lbf.in.)
	E.	Circuit Breakers Safety Clips and Tags
	F.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	G. Material No. 04-004	Common Greases (Ref. 20-31-00)
	H. Material No. 05-005	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 12-13-27, P. Block 1	Flight Controls Replenishing
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up

(1) Retract slats to 0° position (Ref. 27-80-00, P. Block 301).

R (2) Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(3) Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

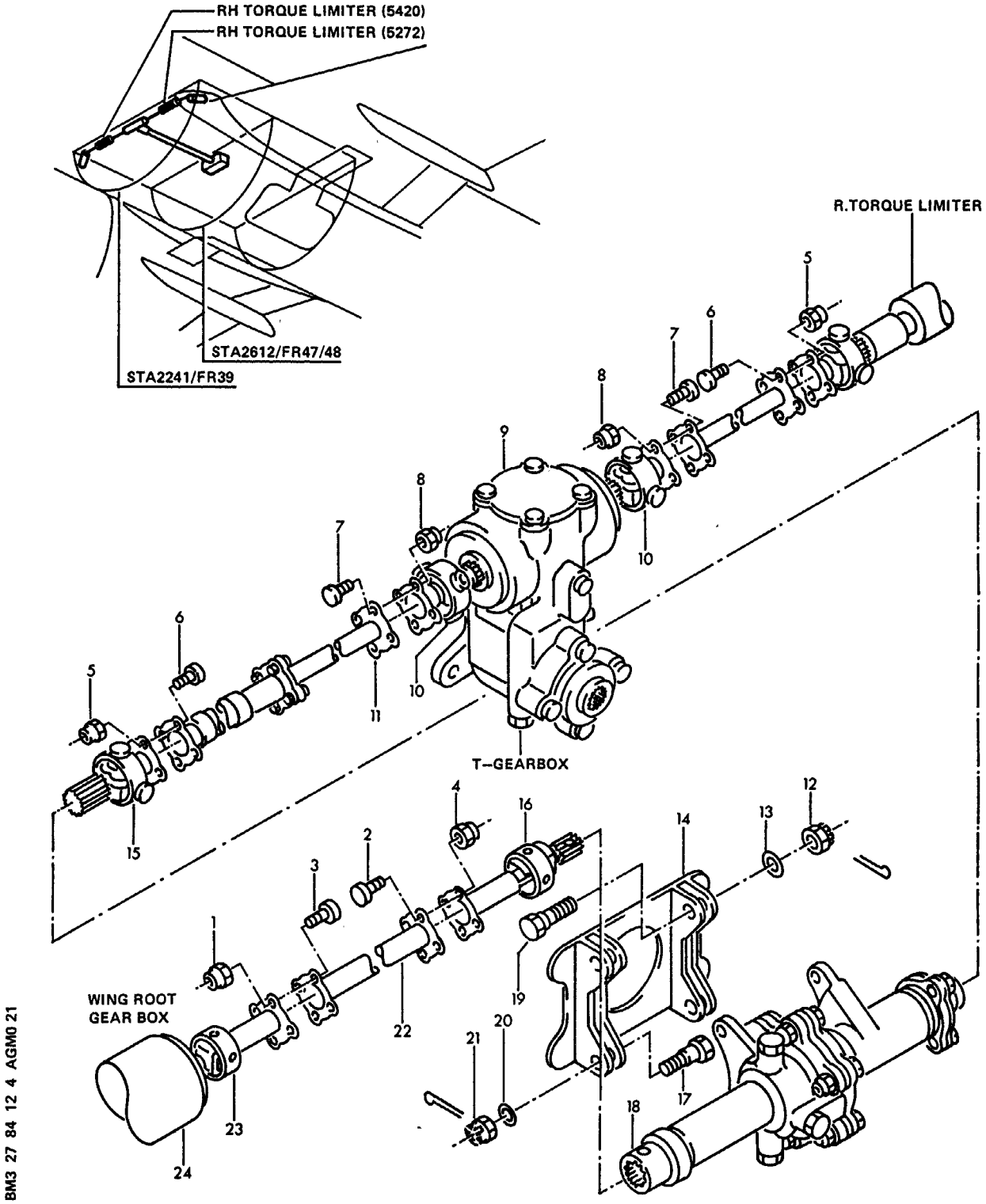
CAUTION : MAKE CERTAIN THAT SLAT POWER CONTROL UNIT OUTPUT SHAFT IS

STABILIZED.
(4)Position access platform.
(5)Open access door 512DB (612DB).
(6)Install locking device PN 98A27808007000.
(7)Open one main gear main door (Ref. 32-12-11, P. Block 301).
(8)Open access door 147BZ.
(9)Gain access to torque limiter to be removed
- FR39, zone 145 for LH torque limiter (5272)
- FR39, zone 146 for RH torque limiter (5420).

B. Removal
(Ref. Fig. 401)
NOTE : As removal/installation procedures of LH (5272) and RH (5420) torque limiters are indentical, only the procedure concerning the LH torque limiter (5272) is described.
R (1)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can
R move the transmission shafts with your hands.
R (2)Remove torque shaft (11) connecting tee gearbox (9) to torque limiter (18) as follows:
(a)Remove nuts (8) and bolts (7) attaching torque shaft (11) to universal joint (10).
(b)Support torque shaft (11).
(c)Remove nuts (5) and bolts (6) attaching torque shaft (11) to universal joint (15).
(d)Remove torque shaft (11).
R (3)Remove torque shaft (22) connecting torque limiter (18) to wing root gearbox (24) as follows:
(a)Remove nuts (4) and bolts (2) attaching torque shaft (22) to universal joint (16).
(b)Support torque shaft (22).
(c)Remove nuts (1) and bolts (3) attaching torque shaft (22) to universal joint (23).
(d)Remove torque shaft (22).
R (4)On either end of torque limiter (18), withdraw and remove universal joints (15),(16).
R (5)Remove cotter pins and nuts (12), retain washers (13).
R (6)Remove cotter pins and nuts (21), retain washers (20).
R (7)Support torque limiter (18).
R (8)Remove bolts (19),(17).
R (9)Remove torque limiter (18) from structural fork fitting (14).

C. Preparation of Replacement Component
(1)Apply grease (Material No. 04-004) to splines of torque limiter.

D. Installation
(1)Position torque limiter (18).
(2)Install bolts (17),(19) attaching torque limiter (18) to structural fork fittings (14).
(3)On bolts (17), install washers (20) and nuts (21), tighten nuts (21) and safety with cotter pins.



Torque Limiter
Figure 401

(4)On bolts (19), install washers (13) and nuts (12), tighten nuts (12) and safety with cotter pins.
(5)On either end of torque limiter (18), install universal joints (15),(16).
NOTE : Apply grease (Material No. 04-004) to splines.
(6)Install torque shaft (11) connecting tee gearbox (9) to torque limiter (18) as follows:
(a)Position torque shaft (11).
(b)Install bolts (7) attaching torque shaft (11) to universal joint (10).
(c)On bolts (7), install and tighten nuts (8).
(d)TORQUE nuts (8) to between 1.3 and 1.5 m.daN (115 and 133 lbf.in.).
(e)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.
(f)Install bolts (6) attaching torque shaft (11) to universal joint (15).
(g)On bolts (6), install and tighten nuts (5).
(h)TORQUE nuts (5) to between 1.3 and 1.5 m.daN (115 and 133 lbf.in.).
(i)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.
(7)Install torque shaft (22) connecting torque limiter (18) to wing root gearbox (24) as follows:
(a)Position torque shaft (22).
(b)Install bolts (3) attaching torque shaft (22) to universal joint (23).
(c)On bolts (3) install and tighten nuts (1).
(d)TORQUE nuts (1) to between 1.02 and 1.24 m.daN (90 and 110 lbf.in.)
(e)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.
(f)Install bolts (2) attaching torque shaft (22) to universal joint (16).
(g)On bolts (2), install and tighten nuts (4).
(h)TORQUE nuts to between 1.02 and 1.24 m.daN (90 and 110 lbf.in.)
(i)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.
NOTE : When holes in torque shaft (22) flange do not line up with those on the universal joint (16) flange, remove universal joint (16), rotate by appropriate number of splines and re-install. Install torque shaft (22).
(8)Check lubricant level in torque limiter, replenish if necessary (Ref. 12-13-27, P. Block 1).
(9)Remove safety guard PN 98A27503003000 from flap/slat control lever quadrant.
(10)Remove locking device PN 98A27808007000. Close access door 512DB (612DB).
(11)Remove access platform.
(12)Remove safety clips and tags and close circuit breakers 7CV, 8CV, 9CV.

E. Test
(1)Carry out operational test (Ref. 27-84-00, P. Block 501)

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 147BZ.
(3)Close main gear main door (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.60 m (8.5 ft.)
R B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C. 98A27808007000	Locking Device - Slat Drive Shaft
D. LL550A017	Alignment Plug
E.	Torque Wrench, 0-1.5 m.daN (0-133 lbf.in.)
F.	Wiper Rings
G.	Circuit Breaker Safety Clips and Tags
H.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
I. Material No. 04-004	Common Greases (Ref. 20-31-00)
J. Material No. 05-005	Special Materials (Ref. 20-31-00)
K. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 12-13-27, P. Block 1	Flight Controls Replenishing
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up

(1)Retract slats to 0° position (Ref. 27-80-00, P. Block 301).

R (2)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/	9CV	335/R66

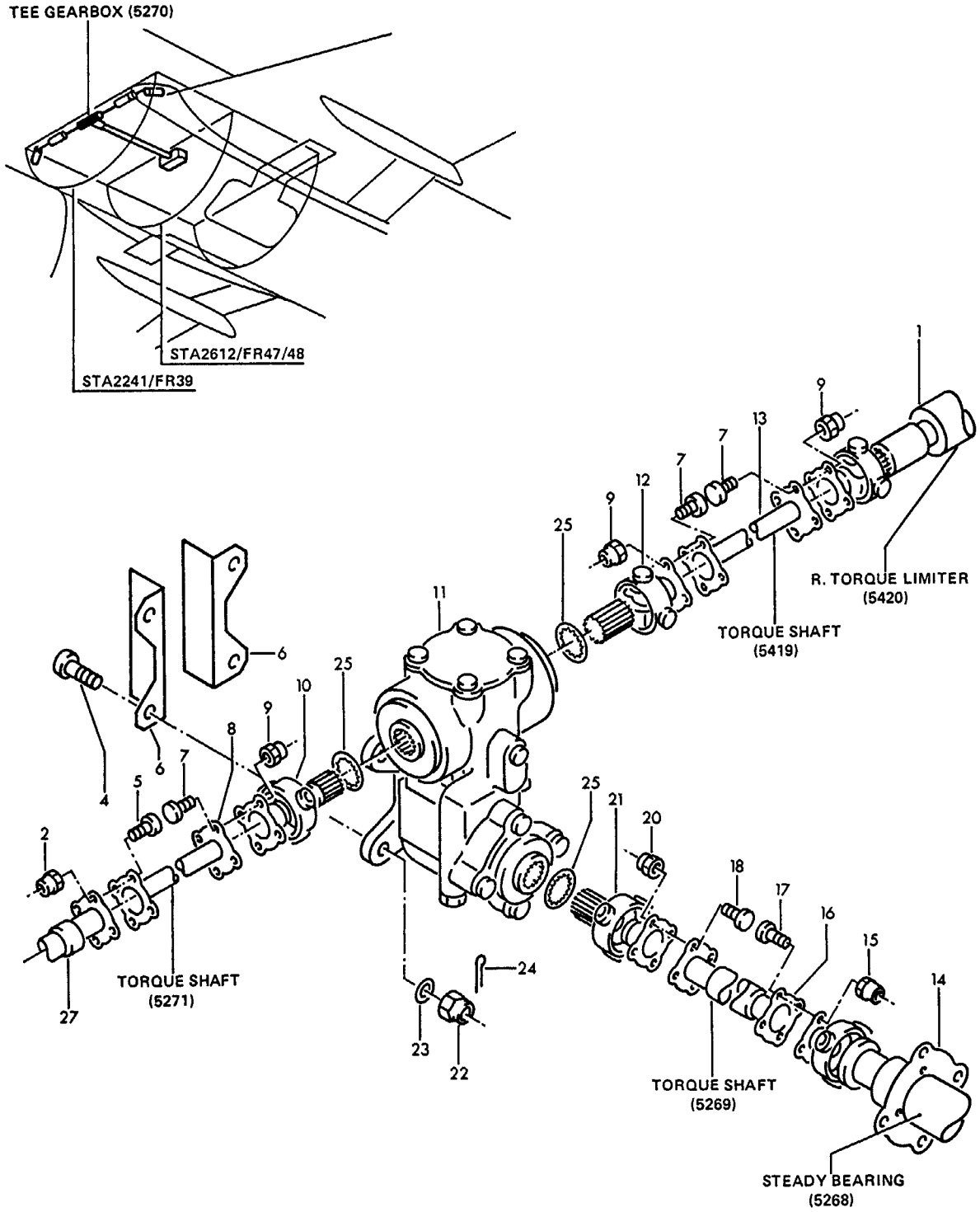
PANEL	SERVICE	IDENT.	LOCATION

SLATS/SYS 1

(4)Install access platform.
(5)Open access doors 512DB and 612DB
(6)Install locking devices PN 98A27808007000 on left and right slat transmissions.
(7)Open main gear main door (Ref. 32-12-11, P. Block 301).
(8)Open access door 147BZ.
(9)Make certain that output shaft of the power control unit is stabilized.

B. Removal
(Ref. Fig. 401)
R (1)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can
R move the transmission shafts with your hands.
R (2)Remove torque shaft (16):
(a)Remove nuts (15) and bolts (17) connecting torque shaft to steady bearing (14), located at FR43.
(b)Support torque shaft (16).
(c)Remove nuts (20) and bolts (18) connecting torque shaft (16) to tee gearbox (11) input universal joint (21).
(d)Remove torque shaft (16).
R (3)Remove torque shaft (8):
(a)Remove nuts (9) and bolts (7) connecting torque shaft (8) to LH output universal joint (10).
(b)Support torque shaft (8).
(c)Remove nuts (2) and bolts (5) connecting torque shaft (8) to shaft (27).
(d)Remove torque shaft (8).
R (4)Remove torque shaft (13):
(a)Remove nut (9) and bolts (7) connecting torque shaft (13) to RH output universal joint (12) and torque limiter (1).
(b)Remove torque shaft (13).
R (5)Remove tee gearbox (11) input universal joint (21).
R (6)Remove tee gearbox (11) LH output universal joint (10).
R (7)Remove tee gearbox (11) RH output universal joint (12).
R (8)Remove and discard cotter pins (24) and nuts (22), retain washers (23).
R (9)Support tee gearbox (11).
R (10)Remove bolts (4) securing tee gearbox (11) to support bracket (6).
R (11)Remove tee gearbox (11).

C. Preparation of Replacement Component
(Ref. Fig. 401)
(1)If the same tee gearbox is to be installed:
(a)Remove the wiper rings (25) from all three transmission connections.
(b)Using white spirit (Material No. 11-002), clean the splined surfaces of the connections.
(c)Install new wiper rings and align them with the splines using alignment



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Tee Gearbox
Figure 401

plug PN LL550A017.
(2)If a new tee gearbox is to be installed:
(a)Make sure that the three transmission connections have wiper rings installed in them.
(b)Align the wiper rings in the splines using alignment plug PN LL550A017.
(3)Apply grease (Material No. 04-004) to tee gearbox (11) splines.

D. Installation
(Ref. Fig. 401)
NOTE : Apply grease (Material No. 04-004) to splines of universal joints splined ends (21),(12),(10).
(1)Position tee gearbox (11) on support bracket (6) at FR39.
(2)Attach with bolts (4), washers (23) and nuts (22). Tighten nuts (22) and safety with cotter pins (24).
(3)Engage tee gearbox (11) with universal joint (21).
(4)Engage tee gearbox (11) with LH universal joint (10).
(5)Engage tee gearbox (11) with RH universal joint (12).
(6)Install LH torque shaft (8) connecting tee gearbox (11) to torque shaft assy (27):
(a)Position torque shaft (8).
(b)Install bolts (7) connecting torque shaft (8) to LH universal joint (10), install and tighten nuts (9).
(c)TORQUE nuts (9) to between 1.3 and 1.5 m.daN (115 and 133 lbf.in.).
(d)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.
(e)Install bolts (5) connecting torque shaft (8) to shaft assy (27) and install and tighten nuts (2).
(f)TORQUE nuts (2) to between 1.02 and 1.24 m.daN (90 and 109 lbf.ft.).
(g)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.
NOTE : When holes in torque shaft (8) flange do not line up with those in universal joint flange (10), remove universal joint (10), rotate by the appropriate number of splines and re-install torque shaft (8).
(7)Install RH torque shaft (13) connecting tee gearbox to torque limiter (1) as follows:
(a)Position torque shaft (13).
(b)Install bolts (7) connecting torque shaft (13) to universal joint (12) and torque limiter (1), install and tighten nuts (9).
(c)TORQUE nuts (9) to between 1.3 and 1.5 m.daN (115 and 133 lbf.in.).
(d)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.
NOTE : When holes in torque shaft (13) flange, do not line up with those in universal joint flange (12), remove universal joint (12) rotate by the appropriate number of splines and re-install torque shaft (13).
(8)Install torque shaft (16) connecting tee gearbox (11) to steady bearing (14) as follows:
(a)Position torque shaft (16).
(b)Install bolts (17) connecting torque shaft (16) to steady bearing (14), FR43, install and tighten nuts (15).
(c)TORQUE nuts (15) to between 1.3 and 1.5 m.daN (115 and 133 lbf.in.).
(d)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.
(e)Install bolts (18) connecting torque shaft (16) to tee gearbox (11)

input universal joint (21), install nuts (20).

(f) TORQUE nuts (20) to between 1.3 and 1.5 m.daN (115 and 133 lbf.in.).

(g) Apply corrosion preventive (Material No. 05-005) to bolts and nuts.

NOTE : When holes in torque shaft (16) flange do not line up with those on universal joint flange (21), remove universal joint (21), rotate by the appropriate number of splines and re-install torque shaft (16).

(9) Check lubricant level in tee gearbox, replenish if necessary (Ref. 12-13-27, P. Block 1).

(10) Remove slat drive shaft locking devices from left and right transmissions and close access doors 512DB and 612DB.

(11) Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.

(12) Remove safety guard from flap/slat control lever quadrant.

E. Test

Carry out operational test of slat system (Ref. 27-84-00, P. Block 501).

F. Close-Up

(1) Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(2) Install access door 147BZ.

(3) Close main gear main door (Ref. 32-12-11, P. Block 301).

(4) Remove access platform.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 4 m (13.1 ft.)
R B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C. 98A27808007000	Locking Device - Slat Drive Shaft
D.	Circuit Breaker Safety Clips and Tags
E.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
F. Material No. 04-004	Common Greases (Ref. 20-31-00)
G. Material No. 05-005	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 12-13-27, P. Block 1	Flight Controls Replenishing
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up

(1)Retract slats to 0° position (Ref. 27-80-00, P. Block 301).

R (2)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/SLATS/SYS 1	9CV	335/R66

(4)Position access platform.

(5)Open access doors 512BB, 513RL (612BB, 613RR).

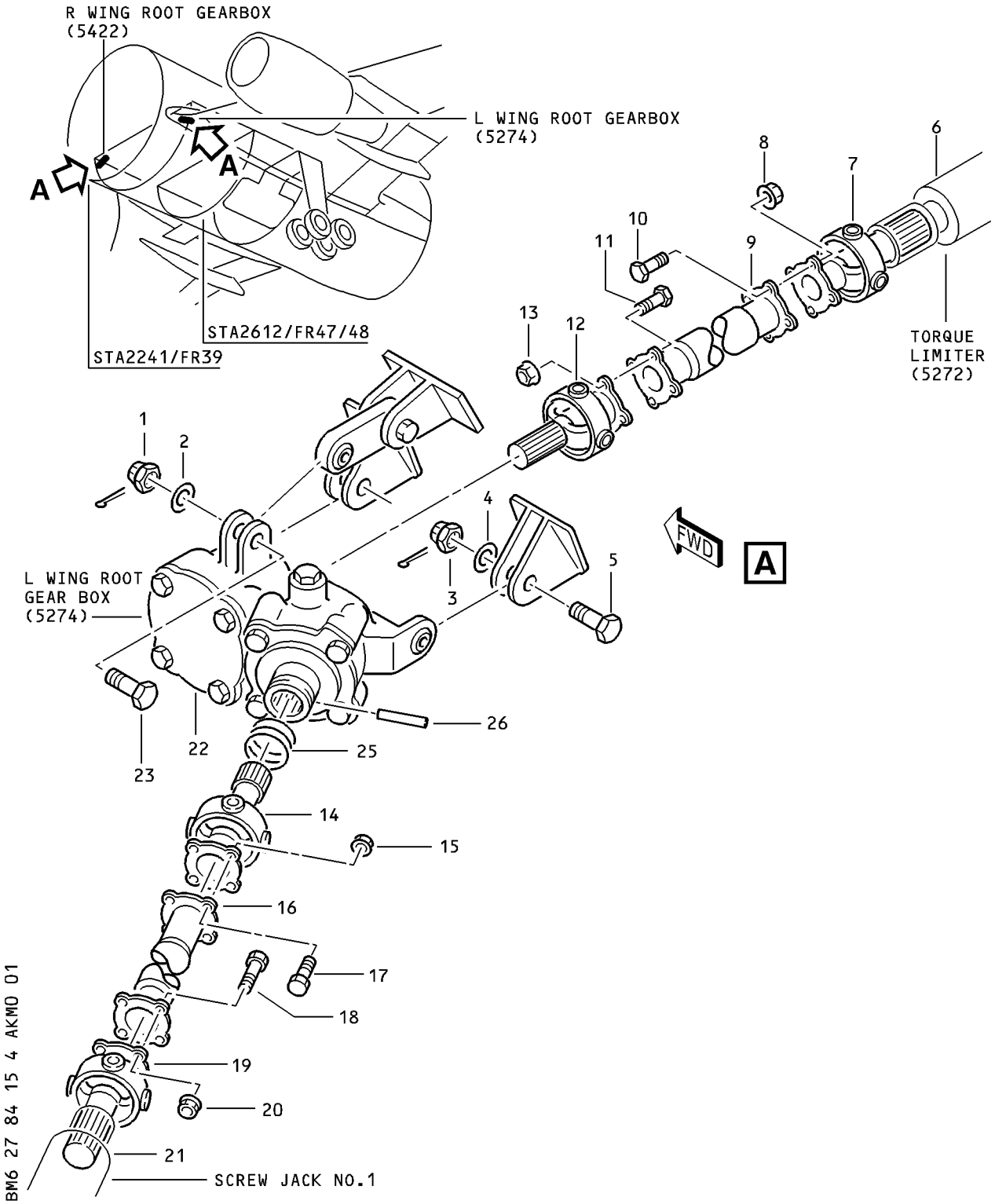
(6)Install locking device PN 98A27808007000.
(7)Open main gear main doors (Ref. 32-12-11, P. Block 301).
(8)Open access door 147BZ.
(9)Make certain that output shaft of power control unit is stabilized.

B. Removal
(Ref. Fig. 401)
NOTE : As RH and LH wing root gearboxes (5422) and (5274) are identical, only the procedure concerning the LH wing root gearbox (5274) is described.

R (1)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can move the transmission shafts with your hands.
R (2)Remove torque shaft (9) connecting torque limiter (6) to wing root gearbox (22) as follows:
(a)Remove nuts (8) and bolts (10) connecting torque shaft (9) to torque limiter (6) output universal joint (7).
(b)Support torque shaft (9).
(c)Remove nuts (13) and bolts (11) connecting torque shaft (9) to wing root gearbox (22) input universal joint (12).
(d)Remove torque shaft (9).
R (3)Remove torque shaft (16) connecting wing root gearbox (22) to screw-jack No. 1 (21) as follows:
(a)Remove spring (25) and pin (26).
(b)Remove nuts (15) and bolts (17) connecting torque shaft (16) to wing root gearbox (22) output universal joint (14).
(c)Support torque shaft (16).
(d)Remove nuts (20) and bolts (18) connecting torque shaft (16) to screw-jack No. 1 (21) input universal joint (19).
R (4)On wing root gearbox (22), withdraw and remove universal joints (12), (14).
R (5)Remove and discard cotter pin and unscrew nut (1), retain washer (2) and remove bolt (23).
R (6)Support wing root gearbox (22).
R (7)Remove and discard cotter pin and remove nuts (3), retain washers (4), remove bolts (5).
R (8)Remove wing root gearbox (22).

C. Preparation of Replacement Component
(1)Apply grease (Material No. 04-004) to replacement wing root gearbox (22) internal splines.

D. Installation
NOTE : Apply grease (Material No. 04-004) to splines of universal joints (12), (14).
(1)Position wing root gearbox (22).
(2)Install bolts (5), (23).
(3)On bolts (5), install washers (4) and nuts (3) and safety with cotter pins.
(4)On bolts (23), install washer (2) and nut (3) and safety with cotter pin.
(5)On either side of wing root gearbox (22), install universal



LH Wing Root Gearbox
Figure 401

R

joints (12), (14).

(6)Install torque shaft (16) connecting wing root gearbox (22) to screwjack No. 1 (21) as follows:

(a)Position torque shaft (16).

(b)Install bolts (17) and nuts (15) connecting torque shaft (16) on wing root gearbox (22) output universal joint (14).

(c)TORQUE nuts (15) to between 1.02 and 1.24 m.daN (90 and 109 lbf.in.).

(d)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.

(e)Install bolts (18) and nuts (20) connecting torque shaft (16) on screwjack No. 1 (21) input universal joint (19).

(f)TORQUE nuts (20) to between 1.02 and 1.24 m.daN (90 and 109 lbf.in.).

(g)Install pin (26) and secure with spring (25).

(h)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.

(7)Install torque shaft (9) connecting wing root gearbox (22) on torque limiter (6) as follows:

(a)Position torque shaft (9).

(b)Install bolts (10) and nuts (8) connecting torque shaft (9) on torque limiter (6) output universal joint (7).

(c)TORQUE nuts (8) to between 1.02 and 1.24 m.daN (90 and 109 lbf.in.).

(d)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.

(e)Install bolts (11) and nuts (13) connecting torque shaft (9) on wing root gearbox (22) input universal joint (12).

(f)TORQUE nuts (13) to between 1.02 and 1.24 m.daN (90 and 109 lbf.in.).

(g)Apply corrosion preventive (Material No. 05-005) to bolts and nuts.

NOTE : When holes in torque shaft (9) flange do not line up with those in universal joint (12) flange, remove universal joint (12), rotate by the appropriate number of splines and re-install torque shaft (9).

(8)Check lubricant level in wing root gearbox, replenish if neccessary (Ref. 12-13-27, P. Block 1).

(9)Remove safety guard PN 98A27503003000 from flap/slat control lever quadrant.

(10)Remove locking device PN 98A27808007000.

(11)Close access doors 512BB, 513RL (612BB, 613RR).

(12)Remove access platform.

(13)Remove safety clips and tags and close circuit breakers 7CV, 8CV und 9CV.

E. Test

(1)Carry out operational test of slat system (Ref. 27-84-00, P. Block 501).

F. Close-Up

(1)Make sure that work area is clean and clear of tools and miscellaneous items of equipment.

(2)Close access doors 147BZ.

(3)Close main gear main doors (Ref. 32-12-11, P. Block 301).

LINE GEARBOXES, TRACKS 2 AND 4 - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3.5 m (11 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27808007000	Locking Device - Slat Drive Shaft
	D.	Torque Wrench, 10.2 to 12.4 Nm (7.5 - 9.2 lbf.ft.)
	E.	Safety Barriers
	F.	Protective Caps
	G.	Circuit Breaker Safety Clips and Tags
	H. Material No. 04-004	Common Greases (Ref. 20-31-00)
	I. Material No. 05-005	Special Materials (Ref. 20-31-00)
	J. Material No. 09-015	Sealants (Ref. 20-31-00)
	Referenced Procedures	
	- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
	- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)

2. Procedure

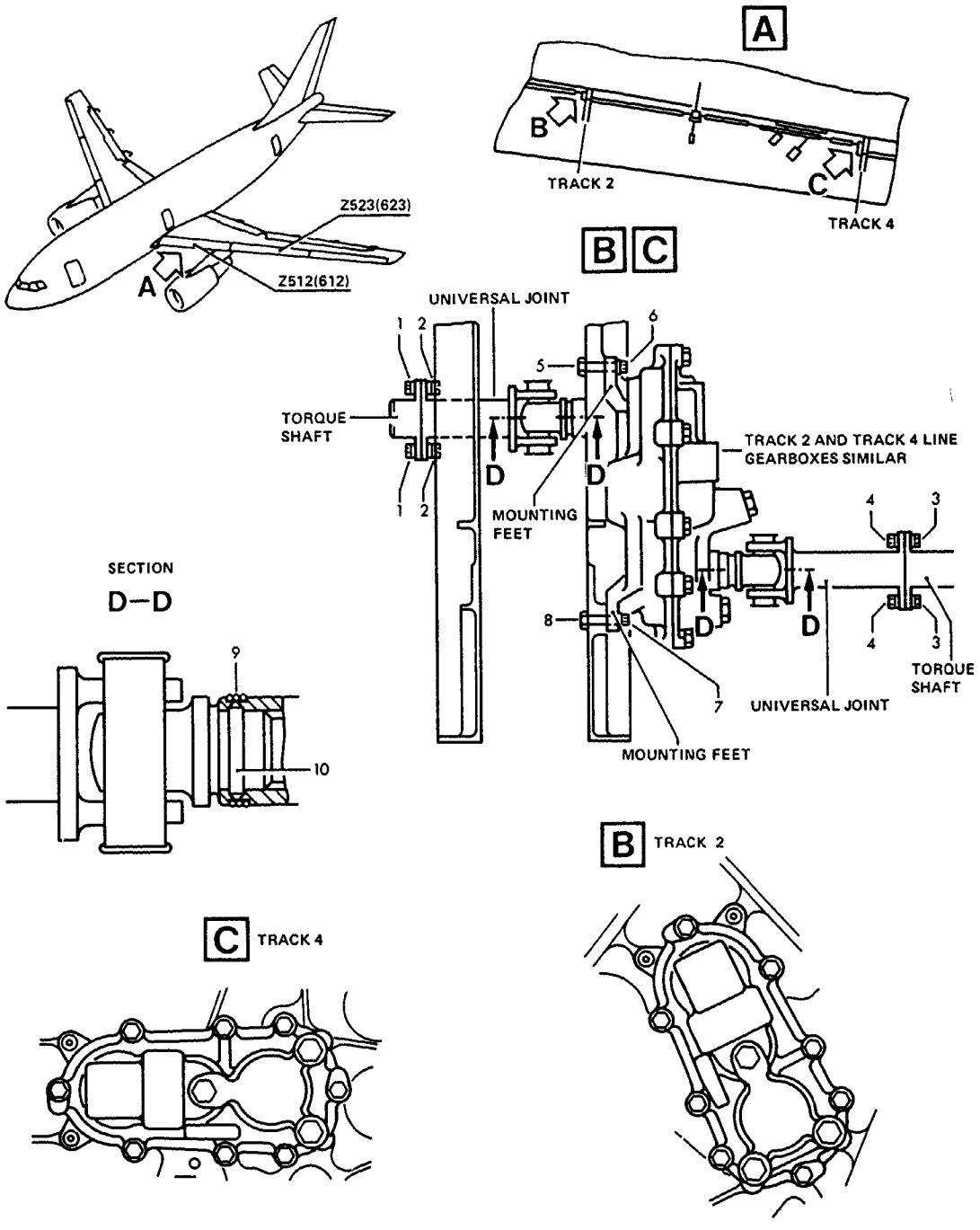
(Ref. Fig. 401)

A. Job Set-Up

(1)Position safety barriers.

(2)Fully retract slats (Ref. 27-80-00, P. Block 301).

R (3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.



Line Gearboxes
Figure 401

(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

(5)Position access platform.
(6)Open access doors 512EB (612EB) and 512FB (612FB) (Track 2 Line Gearbox) 523BB (623BB) and 523CB (623CB) (Track 4 Line Gearbox).
(7)Install locking device PN 98A27808007000 on section of torque shaft outboard of the track 4 line gearbox.

B. Removal (Ref. Fig. 401)

R (1)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can move the transmission shafts with your hands.
R (2)Remove retaining spring (9) and pin (10).
R (3)Remove nuts (2) and bolts (1); carefully separate mating faces of torque shaft and universal joint.
R (4)Withdraw universal joint from line gearbox; cap splined end of universal joint.
R (5)Remove nuts (4) and bolts (3); carefully separate mating faces of torque shaft and universal joint.
R (6)Withdraw universal joint from line gearbox; cap splined end of universal joint.
R (7)Remove nuts (6) and bolts (5).
R (8)Support line gearbox and remove nuts (7) and bolts (8).
R (9)Remove line gearbox.

C. Installation

(1)Apply sealant (Material No. 09-015) to line gearbox mounting feet.
(2)Position line gearbox; install bolts (5) and nuts (6); do not fully tighten at this stage.
(3)Install bolts (8), nuts (7) and tighten.
(4)Tighten nuts (6).
(5)Remove protective caps from universal joints.
(6)Apply grease (Material No. 04-004) over full length of spline on each universal joint.
(7)Install universal joint (outer) on line gearbox making sure that spline is correctly engaged and pin hole in line gearbox and universal joint are aligned.
(8)Install pin (10) and lock with retaining spring (9).
(9)Position torque shaft and universal joint so that holes in flanges are aligned.
(10)Install bolts (1) and nuts (2). TORQUE to between 10.2 and 12.4 Nm (7.5 and 9.2 lbf.ft.).
(11)Repeat steps (7), (8) and (9) with universal joint (inner).
(12)Install bolts (3) and nuts (4). TORQUE to between 10.2 and 12.4 Nm

(7.5 and 9.2 lbf.ft.).
(13)Apply corrosion preventive (Material No. 05-005) to protruding threads of bolts.
(14)Remove locking device PN 98A27808007000.
(15)Remove safety clips and tags and close circuit breakers: 7CV, 8CV, and 9CV.
(16)Remove safety guard PN 98A27503003000 from flap/slat control lever quadrant.

D. Test
(1)Carry out operational test (Ref. 27-84-00, P. Block 501).

E. Close-Up
(1)Make sure that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access doors 512EB (612EB) and 512FB (612FB) (Track 2 Line Gearbox) 523BB (623BB) and 523CB (623CB) (Track 4 Line Gearbox).
(3)Remove safety barriers.
(4)Remove access platform.
(5)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

STEADY BEARINGS - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2 to 5.2 m (6.6 to 17 ft.)
B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C. 98A27808007000	Locking Device - Slat Drive Shaft
D. LL517A034	Alignment Plug
E.	Torque Wrench, 10.2 Nm (7.2 lbf.ft.) to 15 Nm (11 lbf.ft.)
F.	Safety Barriers
G.	Circuit Breaker Safety Clips and Tags
H.	Wiper Ring
J.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
R K. Material No. 04-018	Common Greases (Ref. 20-31-00)
L. Material No. 05-002	Special Materials (Ref. 20-31-00)
M. Material No. 05-005	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 27-84-21, P. Block 401	Transmission Shafts

2. Procedure

(Ref. Fig. 401)
(Ref. Fig. 402)

A. Job Set-Up

(1)Position safety barriers.
(2)Install safety guard PN 98A275003000 on flap/slat control lever quadrant.
(3)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64

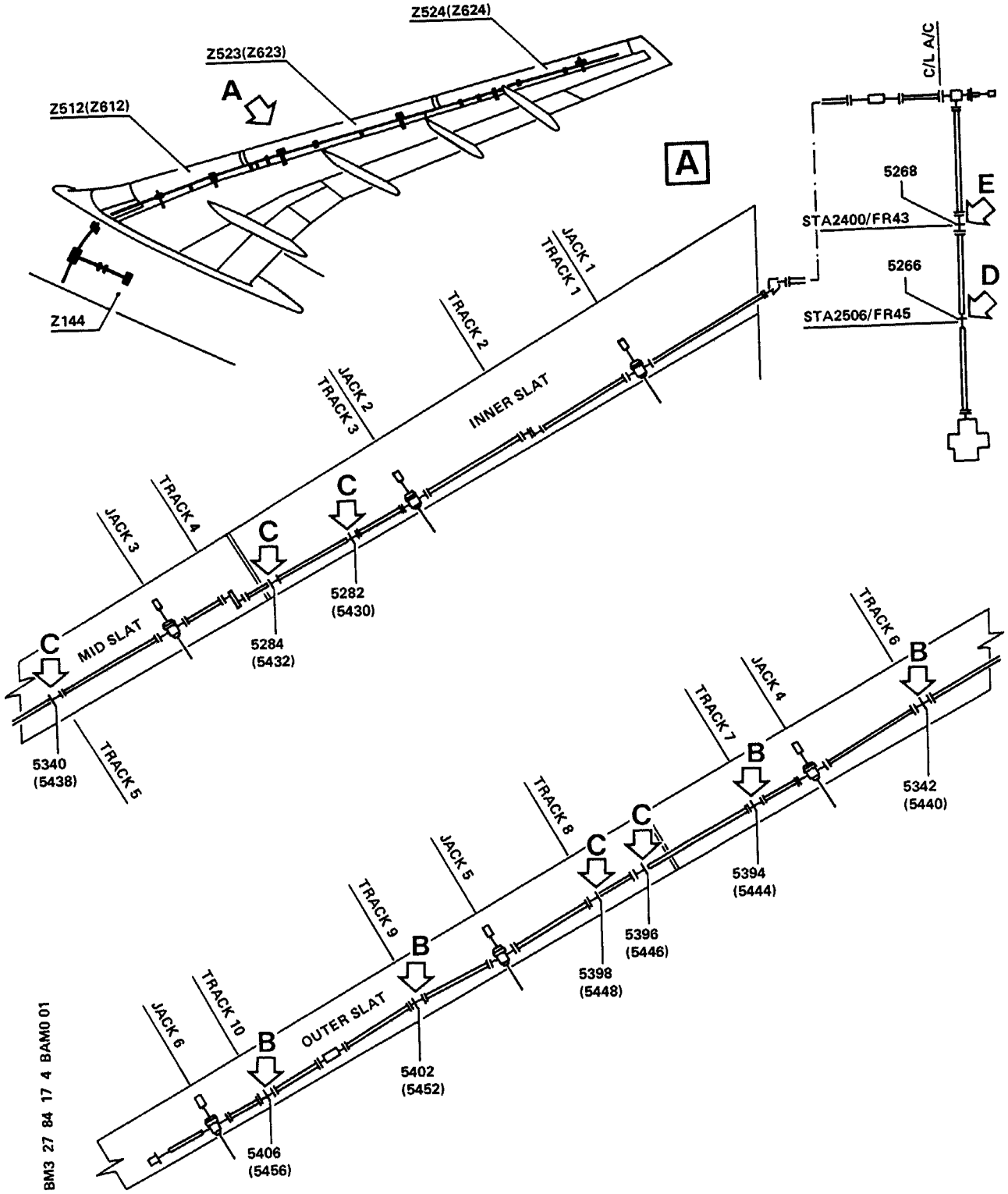
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

(4)Position access platform.
(5)Open following access doors:
steady bearing 5406 - access doors 524HB and 524GB
steady bearing 5456 - access doors 624HB and 624GB
steady bearing 5402 - access doors 524FB and 524EB
steady bearing 5452 - access doors 624FB and 624EB
steady bearing 5398 - access doors 524CB and 524BB
steady bearing 5448 - access doors 624CB and 624BB
steady bearing 5396 - access doors 524BB and 523MB
steady bearing 5446 - access doors 624BB and 623MB
steady bearing 5394 - access doors 523MB and 523LB
steady bearing 5444 - access doors 623MB and 623LB
steady bearing 5342 - access doors 523JB and 523GB
steady bearing 5440 - access doors 623JB and 623GB
steady bearing 5340 - access doors 523FB and 523EB
steady bearing 5438 - access doors 623FB and 623EB
steady bearing 5284 - access doors 523BB and 523AB
steady bearing 5432 - access doors 623BB and 623AB
steady bearing 5282 - access doors 512KB and 512JB
steady bearing 5430 - access doors 612KB and 612JB
steady bearings 5266 and 5268 - access door 147BZ

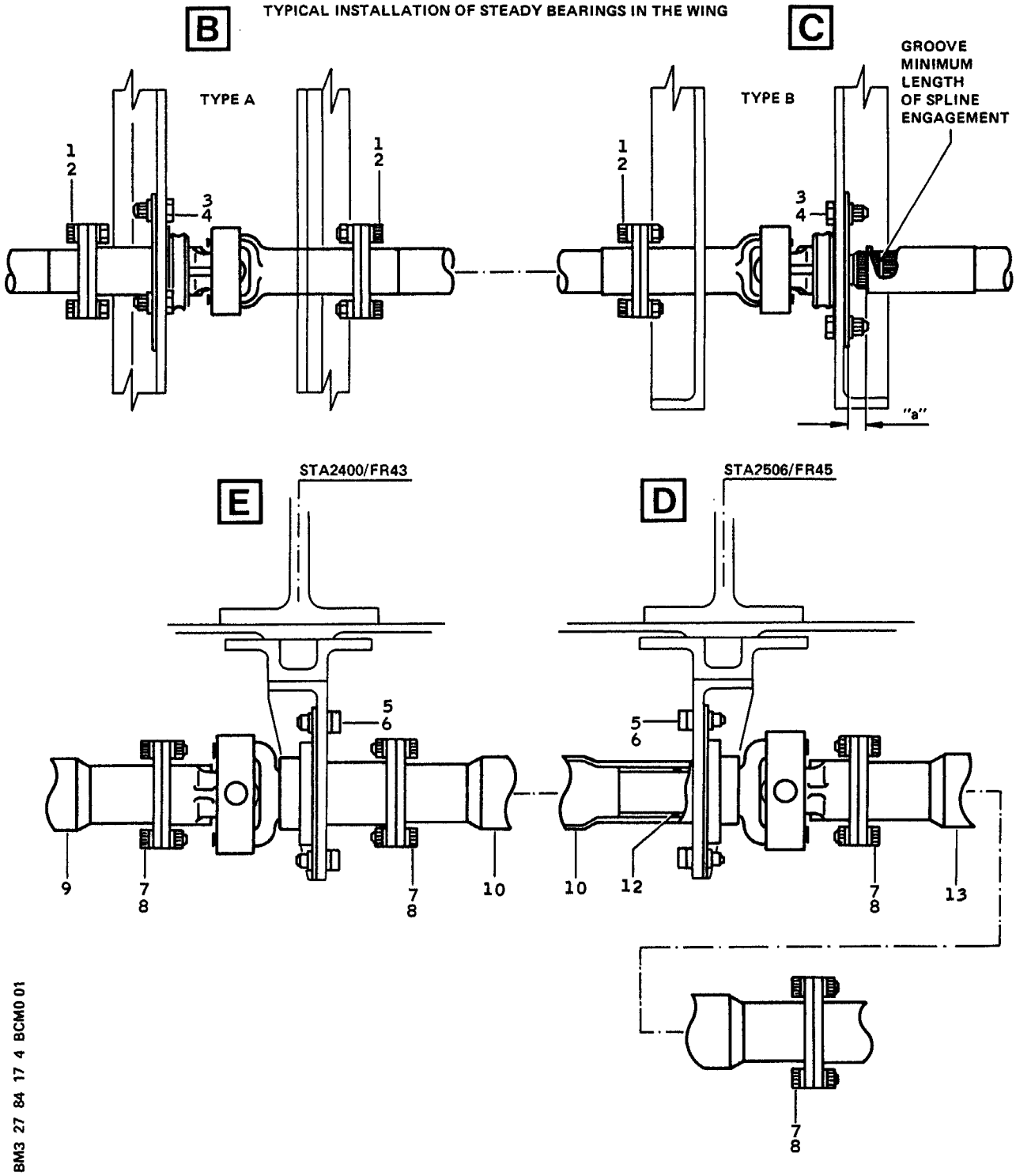
B. Removal
(1)Install locking device PN 98A27808007000 on slat drive shaft outboard of steady bearing to be removed.

NOTE : The locking device should always be installed on the wing transmission shaft.

(2)Removal of steady bearings (Type A) from wing.
(a)Remove nuts (1) and bolts (2) from flange connections.
(b)Remove adjacent torque shaft (Ref. 27-84-21, P. Block 401) on inboard or outboard side depending on which side the steady bearing has to be removed.
(c)Support remaining torque shaft from adjacent structure with lockwire.
(d)Remove nuts (3) and bolts (4) from structure mounting and carefully remove steady bearing.
(3)Removal of steady bearings (Type B) from wing.
(a)Remove nuts (1) and bolts (2) from flange connections.
(b)Remove adjacent torque shaft either with splined or flanged connection (Ref. 27-84-21, P. Block 401) depending on which side the steady bearing has to be removed.
(c)Support remaining torque shaft from adjacent structure with lockwire.
(d)Remove nuts (3) and bolts (4) from structure mounting and carefully remove steady bearing.



Steady Bearings (Slats) Sheet 1
Figure 401



Steady Bearings (Slats) Sheet 2
Figure 402

(4)Removal of steady bearing from the fuselage at FR45.
(a)Remove nuts (7) and bolts (8) at both flange connections of torque shaft (13); carefully separate and remove torque shaft (13).
(b)Remove nuts (5) and bolts (6) from structure mounting and carefully withdraw steady bearing from mounting.
(c)Support torque shaft (10) on adjacent structure with lockwire.
(d)Remove and discard wiper ring (12) from torque shaft (10).
(5)Removal of steady bearing from the fuselage at FR43.
(a)Remove nuts (7) and bolts (8) from flange connections.
(b)Support torque shafts (9, 10) from adjacent structure with lockwire.
(c)Remove nuts (5) and bolts (6) from structure mounting and carefully withdraw steady bearing from structure and torque shaft flanges.

C. Installation
(1)Installation of steady bearing (Type A) in the wing.
(a)Apply anti corrosion compound (Material No. 05-002) to mating surfaces.
(b)Position steady bearing on structure mounting, align holes, install bolts (4) wet with anti corrosion compound (Material No. 05-002) and install nuts (3) and tighten.
(c)Install torque shaft previously removed (Ref. 27-84-21, P. Block 401).
(d)Cut and remove supporting lockwire and support torque shaft by hand.
(e)Align holes in flange of steady bearing with holes in flange of torque shaft and install bolts (2) and nuts (1).

NOTE : If holes in splitter flanges do not align, it will be necessary to disengage the nearest splined connection to align the holes without rotating the torque shaft excessively.

(f)TORQUE nuts (1) to between 10.2 Nm (7.5 lbf.ft.) and 12.4 Nm (9.1 lbf.ft.)
(g)Seal exposed nuts and bolts with corrosion preventive (Material No. 05-005).
(2)Installation of steady bearings (Type B) in the wing.
(a)Apply anti corrosion compound (Material No. 05-002) to mating surfaces.
R (b)Apply grease (Material No. 04-018) to splined connection.
(c)Position steady bearing on structure mounting, mate splined connection, align holes, install bolts (4) wet with anti corrosion compound (Material No. 05-002); install nuts (3) and tighten.
(d)Install torque shaft previously removed (Ref. 27-84-21, P. Block 401).
(e)Cut and remove supporting lockwire and support torque shaft by hand.
(f)Align holes in flange of steady bearing with holes in flange of torque shaft and install bolts (2) and nuts (1).
(g)TORQUE nuts (1) to between 10.2 Nm (7.5 lbf.ft.) and 12.4 Nm (9.1 lbf.ft.).
(h)Make certain that indicator groove is not visible and that dimension 'a' is not less than 2.5 mm (0.098 in.).
(j)Seal exposed nuts and bolts with corrosion preventive (Material No. 05-005).
(3)Installation of steady bearing in the fuselage at FR45.
(a)Apply anti corrosion compound (Material No. 05-002) to mating surfaces.
(b)Install new wiper ring (12) into torque shaft (10) and align using

alignment plug.

R (c)Apply grease (Material No. 04-018) to splined connection.

(d)Cut and remove supporting lockwire and support torque shaft (10) by hand.

(e)Install splined connection of steady bearing into splined connection of torque shaft.

(f)Position steady bearing on structure mounting, align holes and install bolts (6) and nuts (5); do not tighten at this stage.

(g)Position torque shaft (13) between flanges and align holes, if necessary remove steady bearing and rotate splined connection to achieve correct position.

(h)Install bolts (8) and nuts (7) and TORQUE nuts to between 13 Nm (9.5 lbf.ft.) and 15 Nm (11 lbf.ft.).

(j)Tighten nuts (5).

(k)Seal exposed nuts and bolts with corrosion preventive (Material No. 05-005).

(4)Installation of steady bearing in the fuselage at FR43.

(a)Apply sealant (Material No. 09-015) to mating surfaces.

(b)Cut and remove supporting lockwire and support torque shafts (9),(10) by hand.

(c)Position steady bearing on structure mounting, align holes, install bolts (6) wet with corrosion preventive (Material No. 05-005) and install nuts (5) and tighten.

(d)Align holes in flanges of steady bearing with holes in flanges of torque shaft and install bolts (8) and nuts (7).

NOTE : If holes in splitter flanges do not align, it will be necessary to disengage the nearest splined connection to align the holes without rotating the torque shaft excessively.

(e)TORQUE nuts to between 13 Nm (9.5 lbf.ft.) and 15 Nm (11 lbf.ft.).

(f)Seal exposed nuts and bolts with corrosion preventive (Material No. 05-005).

(5)Remove locking device PN 98A27808007000 from torque shaft.

D. Test

(1)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.

(2)Remove safety guard from flap/slat control lever quadrant.

(3)Perform an operational test of slat system (Ref. 27-84-00, P. Block 501).

E. Close-Up

(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(2)Close access doors.

(3)Remove safety barriers.

(4)Remove access platform.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Reason for the Job

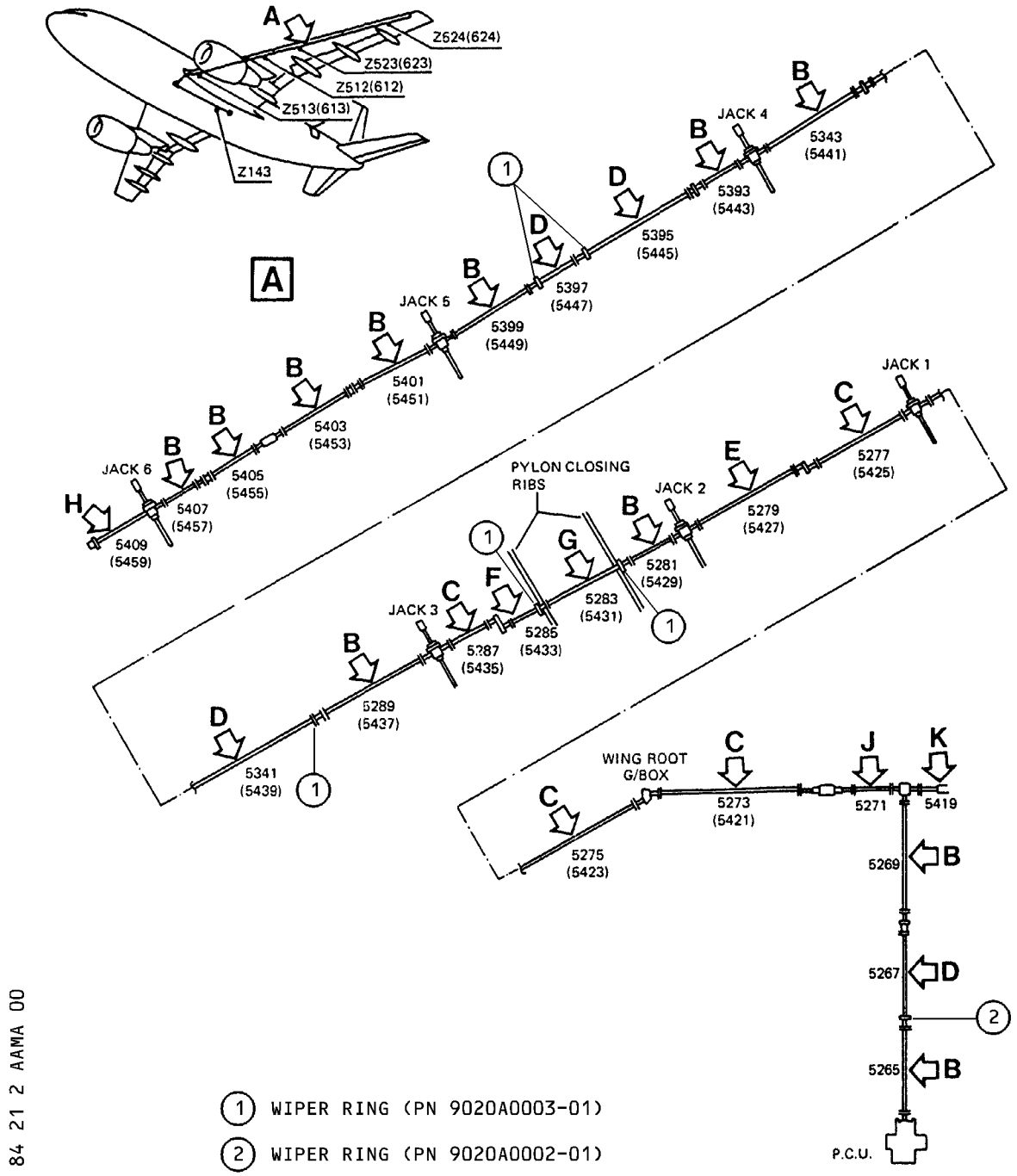
A. Resetting of an activated slat screwjack torque limiter on a jammed slat transmission system.

B. Disconnection/connection of transmission shafts, which may become necessary during trouble shooting procedure.

2. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3 to 5 m (10 to 16 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C.	Torque Wrench, 7.33 to 16 Nm (65 to 142 lbf.in.)
	D.	Safety Barriers
	E.	Circuit Breaker Safety Clips and Tags
	F. Material No. 04-018	Common Greases (Ref. 20-31-00)
	G. Material No. 05-005	Special Materials (Ref. 20-31-00)
	H. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
	Referenced Procedures	
	- 27-80-00, P. Block 501	Lift Augmenting (Slats and Krueger Flaps)
	- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
	- 27-84-16, P. Block 401	Line Gearboxes, Tracks 2 and 4
	- 27-84-17, P. Block 401	Steady Bearings
	- 27-86-11, P. Block 401	Asymmetry Position Pick-off Unit
	- 27-86-12, P. Block 401	Asymmetry Position Pick-off Unit Adapter
	- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

3. Procedure
(Ref. Fig. 201) (Sheet 1/3)



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Slat Drive Transmission Shafts Connections
(Sheet 1/3)
Figure 201

(Ref. Fig. 201) (Sheet 2/3)
(Ref. Fig. 201) (Sheet 3/3)

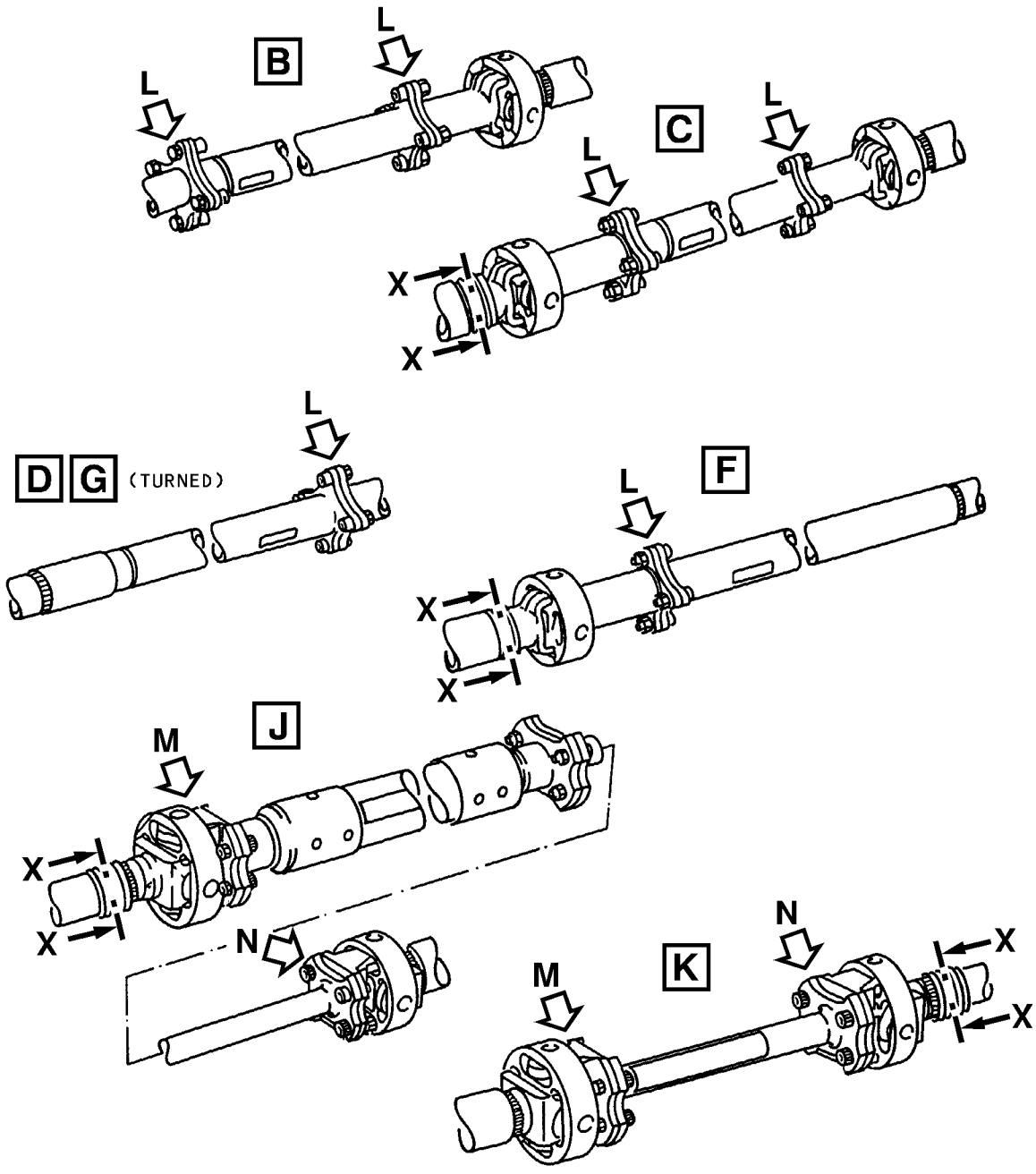
NOTE : Disconnection/connection is described for the LH system.
Variations for the RH system are described in brackets.

A. Job Set-Up
(1)Position safety barriers.
(2)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

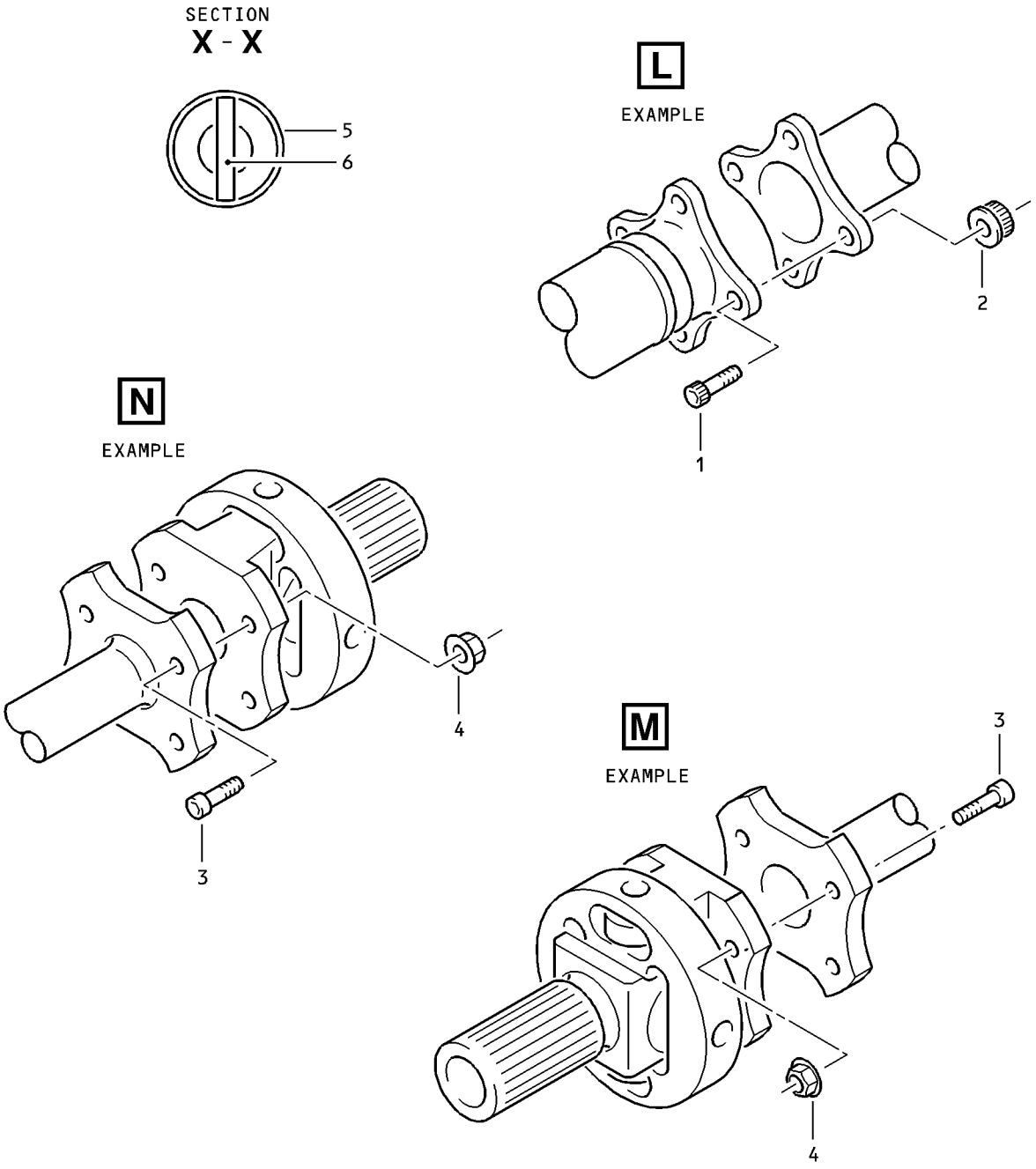
R (3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)For transmission shafts situated in the wing, proceed as follows:
(a)Position access platform.
(b)Open access doors as detailed below:

shaft number	access doors
5409	524JB 524KB
5459	624JB 624KB
5407	524HB 524GB
5457	624HB 624GB
5405	524GB 524HB
5455	624GB 624HB
5403	524FB 524GB
5453	624FB 624GB
5401	535AB 524EB 524FB
5451	635AB 624EB 624FB
5399	524CB 524EB 535AB
5449	624CB 624EB 635AB
5397	524AB 524BB
5447	624AB 624BB
5395	524BB 523MB
5445	624BB 623MB
5393	523LB 523KB
5443	623LB 623KB
5343	523HB 523JB 523LB
5441	623HB 623JB 623LB
5341	523GB 523FB
5439	623GB 623FB
5289	523DB 523EB
5437	623DB 623EB
5287	523CB 523DB
5435	623CB 623DB
5285	523AB 523BB
5433	623AB 623BB
5283	523AB 512KB



BM6 27 84 21 2 AAMJ 00

Slat Drive Transmission Shafts Connections
(Sheet 2/3)
Figure 201



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Slat Drive Transmission Shafts Connections
(Sheet 3/3)
Figure 201

5431	623AB 612KB
5281	512JB 512HB
5429	612JB 612HB
5279	512FB 512GB 512HB
5427	612FB 612GB 612HB
5277	512CB 512DB 512EB
5425	612CB 612DB 612EB
5275	512BB
5423	612BB

(5)For transmission shafts located in the fuselage proceed as follows:
(a)Open LH or RH main gear main door (Ref. 32-12-11, P. Block 301).
(b)Remove access door 147BZ.

R **WARNING : MAKE SURE THAT THE TRANSMISSION SYSTEM IS CLEAR OF PERSONS**
R **AND/OR EQUIPMENT. MOVEMENT OF THE TRANSMISSION SYSTEM CAN CAUSE**
R **INJURY AND/OR DAMAGE.**

B. Resetting of an Activated Slat Screwjack Torque Limiter on a Jammed Slat Transmission System
(Ref. Fig. 202)
(1)Put one special spanner on the first splitter flange connection inboard (or outboard) of the affected screwjack.
(2)Turn the special spanner in the direction the slat screwjack torque limiter indicator shows to take the torque load.
(3)Hold the torque load and reset the slat screwjack torque limiter indicator.
(4)Release the torque load of the transmission system as far as the structure allows.
(5)If necessary put a second special spanner on the next possible connection of the splitter flanges and hold the torque load.
(6)Remove the first special spanner and release the torque load with the second special spanner.
(7)If necessary do the steps above again to release the complete torque load.

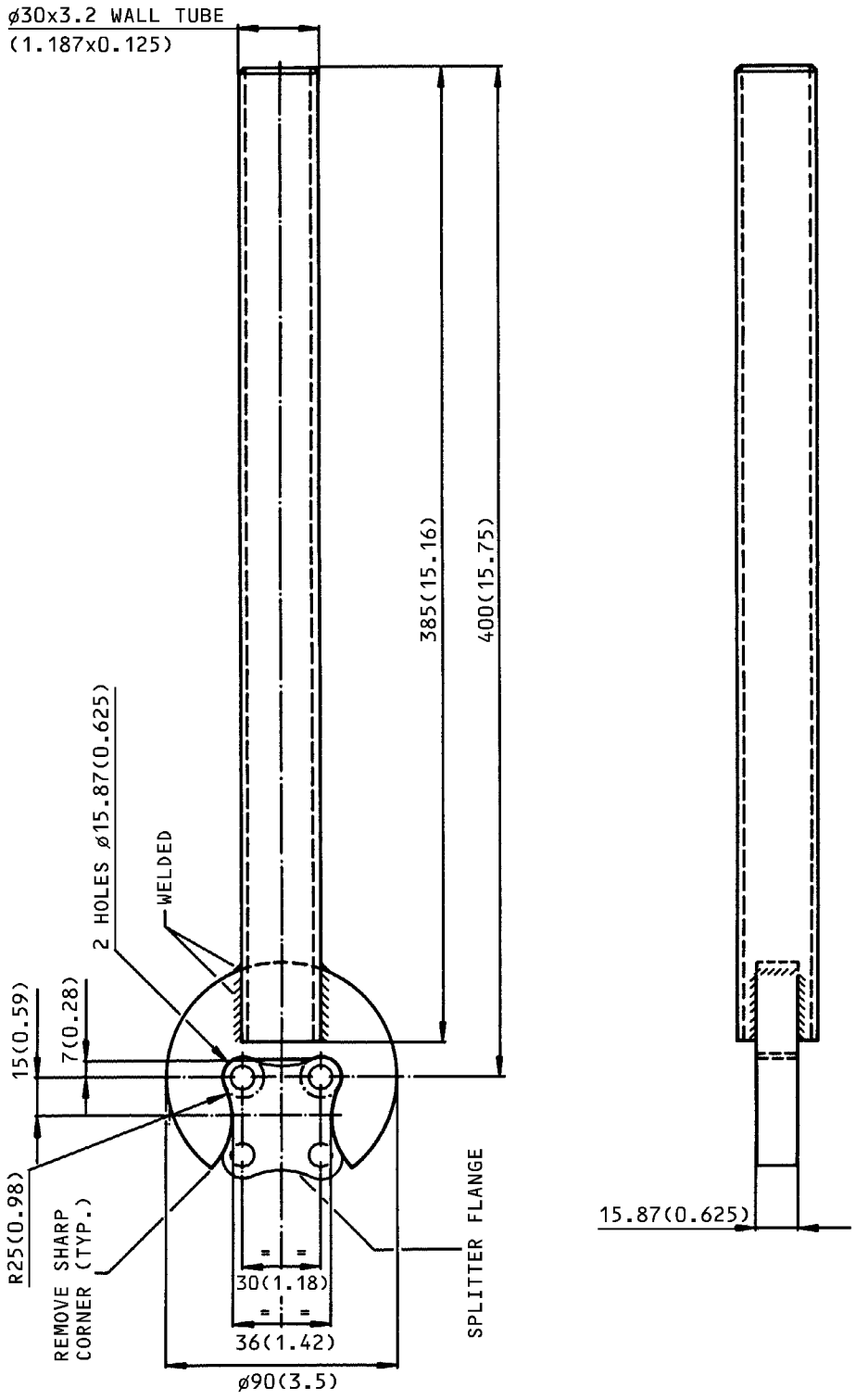
NOTE : The torque load is released after a maximum of 120 degrees.

(8)Make sure that all slat screwjack torque limiter indicators are resetted.
(9)Make sure that the system torque limiter lockout indicators are not popped out. Reset it, if necessary.

R **WARNING : MAKE SURE THAT THE TRANSMISSION SYSTEM IS CLEAR OF PERSONS**
R **AND/OR EQUIPMENT. MOVEMENT OF THE TRANSMISSION SYSTEM CAN CAUSE**
R **INJURY AND/OR DAMAGE.**

C. Disconnection/Connection of a Jammed Slat Transmission System

NOTE : The following procedure describes the restoration of a jammed slat transmission system after screwjack 2, 3, 4, 5, or 6 have locked out.



Special Spanner
Figure 202

NOTE : The following procedure is not necessary if you do the procedure at step B. above.

(1)Select a type B splitter flange connection (inboard of the locked-out slat screwjack) where the disconnection will be performed (Ref. Fig. 201) (Sheets 1 and 2).

NOTE : At least one splitter flange connection must be between the disconnection point and the locked-out slat screwjack.

(2)Make a reference mark on both sides of splitter flanges.
(3)Remove nuts (2) from splitter flanges (Ref. Fig. 201) (Sheet 3).
(4)Use two special spanners as shown (Ref. Fig. 202) or suitable adjustable spanners and install on splitter flanges, one inboard and one outboard of the disconnection point.
(5)Carefully apply and maintain a torque on spanners in opposite direction to each other until bolts (1) in splitter flanges are loose.
(6)Remove bolts (1).
(7)Release torque progressively on both spanners.
(8)Reset appropriate slat screwjack torque limiter and system torque limiter indicator.
(9)Align splitter flanges using reference mark made in step (2), if necessary, rotate slat transmission system outboard of the splitter flange connection.
(10)Install bolts (1) and nuts (2). Do not torque nuts (2) at this stage.
(11)Do a check of the slat neutral position outboard of the splitter flange connection (Ref. 27-80-00, P. Block 501).
(12)If necessary, adjust slat drive system (Ref. 27-80-00, P. Block 501).
(13)TORQUE nuts (2), located in the wing, to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(14)TORQUE nuts (2), located in the fuselage, to between 13 and 15 Nm (115 and 133 lbf.in.).
(15)Apply corrosion preventive (Material No. 05-005) to bolts (1) and nuts (2).

R WARNING : MAKE SURE THAT THE TRANSMISSION SYSTEM IS CLEAR OF PERSONS
R AND/OR EQUIPMENT. MOVEMENT OF THE TRANSMISSION SYSTEM CAN CAUSE
R INJURY AND/OR DAMAGE.

D. Disconnection/Connection of Individual Slat Transmission System Components
(1)Disconnection
(a)For type 'B' shafts (Ref. Fig. 201) (Sheets 1 and 2), proceed as follows:
1 Remove four nuts (2) and bolts (1) securing splitter flanges at both ends of shaft (Ref. Fig. 201) (Sheet 3).
2 Withdraw universal joint assembly from splined connection.
(b)For type 'C' shafts (Ref. Fig. 201) (Sheets 1 and 2), proceed as follows:
1 Remove four nuts (2) and bolts (1) securing splitter flanges at both ends of shaft (Ref. Fig. 201) (Sheet 3)
2 Withdraw sliding universal joint assembly from splined connection.
3 Remove retaining spring (5) and pin (6) securing fixed universal joint

assembly and withdraw assembly from splined connection.

NOTE : Shaft 5275 (5423) may have shims installed between splitter flange halves at one or both ends.

(c)For type 'D' shafts (Ref. Fig. 201) (Sheets 1 and 2), proceed as follows:
1 Remove four nuts (2) and bolts (1) securing splitter flange.
2 Deflect shaft downward to rotate steady bearing in its housing and withdraw shaft from sliding splined connection (Ref. Fig. 201) (Sheet 3).
(d)For type 'E' shafts (Ref. Fig. 201) (Sheets 1 and 2), proceed as follows:
1 Remove shaft 5277 (5425) as detailed in step D.(1)(b).
2 Remove line gearbox (Ref. 27-84-16, P. Block 401).
3 Withdraw shaft complete with universal joint assembly from splined connection on screwjack 2, and remove from aircraft via line gearbox aperture.
(e)For type 'F' shafts (Ref. Fig. 201) (Sheets 1 and 2), proceed as follows:
1 Remove four nuts (2) and bolts (1) securing splitter flange (Ref. Fig. 201) (Sheet 3).
2 Remove retaining spring (5) and pin (6) securing fixed universal joint assembly and withdraw assembly from splined connection.
3 Withdraw remaining section of shaft from sliding splined connection.
(f)For type 'G' shafts (Ref. Fig. 201) (Sheets 1 and 2), proceed as follows:
1 Remove shaft 5281 (5429) as detailed in step D.(1)(a).
2 Support inboard end of shaft 5283 (5431) and remove steady bearing 5282 (5430) (Ref. 27-84-17, P. Block 401).
3 Remove four nuts (2) and bolts (1) securing outboard end of shaft and remove shaft via steady bearing aperture (Ref. Fig. 201) (Sheet 3).
(g)For type 'H' shafts (Ref. Fig. 201) (Sheets 1 and 2), proceed as follows:
1 Remove Asymmetry Position Pick-off Unit (APPU) (Ref. 27-86-11, P. Block 401).
2 Remove APPU adaptor (Ref. 27-86-12, P. Block 401).
3 Withdraw shaft assembly from sliding splined connection on screw-jack 6.
(h)For types J and K shafts/torsion dampers (Ref. Fig. 201) (Sheets 1, and 2), proceed as follows:
1 Remove nuts (4) and bolts (3) securing splitter flanges (***//AAMZ//***) (Sheet 3).
2 Remove torsion damper, complete with plain section of shaft (type J only).
3 Remove retaining spring (5) and pin (6) securing universal joint at system torque limiter.
4 Extract universal joint assemblies from splined connections.
(2)Preparation for Connection

CAUTION : WHEN CLEANING STEADY BEARING SPLINES, MAKE CERTAIN THAT NO WHITE SPIRIT ENTERS BEARING HOUSING.

(a)At locations where a sliding splined connection is employed, the female half of the connection incorporates a felt wiper ring. Whenever this type of connection is parted, the wiper ring must be discarded, and after cleaning the splined surfaces with white spirit (Material No. 11-002), a new wiper ring must be installed using the appropriate alignment plug.

(b)Clean male and female portions of disassembled spline connections using white spirit (Material No. 11-002).

(c)Apply grease (Material No. 04-018) to splined surfaces.

(3)Connection

(a)For type 'B' shafts (Ref. Fig. 201) (Sheet 1 and 2) proceed as follows:

In the wing

1 Install universal joint assembly in splined connection, such that when shaft is installed, splitter flanges are aligned.
2 Position section of shaft, secure splitter flange with bolts (1) and nuts (2) (Ref. Fig. 201) (Sheet 3).
3 TORQUE nuts (2) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
4 Apply corrosion preventive (Material No. 05-005) to bolts (1) and nuts (2).

In the fuselage

1 Install universal joint assembly in splined connection, such that when shaft is installed, splitter flanges are aligned.
2 Position section of shaft, secure splitter flange with bolts (1) and nuts (2) (Ref. Fig. 201) (Sheet 3).
3 TORQUE nuts (2) to between 13 and 15 Nm (115 and 133 lbf.in.).
4 Apply corrosion preventive (Material No. 05-005) to bolts (1) and nuts (2).

(b)For type 'C' shafts (Ref. Fig. 201) (Sheets 1 and 2), but not shafts 5275 (5423), proceed as follows:

1 Install non-sliding universal joint assembly in splined connection, making certain that holes thru connection are aligned.
2 Install pin (6), secure with retaining spring (5) (Ref. Fig. 201) (Sheet 3).
3 Install sliding universal joint assembly in splined connection.
4 Position section of shaft, secure splitter flanges with bolts (1) and nuts (2).
5 TORQUE nuts (2) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
6 Apply corrosion preventive (Material No. 05-005) to nuts (2) and bolts (1).

(c)For shafts 5275 (5423) proceed as follows (Ref. Fig. 201) (Sheets 1 and 2):

1 Install non-sliding universal joint assembly in wing root gearbox splined connection, making certain that holes thru splines are aligned.
2 Install pin (6) and secure with retaining spring (5) (Ref. Fig. 201) (Sheet 3).
3 If removed, install shims.

4 Secure splitter flange(s) with bolts (1) and nuts (2) and tighten.
5 TORQUE nuts (2) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
6 Apply corrosion preventive (Material No. 05-005) to nuts (2) and bolts (1).

(d)For type 'D' shafts (Ref. Fig. 201) (Sheets 1 and 2), proceed as follows:

In the wing

1 Insert male portion of splined connection in steady bearing such that splitter flange holes are aligned.
2 Rotate shaft and steady bearing upward, secure splitter flange with bolts (1) and nuts (2) (Ref. Fig. 201) (Sheet 3).
3 TORQUE nuts (2) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
4 Apply corrosion preventive (Material No. 05-005) to nuts (2) and bolts (1).

In the fuselage

1 Insert male portion of splined connection in steady bearing such that splitter flange holes are aligned.
2 Rotate shaft and steady bearing upward, secure splitter flange with bolts (1) and nuts (2) (Ref. Fig. 201) (Sheet 3).
3 TORQUE nuts (2) to between 13 and 15 Nm (115 and 133 lbf.in.).
4 Apply corrosion preventive (Material No. 05-005) to nuts (2) and bolts (1).

(e)For type 'E' shafts (Ref. Fig. 201) (Sheets 1 and 2), proceed as follows:

1 Insert shaft via line gearbox aperture and insert male portion of splined connection in screwjack 2 such that when shaft is installed, splitter flanges are aligned.
2 Install line gearbox (Ref. 27-84-16, P. Block 401).
3 Install shaft 5277 (5425) as detailed in step (3)(b).

(f)For type 'F' shafts (Ref. Fig. 201) (Sheets 1 and 2), proceed as follows:

1 Install shaft section on male splined connection of steady bearing such that when universal joint assembly is installed, splitter flanges will align.
2 (c)Install universal joint assembly in line gearbox connection, making certain that locking pin holes thru splines are aligned.
3 Install pin (6), secure with retaining spring (5) (Ref. Fig. 201) (Sheet 3).
4 Connect splitter flange, secure with bolts (1) and nuts (2).
5 TORQUE nuts (2) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
6 Apply corrosion preventive (Material No. 05-005) to nuts (2) and bolts (1).

(g)For type 'G' shafts (Ref. Fig. 201) (Sheets 1 and 2), proceed as follows:

1 Insert shaft via steady bearing aperture and secure splitter flange to steady bearing 5284 (5432) with bolts (1) and nuts (2) (Ref. Fig. 201) (Sheet 3).
2 Support inboard end of shaft.
3 Install steady bearing 5282 (5430) (Ref. 27-84-17, P. Block 401).
4 TORQUE nuts (2) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
5 Install shaft 5281 (5429) as detailed in step (3)(d).

6 Apply corrosion preventive (Material No. 05-005) to nuts (2) and bolts (1).

(h)For type 'H' shafts (Ref. Fig. 201) (Sheets 1 and 2), proceed as follows:

1 Insert male splined connection into screwjack 6 such that locking pin holes are correctly positioned to align with holes in APPU.

2 Install APPU Adaptor (Ref. 27-86-12, P. Block 401).

3 Install APPU (Ref. 27-86-11, P. Block 401).

(j)For type J and K shafts/torsion dampers (Ref. Fig. 201) (Sheets 1 and 2), proceed as follows:

1 Insert outboard universal joint in system torque limiter input connection, making certain that securing pin holes are aligned.

2 Install pin (6) and secure with retaining spring (5) (Ref. Fig. 201) (Sheet 3).

3 Insert inboard universal joint assembly in splined connection such that splitter flange bolt holes are correctly aligned for installation of torsion damper.

4 Install torsion damper, complete with plain section of shaft (type J only), secure with bolts (3) and nuts (4).

5 TORQUE nuts (3) to between 13 Nm and 15 Nm (115 and 133 lbf.in.).

6 Apply corrosion preventive (Material No. 05-005) to nuts (4) and bolts (3).

E. Test

(1)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.

(2)Remove safety guard from flap/slat control lever quadrant.

(3)Carry out operational test of slat system (Ref. 27-84-00, P. Block 501).

F. Close-Up

(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(2)For transmission shafts located in the wings , proceed as follows:

(a)Close access doors opened at step 3.A.(4)(b).

(b)Remove access platform.

(3)For transmission shafts located in the fuselage, proceed as follows:

(a)Close access doors 512BB (612BB) and 147BZ.

(b)Close main gear main door (Ref. 32-12-11, P. Block 301).

TRANSMISSION SHAFTS (5265 THRU 5289, 5341, 5343, 5393 THRU 5409, 5419 THRU 5459) (ODD NUMBERS ONLY) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3 to 5 m (10 to 16 ft.)
R B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C. 98A27808007000	Locking Device - Slat Drive Shaft
D. LL517A034	Alignment Plug
E. LL550A017	Alignment Plug
F.	Torque Wrench, 10.2 to 15 Nm (91 to 133 lbf.in.)
G.	Circuit Breaker Safety Clips and Tags
H.	Wiper Rings
I. Material No. 04-018	Common Greases (Ref. 20-31-00)
J. Material No. 05-005	Special Materials (Ref. 20-31-00)
K. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

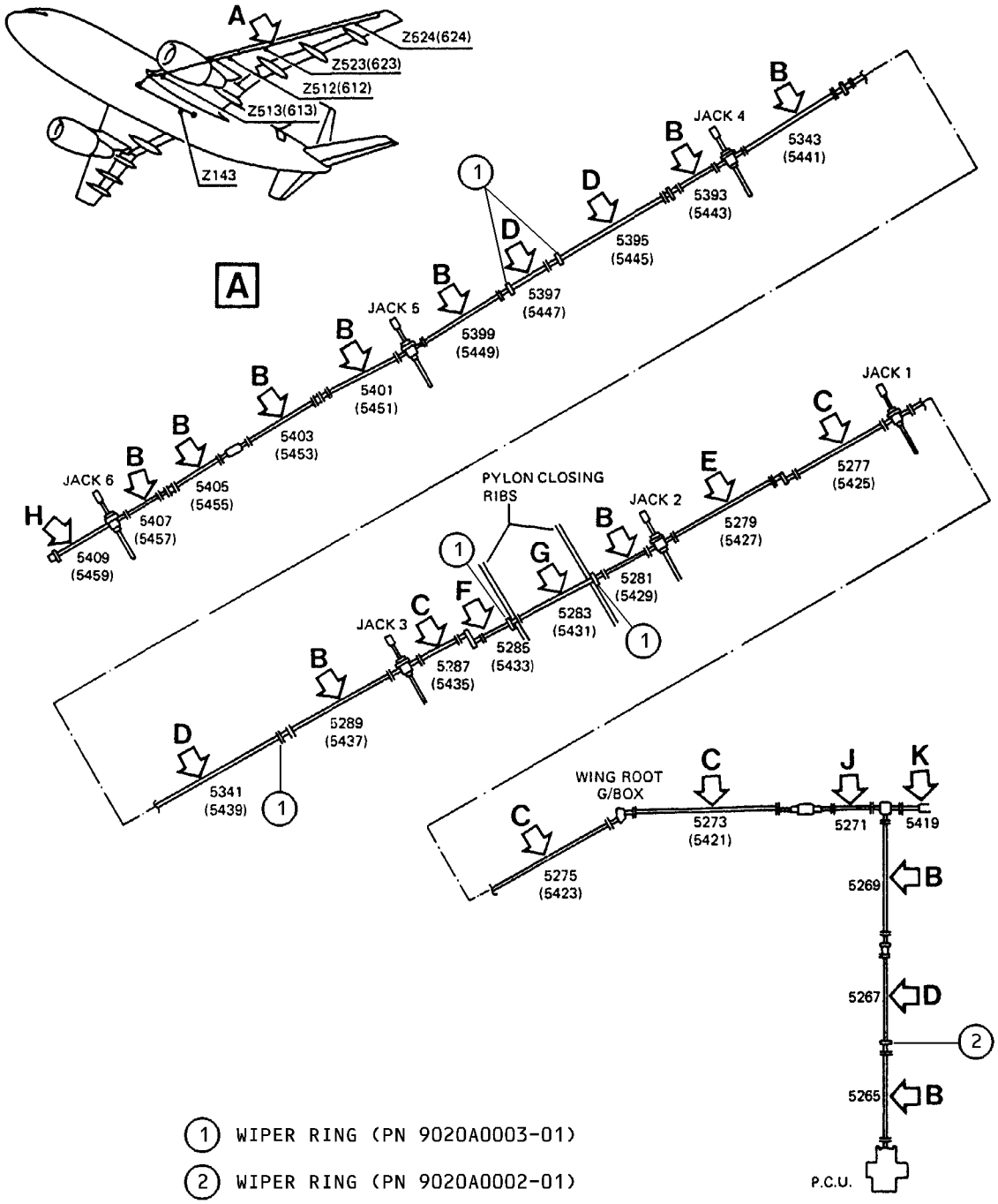
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 27-84-16, P. Block 401	Line Gearboxes, Tracks 2 and 4
- 27-84-17, P. Block 401	Steady Bearings
- 27-86-11, P. Block 401	Asymmetry Position Pick-Off Unit
- 27-86-12, P. Block 401	Asymmetry Position Pick-Off Unit Adapter
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401) (Sheet 1/3)
(Ref. Fig. 401) (Sheet 2/3)
(Ref. Fig. 401) (Sheets 3/3)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers:



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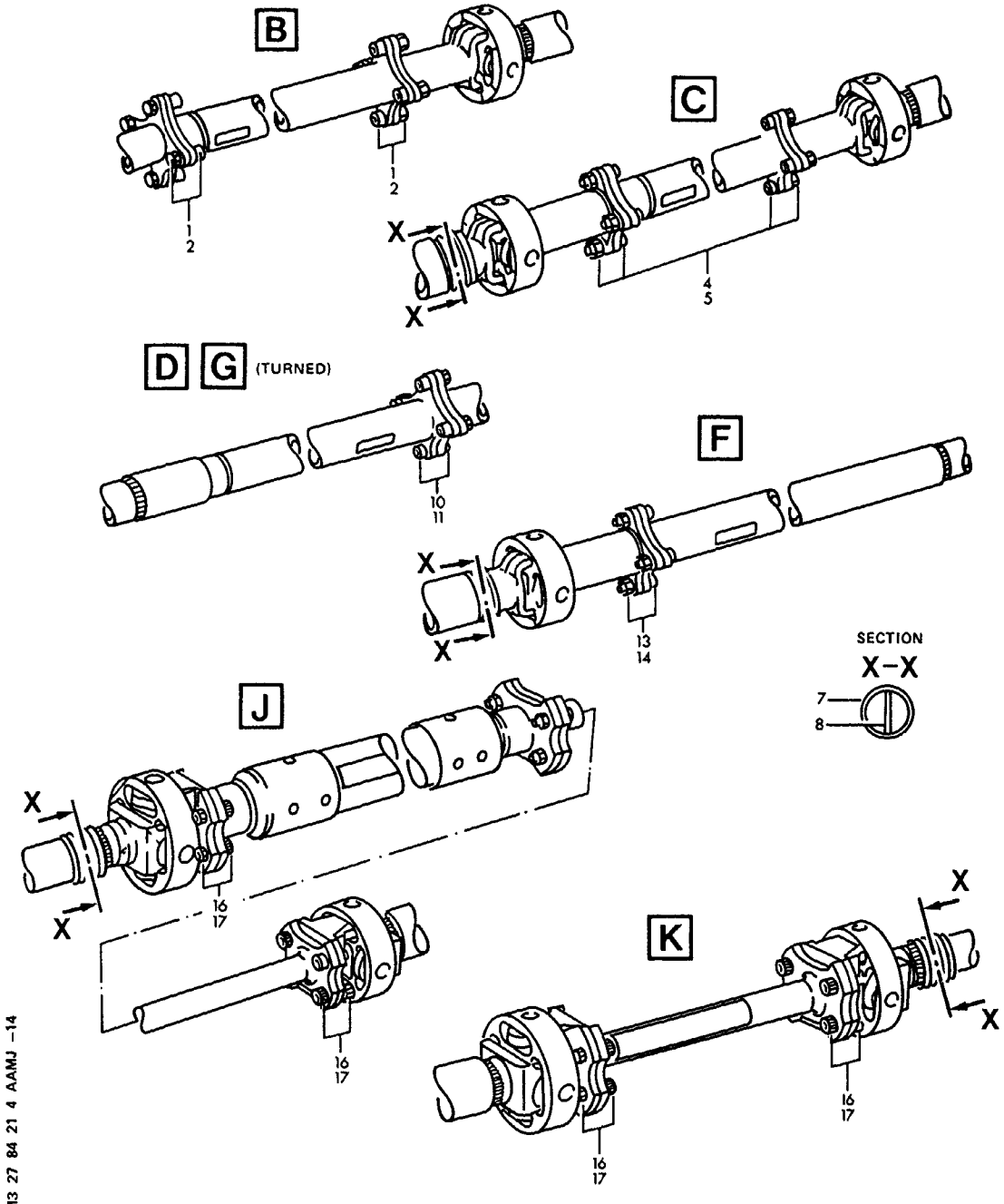
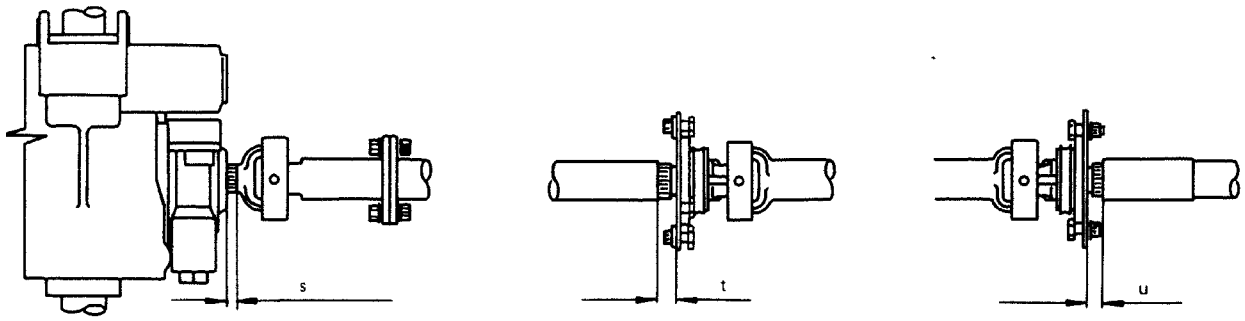
Slat Drive Transmission Shafts (Sheet 1/3)
Figure 401

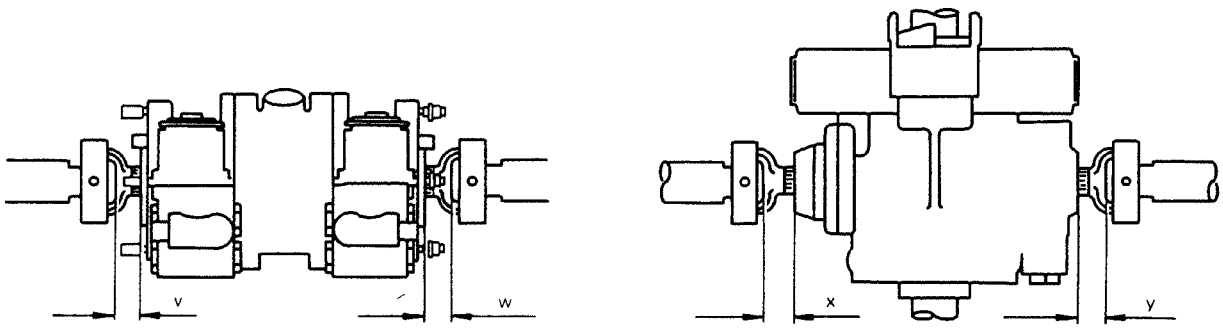
R



Slat Drive Transmission Shafts (Sheet 2/3)
Figure 401

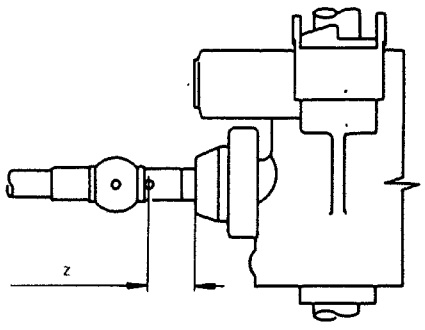


SCREW JACK 1



WING TIP BRAKE

SCREW JACK



SCREW JACK 6

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Slat Drive Transmission Shafts (Sheet 3/3)
Figure 401

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

R (2)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(3)For transmission shafts situated in the wing, proceed as follows:

(a)Position access platform.

(b)Open access doors as detailed below:

shaft number	access doors
5409	524JB 524KB
5459	624JB 624KB
5407	524HB 524GB
5457	624HB 624GB
5405	524GB 524HB
5455	624GB 624HB
5403	524FB 524GB
5453	624FB 624GB
5401	535AB 524EB 524FB
5451	635AB 624EB 624FB
5399	524CB 524EB 535AB
5449	624CB 624EB 635AB
5397	524AB 524BB
5447	624AB 624BB
5395	524BB 523MB
5445	624BB 623MB
5393	523LB 523KB
5443	623LB 623KB
5343	523HB 523JB 523LB
5441	623HB 623JB 623LB
5341	523GB 523FB
5439	623GB 623FB
5289	523DB 523EB
5437	623DB 623EB
5287	523CB 523DB
5435	623CB 623DB
5285	523AB 523BB
5433	623AB 623BB
5283	523AB 512KB
5431	623AB 612KB
5281	512JB 512HB
5429	612JB 612HB
5279	512FB 512GB 512HB
5427	612FB 612GB 612HB
5277	512CB 512DB 512EB
5425	612CB 612DB 612EB
5275	512BB
5423	612BB

(c)Install slat drive shaft locking device PN 98A27808007000 on shaft outboard of section to be worked on.

(4)For transmission shafts located in the fuselage proceed as follows:

(a)Open LH or RH main gear main door (Ref. 32-12-11, P. Block 301).

(b)Remove access door 147BZ.

(c)Open access door 512BB (612BB) and install shaft locking device.

B. Removal

R (1)Make sure that there is no torque load in the transmission system.

R NOTE : There is no torque load in the transmission system if you can move the transmission shafts with your hands.

R (2)For type 'B' shafts (Ref. Fig. 401) (Sheets 1 and 2), proceed as follows:

(a)Remove four nuts (1) and bolts (2) securing splitter flanges at both ends of shaft.

(b)Withdraw universal joint assembly from splined connection.

R (3)For type 'C' shafts (Ref. Fig. 401) (Sheets 1 and 2), proceed as follows:

(a)Remove four nuts (4) and bolts (5) securing splitter flanges at both ends of shaft.

(b)Withdraw sliding universal joint assembly from splined connection.

(c)Remove retaining spring (7) and pin (8) securing fixed universal joint assembly and withdraw assembly from splined connection.

NOTE : Shaft 5275 (5423) may have shims installed between splitter flange halves at one or both ends.

R (4)For type 'D' shafts (Ref. Fig. 401) (Sheets 1 and 2), proceed as follows:

(a)Remove four nuts (10) and bolts (11) securing splitter flange.

(b)Deflect shaft downward to rotate steady bearing in its housing and withdraw shaft from sliding splined connection.

R (5)For type 'E' shafts (Ref. Fig. 401) (Sheets 1 and 2), proceed as follows:

(a)Remove shaft 5277 (5425) as detailed in step B.(2).

(b)Remove line gearbox (Ref. 27-84-16, P. Block 401).

(c)Withdraw shaft complete with universal joint assembly from splined connection on screwjack 2, and remove from aircraft via line gearbox aperture.

R (6)For type 'F' shafts (Ref. Fig. 401) (Sheets 1 and 2), proceed as follows:

(a)Remove four nuts (13) and bolts (14) securing splitter flange.

(b)Remove retaining spring (7) and pin (8) securing fixed universal joint assembly and withdraw assembly from splined connection.

(c)Withdraw remaining section of shaft from sliding splined connection.

R (7)For type 'G' shafts (Ref. Fig. 401) (Sheets 1 and 2), proceed as follows:

(a)Remove shaft 5281 (5429) as detailed in step B.(1).

(b)Support inboard end of shaft 5283 (5431) and remove steady bearing 5282 (5430) (Ref. 27-84-17, P. Block 401).

(c)Remove four nuts (10) and bolts (11) securing outboard end of shaft and remove shaft via steady bearing aperture.

R (8)For type 'H' shafts (Ref. Fig. 401) (Sheets 1 and 2), proceed as

follows:
(a)Remove Asymmetry Position Pick-off Unit (APPU) (Ref. 27-86-11, P. Block 401).
(b)Remove APPU adaptor (Ref. 27-86-12, P. Block 401).
(c)Withdraw shaft assembly from sliding splined connection on screwjack 6.

R (9)For types J & K shafts/torsion dampers (Ref. Fig. 401) (Sheets 1 and 2), proceed as follows:
(a)Remove nuts (16) and bolts (17) securing splitter flanges.
(b)Remove torsion damper, complete with plain section of shaft (type J only).
(c)Remove retaining spring (7) and pin (8) securing universal joint at system torque limiter.
(d)Extract universal joint assemblies from splined connections.

C. Preparation for Installation

CAUTION : WHEN CLEANING STEADY BEARING SPLINES, MAKE SURE THAT NO WHITE SPIRIT ENTERS BEARING HOUSING.

(1)At locations where a sliding splined connection is employed, the female half of the connection incorporates a felt wiper ring. Whenever this type of connection is parted, the wiper ring must be discarded, and after cleaning the splined surfaces with white spirit (Material No. 11-002), a new wiper ring must be installed using the appropriate alignment plug.
(2)Clean male and female portions of disassembled spline connections using white spirit (Material No. 11-002).
(3)Apply grease (Material No. 04-018) to splined surfaces.

D. Installation

(1)For type 'B' shafts (Ref. Fig. 401) (Sheet 1 and 2) proceed as follows:
In the wing
(a)Install universal joint assembly in splined connection, such that when shaft is installed, splitter flanges are aligned.
(b)Position section of shaft, secure splitter flange with bolts (2) and nuts (1).
(c)TORQUE nuts (1) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(d)Apply corrosion preventive (Material No. 05-005) to bolts (2) and nuts (1).
In the fuselage
(a)Install universal joint assembly in splined connection, such that when shaft is installed, splitter flanges are aligned.
(b)Position section of shaft, secure splitter flange with bolts (2) and nuts (1).
(c)TORQUE nuts (1) to between 13 and 15 Nm (115 and 133 lbf.in.).
(d)Apply corrosion preventive (Material No. 05-005) to bolts (2) and nuts (1).
(2)For type 'C' shafts (Ref. Fig. 401) (Sheets 1 and 2), but not shafts 5275 (5423), proceed as follows:
(a)Install non-sliding universal joint assembly in splined connection, making certain that holes thru connection are aligned.
(b)Install pin (8), secure with retaining spring (7).

(c)Install sliding universal joint assembly in splined connection.
(d)Position section of shaft, secure splitter flanges with bolts (5) and nuts (4).
(e)TORQUE nuts (4) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(f)Apply corrosion preventive (Material No. 05-005) to nuts (4) and bolts (5).

(3)For shafts 5275 (5423) proceed as follows (Ref. Fig. 401) (Sheets 1 and 2):
(a)Install non-sliding universal joint assembly in wing root gearbox splined connection, making certain that holes thru splines are aligned.
(b)Install pin (8) and secure with retaining spring (7).
(c)Position section of shaft, install bolts (5) and nuts (4) and tighten, but do not torque at this stage.
(d)Measure gap 'S' (Ref. Fig. 401) (Sheet 3). Gap must be 17.5 mm (0.68 in.) max, 3.5 mm (0.137 in.) min.
(e)If gap is not within the above limits, proceed as follows:
1 Determine quantity of shims required to adjust overall length of shaft assembly to obtain correct dimension for gap 'S' (shims are 3.5 mm (0.137 in.) thick); maximum quantity of shims permitted is one at each end.
2 Remove nuts (4) and bolts (5) from splitter flange at position(s) where shim(s) are to be installed.
3 Install shim(s).
4 Substitute longer bolts for standard bolts (5) at position(s) where shim(s) are installed.
5 Secure splitter flange(s) with bolts (5) and nuts (4) and tighten.
(f)TORQUE nuts (4) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(g)Apply corrosion preventive (Material No. 05-005) to nuts (4) and bolts (5).

(4)For type 'D' shafts (Ref. Fig. 401) (Sheets 1 and 2), proceed as follows:
In the wing
(a)Insert male portion of splined connection in steady bearing such that splitter flange holes are aligned.
(b)Rotate shaft and steady bearing upward, secure splitter flange with bolts (11) and nuts (10).
(c)TORQUE nuts (10) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(d)Apply corrosion preventive (Material No. 05-005) to nuts (10) and bolts (11).
In the fuselage
(a)Insert male portion of splined connection in steady bearing such that splitter flange holes are aligned.
(b)Rotate shaft and steady bearing upward, secure splitter flange with bolts (11) and nuts (10).
(c)TORQUE nuts (10) to between 13 and 15 Nm (115 and 133 lbf.in.).
(d)Apply corrosion preventive (Material No. 05-005) to nuts (10) and bolts (11).

(5)For type 'E' shafts (Ref. Fig. 401) (Sheets 1 and 2), proceed as follows:
(a)Insert shaft via line gearbox aperture and insert male portion of splined connection in screwjack 2 such that when shaft is installed,

splitter flanges are aligned.
(b)Install line gearbox (Ref. 27-84-16, P. Block 401).
(c)Install shaft 5277 (5425) as detailed in step D.(2).

(6)For type 'F' shafts (Ref. Fig. 401) (Sheets 1 and 2), proceed as follows:
(a)If new shaft is to be installed, remove nuts (13) and bolts (14) and separate universal joint assembly from shaft section.
(b)Install shaft section on male splined connection of steady bearing such that when universal joint assembly is installed, splitter flanges will align.
(c)Install universal joint assembly in line gearbox connection, making certain that locking pin holes thru splines are aligned.
(d)Install pin (8), secure with retaining spring (7).
(e)Connect splitter flange, secure with bolts (14) and nuts (13).
(f)TORQUE nuts (13) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(g)Apply corrosion preventive (Material No. 05-005) to nuts (13) and bolts (14).

(7)For type 'G' shafts (Ref. Fig. 401) (Sheets 1 and 2), proceed as follows:
(a)Insert shaft via steady bearing aperture and secure splitter flange to steady bearing 5284 (5432) with bolts (11) and nuts (10).
(b)Support inboard end of shaft.
(c)Install steady bearing 5282 (5430) (Ref. 27-84-17, P. Block 401).
(d)TORQUE nuts (10) to between 10.2 and 12.4 Nm (91 and 110 lbf.in.).
(e)Install shaft 5281 (5429) as detailed in step D.(4).
(f)Apply corrosion preventive (Material No. 05-005) to nuts (10) and bolts (11).

(8)For type 'H' shafts (Ref. Fig. 401) (Sheets 1 and 2), proceed as follows:
(a)Insert male splined connection into screwjack 6 such that locking pin holes are correctly positioned to align with holes in APPU.
(b)Install APPU Adaptor (Ref. 27-86-12, P. Block 401).
(c)Install APPU (Ref. 27-86-11, P. Block 401).

(9)For type J & K shafts/torsion dampers (Ref. Fig. 401) (Sheets 1 and 2), proceed as follows:
(a)Insert outboard universal joint in system torque limiter input connection, making certain that securing pin holes are aligned.
(b)Install pin (8) and secure with retaining spring (7).
(c)Insert inboard universal joint assembly in splined connection such that splitter flange bolt holes are correctly aligned for installation of torsion damper.
(d)Install torsion damper, complete with plain section of shaft (type J only), secure with bolts (17) and nuts (16).
(e)TORQUE nuts (16) to between 13 Nm and 15 Nm (115 and 133 lbf.in.).
(f)Apply corrosion preventive (Material No. 05-005) to nuts (16) and bolts (17).

(10)At all positions where shafts have been replaced, make certain that indicator groove on sliding splined connections is not visible, indicating adequate engagement, and that clearances as detailed below are obtained (Ref. Fig. 401) (Sheet 3).
shaft 5409 (5459) dimension 'z' shaft 5407 (5457) dimension 'y'

shaft 5405 (5455) dimension 'v' shaft 5403 (5453) dimension 'w'
shaft 5401 (5451) dimension 'x' shaft 5399 (5449) dimension 'y'
shaft 5397 (5447) dimension 'u' shaft 5395 (5445) dimension 'u'
shaft 5393 (5443) dimension 'x' shaft 5343 (5441) dimension 'y'
shaft 5341 (5439) dimension 't' shaft 5289 (5437) dimension 'x'
shaft 5287 (5435) dimension 'y' shaft 5285 (5433) dimension 't'
shaft 5283 (5431) dimension 't' shaft 5281 (5429) dimension 'x'
shaft 5279 (5427) dimension 'y' shaft 5277 (5425) dimension 'x'
shaft 5275 (5423) dimension 's'

The values for the above dimensions are as follows:
dimension 's' 17.5 mm (0.69 in.) max., 3.5 mm (0.138 in.) min.
dimension 't' 2.5 mm (0.098 in.) min.
dimension 'u' 2.5 mm (0.098 in.) min.
dimension 'v' 11.8 mm (0.464 in.) min.
dimension 'w' 11.8 mm (0.464 in.) min.
dimension 'x' 12.5 mm (0.492 in.) min.
dimension 'y' 12.5 mm (0.492 in.) min.
dimension 'z' 24.2 mm (0.953 in.) min.

(11)Remove slat drive shaft locking device PN 98A27808007000.
(12)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
(13)Remove safety guard from flap/slat control lever quadrant.

E. Test

(1)Carry out operational test of slat system (Ref. 27-84-00, P. Block 501).

F. Close-Up

(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)For transmission shafts located in the wings , proceed as follows:
(a)Close access doors opened at step 2.A.(3)(b).
(b)Remove access platform.
(3)For transmission shafts located in the fuselage, proceed as follows:
(a)Close access doors 512BB (612BB) and 147BZ.
(b)Close main gear main door (Ref. 32-12-11, P. Block 301).

TRANSMISSION SHAFTS (5265 THRU 5289, 5341, 5343, 5393 THRU 5409, 5419 THRU 5459) (ODD NUMBERS ONLY)) - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Slat Drive Transmission Shafts-General Check

A. Reason for the Job

(1)General visual inspection of transmission shafts.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3 to 5 m (10 to 16 ft.)
(2)	Circuit Breaker Safety Clips and Tags
Referenced Procedures	
- 06-41-57, P. Block 1	Wings - General
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure

(1)Job Set-Up

(a)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY	9CV	335/R66

(b)Position access platform.
(c)Open all access panels in wings below the slat transmission system (Ref. 06-41-57, P. Block 1).
(d)Open main gear doors (Ref. 32-12-11, P. Block 301).
(e)Open access panel 147BZ.

(2)Inspection
(a)Inspect slat drive shafts, make certain that there is no corrosion, cracks, bending or other damage.
(b)Make certain that there is adequate clearance between slat drive shafts and aircraft structure, components cables and pipes.

(d)Make certain that all nuts, bolts are secured and that all safetying devices are intact.

(3)Close-Up
(a)Close access panel 147BZ.
(b)Close main gear doors (Ref. 32-12-11, P. Block 301).
(c)Close access panels in wing.
(d)Remove access platforms.
(e)Remove tags and safety clips and close circuit breakers 9CV, 8CV, 7CV.

SCREWJACKS 1 THRU 4 (5276, 5280, 5288, 5344, 5424, 5428, 5436, 5442) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platforms, 2 to 5.2 m (6.6 to 17 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27804000000	Extractor - Gimbal Pin - Slat Jack Attachment
	D. 98A27808003000	Drive Tool - Slat Torque Shaft
	E. 98A27808007000	Locking Device - Slat Drive Shaft
	F. LL517A034	Alignment Plug
	G.	Torque Wrench, 10.2 to 12.4 Nm (7.5 to 9.1 lbf.ft.)
	H.	Safety Barriers
	I.	Wiper Rings
	J.	Cotter Pins
	K.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	L.	Circuit Breaker Safety Clips and Tags
	M. Material No. 04-004	Common Greases (Ref. 20-31-00)
	N. Material No. 05-005	Special Materials (Ref. 20-31-00)
	O. Material No. 09-015	Sealants (Ref. 20-31-00)
	P. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

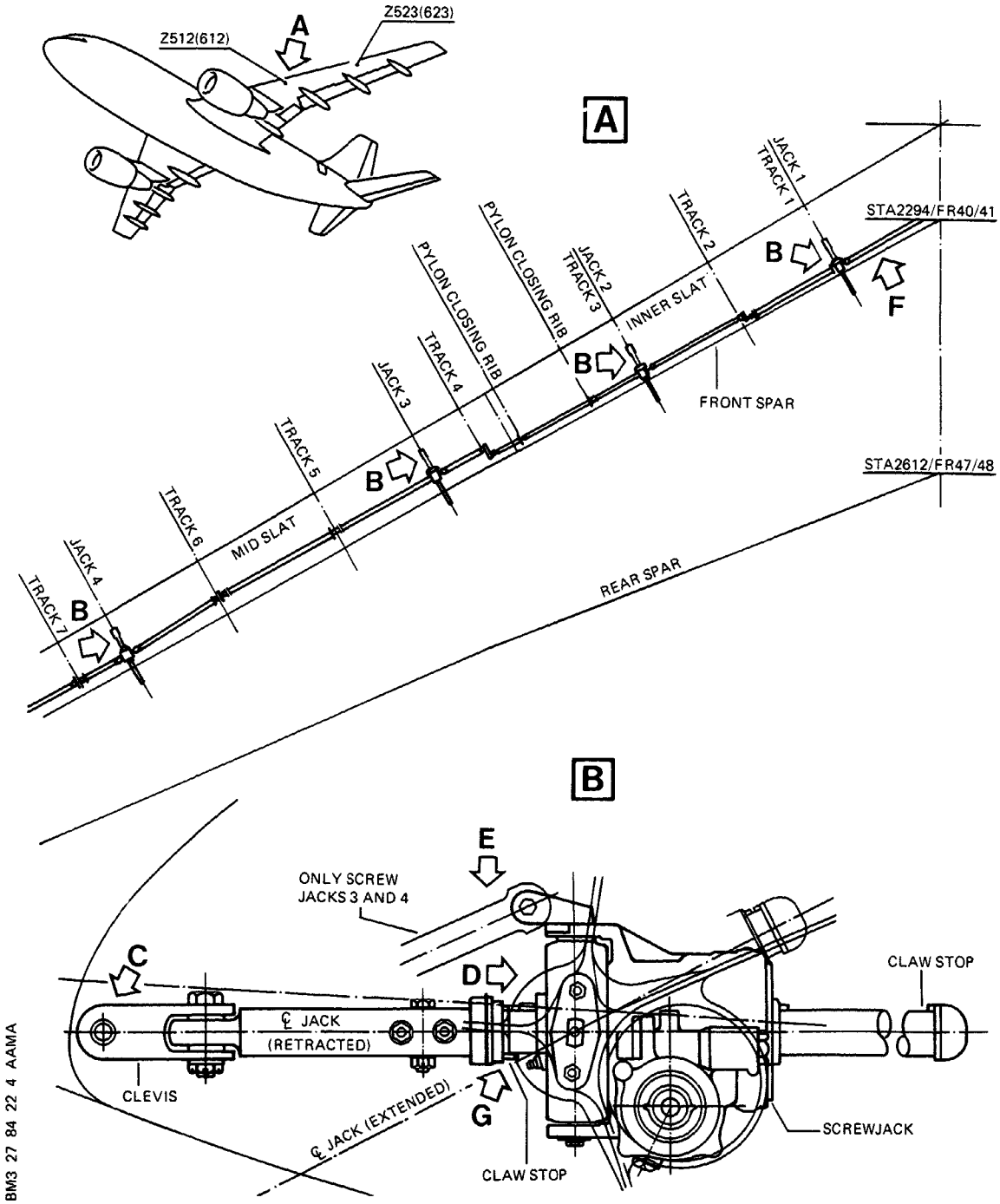
Referenced Procedures

- 12-13-27, P. Block 1	Flight Controls Replenishing
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)

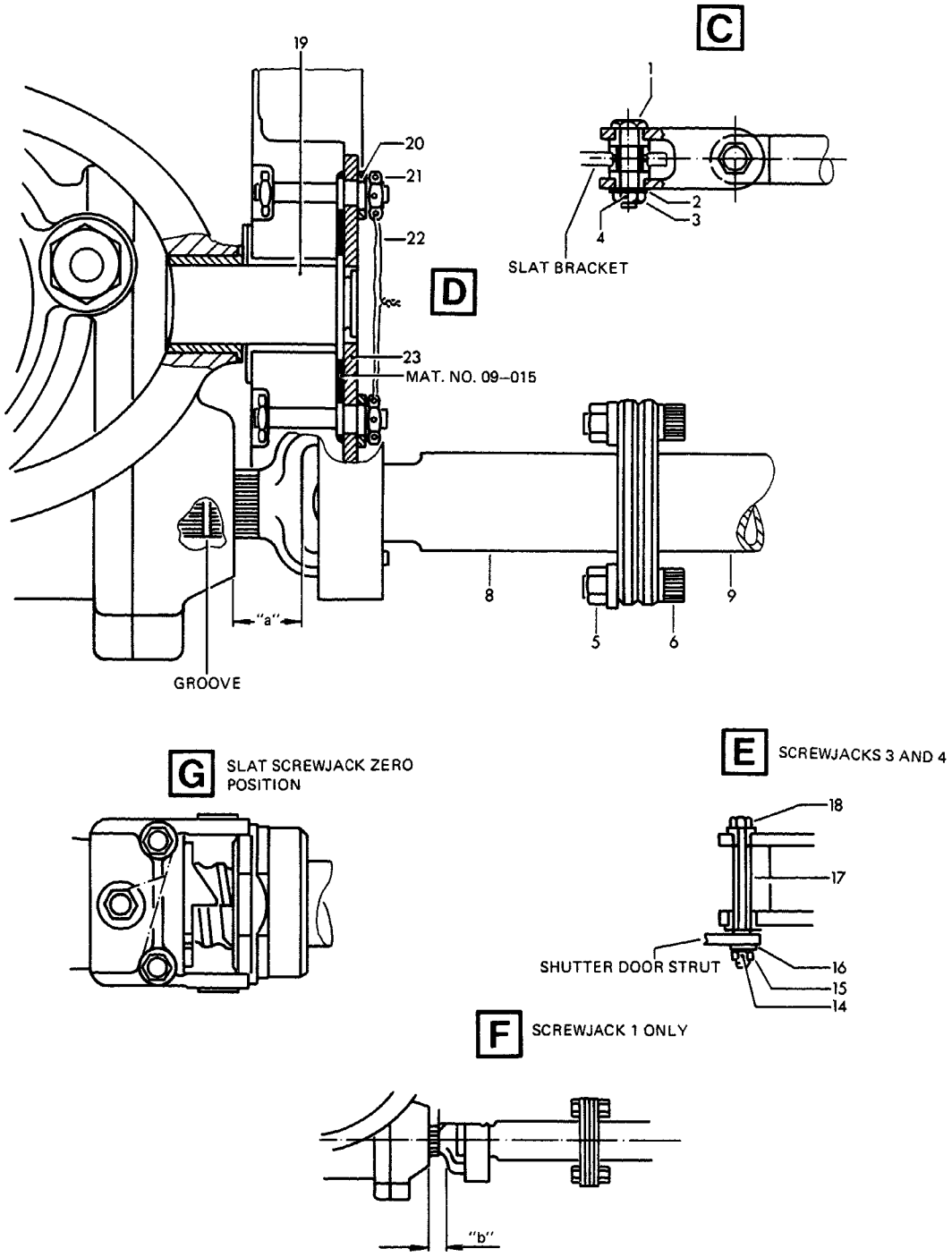
2. Procedure

(Ref. Fig. 401) (Sheet 1/2)
(Ref. Fig. 401) (Sheet 2/2)

A. Job Set-Up
(1)Position safety barriers.



Screwjacks 1 thru 4
Sheet 1/2
Figure 401



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Screwjacks 1 thru 4
Sheet 2/2
Figure 401

(2)Extend slats to 30° position (Ref. 27-80-00, P. Block 301).
(3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

(5)Position access platform.
(6)Open access doors:
Screwjack 1 - 512BB (612BB), 512CB (612CB), 512DB (612DB)
Screwjack 2 - 512GB (612GB), 512HB (612HB), 512JB (612JB)
Screwjack 3 - 523CB (623CB), 523DB (623DB), 523EB (623EB)
Screwjack 4 - 523JB (623JB), 523KB (623KB), 523LB (623LB)
(7)Only applicable to screwjacks 3 and 4:
Remove screws and angles below access doors 523DB (623DB) and 523KB (623KB).

B. Removal

NOTE : Removal/Installation procedures of screwjack 3 are described in this Page Block. Procedures for screwjacks 1, 2 and 4 are similar except where otherwise stated.

(1)Install locking device PN 98A27808007000 outboard of screwjack to be removed.
(2)Support slat to avoid movement after disconnection of screwjack.
(3)Measure and record extension of screwjack to facilitate reassembly.
R (4)Make sure tht there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can
R move the transmission shafts with your hands.
R (5)Remove nuts (5) and bolts (6) from connections universal joints (8)/ torque shafts (9).
R (6)Support torque shafts (9) and carefully separate flanges of universal joints (8) and torque shafts (9); withdraw universal joints (8) from screwjack.
R (7)Support torque shaft (9) from adjacent structure with lockwire.
R (8)Remove and discard cotter pin (4); remove nuts (3), washer (2) and bolt (1); separate clevis from slat structure.
R (9)Only applicable to screwjacks 3 and 4:
Remove and discard cotter pin (14); remove nut (15), washer (16), bolt (18), sleeve (17) and disconnect shutter door strut from screwjack.
R (10)Cut and remove lockwire (22) at screwjack mountings.
R (11)Remove nuts (21), washers (20) and clamping plates (23).
R (12)Support screwjack and carefully remove gimbal pins (19) using extractor PN 98A27804000000.
R (13)Remove screwjack.

C. Preparation of Replacement Component

(1)A felt wiper ring is installed in the screwjack transmission splined connections. Whenever a connection is broken, the wiper ring is to be discarded and after cleaning the splined surfaces with white spirit (Material No. 11-002) a new wiper ring is to be installed using alignment plug PN LL517A034.

D. Installation

(1)Make sure that screwjack is in fully extended position.
NOTE : For rotation of screwjack the drive tool PN 98A27808003000 may be used.
(2)Position screwjack between mountings and install gimbal pins (19).
(3)Apply sealant (Material No. 09-015) to close gap between gimbal pin (19) and mounting.
(4)Install clamping plates (23), washers (20) and nuts (21).
(5)Safety nuts with lockwire (22).
(6)Seal attachment parts with corrosion preventive (Material No. 05-005).
(7)Set extension of screwjack to that recorded during removal.
(8)Align clevis with slat bracket, and install bolt (1), washer (2) and nut (3).
(9)Safety nut (3) with cotter pin. Seal exposed nuts and bolts with corrosion preventive (Material No. 05-005).
(10)Apply synthetic grease (Material No. 04-004) to splined end of universal joints (8).
(11)Align holes in flange of universal joints (8) with holes in flange of torque shafts (9) and install universal joints (8) in screwjack.
(12)Make sure that indicator groove is not visible and check dimension 'a' for minimum gap of not less than 12.5 mm (0.49 in.). Check dimension 'b' (screwjack 1 only) is between 3.5 and 17.5 mm (0.14 and 0.69 in.).
(13)Cut and remove supporting lockwire, support torque shaft (9) by hand and install bolts (6) and nuts (5). Do not tighten nuts (5) at this stage.
(14)Only applicable to screwjacks 3 and 4:
Position shutter door strut to screwjack hinge and install sleeve (17), bolt (18), washer (16) and nut (15). Safety nut (15) with cotter pin (14).
(15)Remove locking device PN 98A27808007000 from torque shaft.
(16)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
(17)Remove safety guard from flap/slat control lever quadrant.
(18)Retract slats to zero position (Ref. 27-80-00, P. Block 301).
(19)Check that distance between claw stops on screwnut and on screwjack housing is:
- 180 ±15° on screwjacks 1 and 2
- 270 ±15° on screwjacks 3 and 4
(slat screwjack zero position).
If necessary, adjust as follows:
(a)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
(b)Install safety guard on flap/slat control lever quadrant.
(c)Reinstall locking device PN 98A27808007000.
(d)Remove nuts (5) and bolts (6) from torque shafts (9).
(e)By rotating universal joints adjust screwjacks as follows:
- screwjacks 1 and 2 to 180±15°

- screwjacks 3 and 4 to 270±15°

(f)Align holes in flange of universal joints (8) with holes in flange of torque shafts (9) and install bolts (6) and nuts (5).

NOTE : If the holes in flanges of torque shafts do not align with those in the universal joints, withdraw universal joints, displace it by the required number of teeth until holes in flanges are aligned.

(g)Remove locking device PN 98A27808007000.

(20)If not performed in step (19) proceed as follows:

(a)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.

(b)Install safety guard on flap/slat control lever quadrant.

(21)Torque nuts (5) to between 10.2 and 12.4 Nm (7.5 and 9.1 lbf.ft.).

(22)Seal exposed nuts and bolts with corrosion preventive (Material No. 05-005).

(23)Lubricate ball screw assembly with synthetic grease (Material No. 04-004).

(24)Check that screwjack oil level is correct (Ref. 12-13-27, P. Block 1).

E. Test

(1)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.

(2)Remove safety guard from flap/slat control lever quadrant.

(3)Perform an operational test of slat system (Ref. 27-84-00, P. Block 501).

F. Close-Up

(1)Only applicable to screwjacks 3 and 4:
Install screws and angles below access doors 523DB (623DB) and 523KB (623KB).

(2)Make sure that work area is clean and clear of tools and miscellaneous items of equipment.

(3)Close access doors:
Screwjack 1 - 512BB (612BB), 512CB (612CB), 512DB (612DB)
Screwjack 2 - 512GB (612GB), 512HB (612HB), 512JB (612JB)
Screwjack 3 - 523CB (623CB), 523DB (623DB), 523EB (623EB)
Screwjack 4 - 523JB (623JB), 523KB (623KB), 523LB (623LB)

(4)Remove safety barriers.

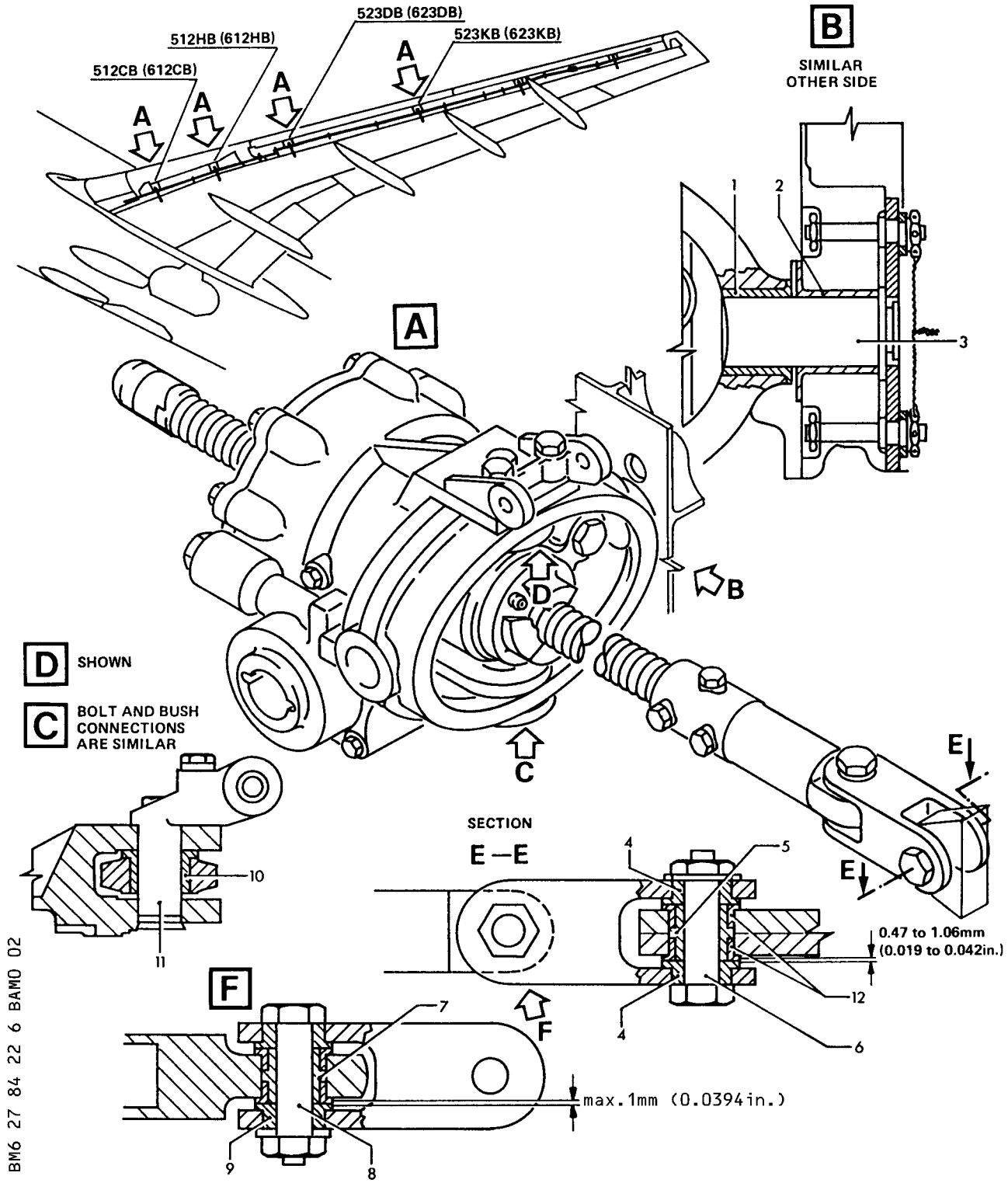
(5)Remove access platform.

1. Reason for the Job

A. Check of Fits and Clearances after Removal

Table of Fits and Clearances
(Ref. Fig. 601)

	Detail and item No.	Original Mfg Limits: Dimension mm (in.) Min.	Original Mfg Limits: Dimension mm (in.) Max.	Original Mfg Limits: Assy. Clearance mm (in.) Min.	Original Mfg Limits: Assy. Clearance mm (in.) Max.	In-Service Wear Limits: Dimension Limits mm (in.) Min.	In-Service Wear Limits: Dimension Limits mm (in.) Max.	In-Service Wear Limits: Max. Allow. clear mm(in.)
	B ID 1	19.070 (0.7507)	19.100 (0.7519)				19.162 (0.7544)	
				0.027 (0.0014)	0.070 (0.0027)			0.191 (0.0075)
	OD 3	19.030 (0.7492)	19.043 (0.7497)			18.971 (0.7469)		
	B ID 2	19.050 (0.7500)	19.083 (0.7513)				19.129 (0.7531)	
				0.007 (0.0003)	0.053 (0.0021)			0.140 (0.0055)
	OD 3	19.030 (0.7492)	19.043 (0.7497)			18.989 (0.7476)		
	E-E ID 4	12.700 (0.5000)	12.718 (0.5007)				12.751 (0.5020)	
R R				0.013 (0.0005)	0.043 (0.0017)			0.089 (0.0035)
	OD 6	12.675 (0.4990)	12.687 (0.4995)			12.662 (0.4985)		
	E-E ID 5	12.700 (0.5000)	12.718 (0.5007)				12.751 (0.5020)	
				0.013 (0.0005)	0.043 (0.0017)			0.089 (0.0035)
	OD 6	12.675 (0.4990)	12.687 (0.4995)			12.662 (0.4985)		



Slat Screwjacks 1 thru 4
Figure 601

R

	Detail and item No.	Original Mfg Limits: Dimension mm Min.	Original Mfg Limits: Dimension mm Max.	Original Mfg Limits: Assy. Clearance mm Min.	Original Mfg Limits: Assy. Clearance mm Max.	In-Service Wear Limits: Dimension Limits mm Min.	In-Service Wear Limits: Dimension Limits mm Max.	In-Service Wear Limits: Max. Allow. clear mm(in.)
		(in.)	(in.)	(in.)	(in.)	(in.)	(in.)	
	E-E							
	ID 12	15.893 (0.6257)	15.918 (0.6267)				15.982 (0.6292)	
R R				0.034 (0.0013)	0.068 (0.0027)			0.191 (0.0075)
	OD 5	15.849 (0.6240)	15.859 (0.6244)			15.791 (0.6217)		
	F							
	ID 7	12.700 (0.5000)	12.718 (0.5007)			12.700 (0.5000)	12.803 (0.5040)	
				0.013 (0.0005)	0.043 (0.0017)			0.250 (0.001)
	OD 8	12.675 (0.7990)	12.687 (0.4994)			12.583 (0.4954)	12.687 (0.4994)	
	F							
	ID 9	12.700 (0.5000)	12.718 (0.5007)			12.700 (0.5000)	12.803 (0.5040)	
				0.013 (0.0005)	0.043 (0.0017)			0.250 (0.001)
	OD 8	12.675 (0.7990)	12.687 (0.4994)			12.583 (0.4954)	12.687 (0.4994)	
	C,D							
	ID 10	15.006 (0.5907)	15.033 (0.5918)			15.006 (0.5907)	15.140 (0.5960)	
R R				0.0060 (0.00023)	0.044 (0.0017)			0.250 (0.001)
R R	OD 11	14.989 (0.5901)	15.000 (0.5906)			14.890 (0.5862)	15.000 (0.5906)	

SCREWJACKS 5 AND 6 (5400, 5408, 5450, 5458) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 2 to 5.2 m (6.6 to 17 ft.)
R	B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	C. 98A27804000000	Extractor - Gimbal Pin - Slat Jack Attachment
	D. 98A27808003000	Drive Tool - Slat Torque Shaft
	E. 98A27808007000	Locking Device - Slat Drive Shaft
	F. LL517A034	Alignment Plug
	G.	Torque Wrench, 10.2 to 12.4 Nm (7.5 to 9.1 lbf.ft.)
	H.	Safety Barriers
	I.	Wiper Rings
	J.	Cotter Pins
	K.	Circuit Breaker Safety Clips and Tags
	L.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	M. Material No. 04-004	Common Greases (Ref. 20-31-00)
	N. Material No. 05-005	Special Materials (Ref. 20-31-00)
	O. Material No. 09-015	Sealants (Ref. 20-31-00)
	P. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

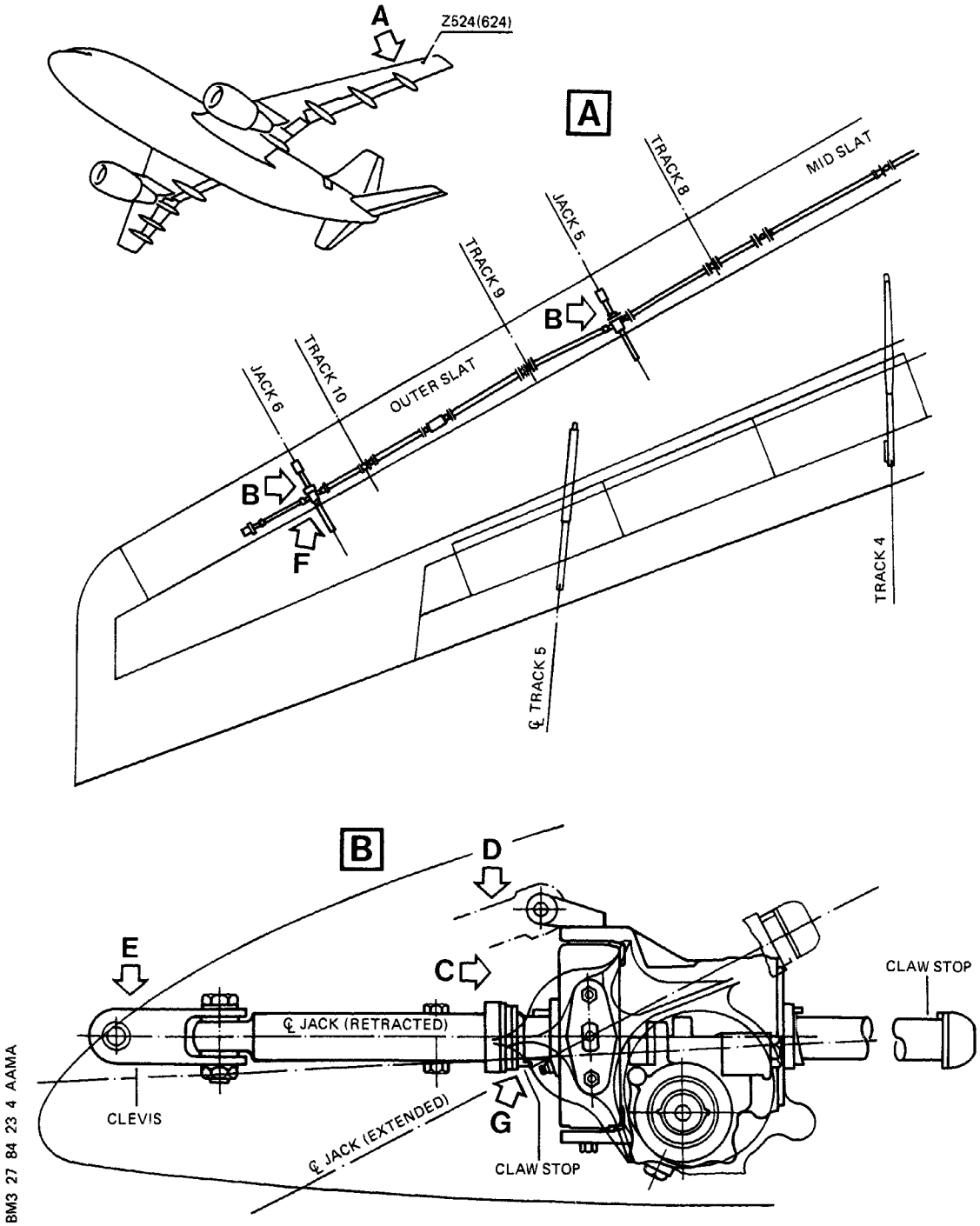
Referenced Procedures

- 12-13-27, P. Block 1	Flight Controls Replenishing
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 27-86-11, P. Block 401	Asymmetry Position Pick-Off Unit
- 27-86-12, P. Block 401	Asymmetry Position Pick-Off Unit Adapter

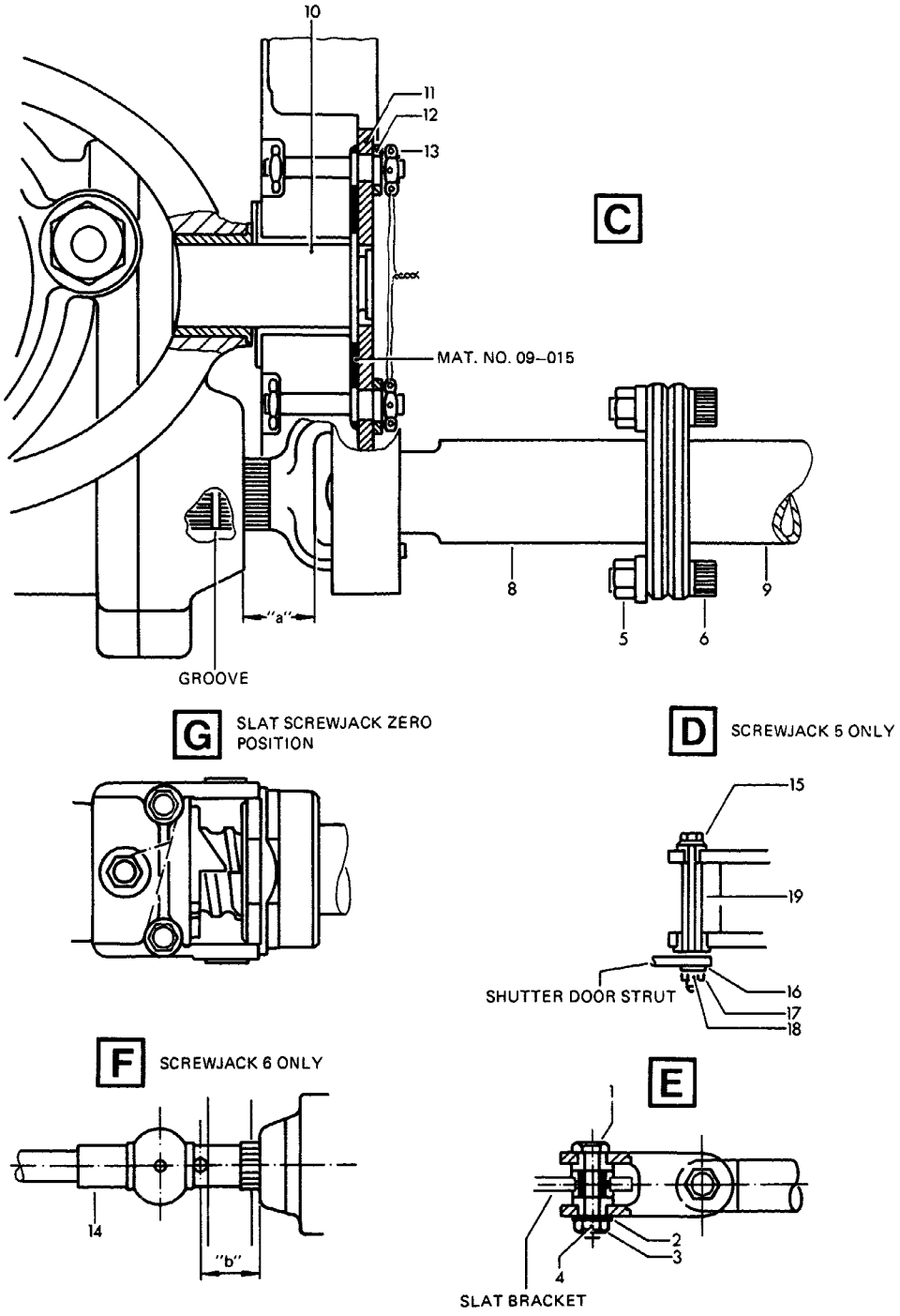
2. Procedure

(Ref. Fig. 401) (Sheet 1/2)
(Ref. Fig. 401) (Sheet 2/2)

A. Job Set-Up



Screwjacks 5 and 6
Sheet 1/2
Figure 401



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Screwjacks 5 and 6
Sheet 2/2
Figure 401

(1)Position safety barriers.
(2)Extend slats to 30° position (Ref. 27-80-00, P. Block 301).
(3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

(5)Position access platform.
(6)Open access doors:
Screwjack 5 - 524CB (624CB), 524DB (624DB), 524EB (624EB)
Screwjack 6 - 524HB (624HB), 524JB (624JB), 524KB (624KB)
(7)Remove screws and angles below access doors 524DB (624DB) and 524JB (624JB).

B. Removal

NOTE : Removal/Installation procedures for screwjack 5 are described in this Page Block. Procedures for screwjack 6 are similar except where otherwise stated.

(1)Install locking device PN 98A27808007000 for removal of screwjack 5 between tracks 9 and 10.

NOTE : Installation of the locking device for removal of screwjack 6 is not necessary.

(2)Support slat to avoid movement after disconnection of screwjack.
(3)Measure and record extension of screwjack to facilitate reassembly.
R (4)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you
R can move the transmission shafts with your hands.
R (5)Applicable to screwjack 6 only:
(a)Remove asymmetry position pick-off unit (Ref. 27-86-11, P. Block 401) and asymmetry position pick-off unit adapter (Ref. 27-86-12, P. Block 401).
(b)Remove torque shaft (14) from screwjack.
R (6)Remove nuts (5) and bolts (6) from connections universal joints (8)/ torque shafts (9).
R (7)Support torque shafts (9) and carefully separate flanges of universal joints (8) and torque shafts (9); withdraw universal joints (8) from screwjack.
R (8)Support torque shafts (9) from adjacent structure with lockwire.
R (9)Remove and discard cotter pin (4); remove nut (3), washer (2) and bolt (1); separate clevis from slat structure.
R (10)Applicable to screwjack 5 only:
(a)Remove and discard cotter pin (18); remove nut (17), washer (16), bolt (15), sleeve (19) and disconnect shutter door strut from screwjack.
R (11)Cut and remove lockwire at screwjack mountings.

R (12)Remove nuts (13), washers (12) and clamping plates (11).
R (13)Support screwjack and carefully remove gimbal pins (10) using extractor PN 98A27804000000.
R (14)Remove screwjack.

C. Preparation of Replacement Component
(1)A felt wiper ring is installed in the screwjack transmission splined connections. Whenever a connection is broken, the wiper ring is to be discarded and after cleaning the splined surfaces with white spirit (Material No. 11-002) a new wiper ring is to be installed using alignment plug PN LL517A034.

D. Installation
(1)Make sure that screwjack is in fully extended position.
NOTE : For rotation of screwjack the drive tool PN 98A27808003000 may be used.
(2)Position screwjack between mountings and install gimbal pins (10).
(3)Apply sealant (Material No. 09-015) to close gap between gimbal pin (10) and mounting.
(4)Install clamping plates (11), washers (12) and nuts (13).
(5)Safety nuts with lockwire.
(6)Seal attachment parts with corrosion preventive (Material No. 05-005).
(7)Set extension of screwjack to that recorded during removal.
(8)Align clevis with slat bracket, and install bolt (1), washer (2) and nut (3).
(9)Safety nut (3) with cotter pin (4). Seal exposed nuts and bolts with corrosion preventive (Material No. 05-005).
(10)Apply synthetic grease (Material No. 04-004) to splined connections.
(11)Applicable to screwjack 6 only:
(a)Install torque shaft (14) to screwjack.
(b)Make sure that indicator groove is not visible and check dimension 'b' for minimum gap of not less than 24.2 mm (0.95 in.).
(c)Install assymmetry position pick-off unit adapter (Ref. 27-86-12, P. Block 401) and asymmetry position pick-off unit (Ref. 27-86-11, P. Block 401).
(12)Align holes in flange of universal joints (8) with holes in flange of torque shafts (9) and install universal joints (8) in screwjack.
(13)Make sure that indicator groove is not visible and check dimension 'a' for minimum gap of not less than 12.5 mm (0.49 in.).
(14)Cut and remove supporting lockwire, support torque shaft (9) by hand and install bolts (6) and nuts (5). Do not tighten at this stage.
(15)Applicable to screwjack 5 only:
(a)Position shutter door strut to screwjack hinge and install sleeve (19), bolt (15), washer (16) and nut (17). Safety nut (17) with cotter pin (18).
(16)Remove locking device PN 98A27808007000 from torque shaft.
(17)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
(18)Remove safety guard from flap/slat control lever quadrant.
(19)Retract slats to zero position (Ref. 27-80-00, P. Block 301).
(20)Applicable to screwjack 5 only:
(a)Check that distance between claw stops on screw nut and on screwjack

housing is 270 ±15° (slat screwjack zero position). If necessary adjust as follows:

1 Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
2 Install safety guard on flap/slat control lever quadrant.
3 Reinstall locking device PN 98A27808007000.
4 Remove nuts (5) and bolts (6) from torque shafts (9).
5 Adjust distance between claw stops to 270 ±15° by rotating universal joints.
6 Align holes in flange of universal joints (8) with holes in flange of torque shaft (9) and install bolts (6) and nuts (5).
NOTE : If the holes in flanges of torque shafts do not align with those in the universal joints, withdraw universal joints, displace them by the required number of teeth until holes in flanges are aligned.
7 Remove locking device PN 98A27808007000.

(21)Applicable to screwjack 6 only:
(a)Check that distance between claw stops on screw nut and on screwjack housing is 270 ±15° (slat screwjack zero position). If necessary adjust as follows:

1 Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
2 Install safety guard on flap/slat control lever quadrant.
3 Remove asymmetry position pick-off unit (Ref. 27-86-11, P. Block 401).
4 Remove nuts (5) and bolts (6) from torque shaft (9).
5 Adjust distance between claw stops to 270 ±15° by rotating universal joint (8).
6 Align holes in flange of universal joint (8) with holes in flange of torque shaft (9) and install bolts (6) and nuts (5).
NOTE : If the holes in flange of torque shaft do not align with those in universal joint, withdraw universal joint, displace it by the required number of teeth until holes in flanges are aligned.
7 Install asymmetry position pick-off unit (Ref. 27-86-11, P. Block 401).

(22)If not performed in steps (20) or (21) proceed as follows:
(a)Open, safety and tag circuit breakers 7CV, 8CV and 9CV.
(b)Install safety guard on flap/slat control lever quadrant.
(23)TORQUE nuts (5) to between 10.2 and 12.4 Nm (7.5 and 9.1 lbf.ft.)
(24)Seal exposed nuts and bolts with corrosion preventive (Material No. 05-005).
(25)Lubricate ball screw assembly with synthetic grease (Material No. 04-004).
(26)Check that screwjack oil level is correct (Ref. 12-13-27, P. Block 1).

E. Test
(1)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.
(2)Remove safety guard from flap/slat control lever quadrant.
(3)Perform an operational test of slat system (Ref. 27-84-00, P. Block 501).

F. Close-Up

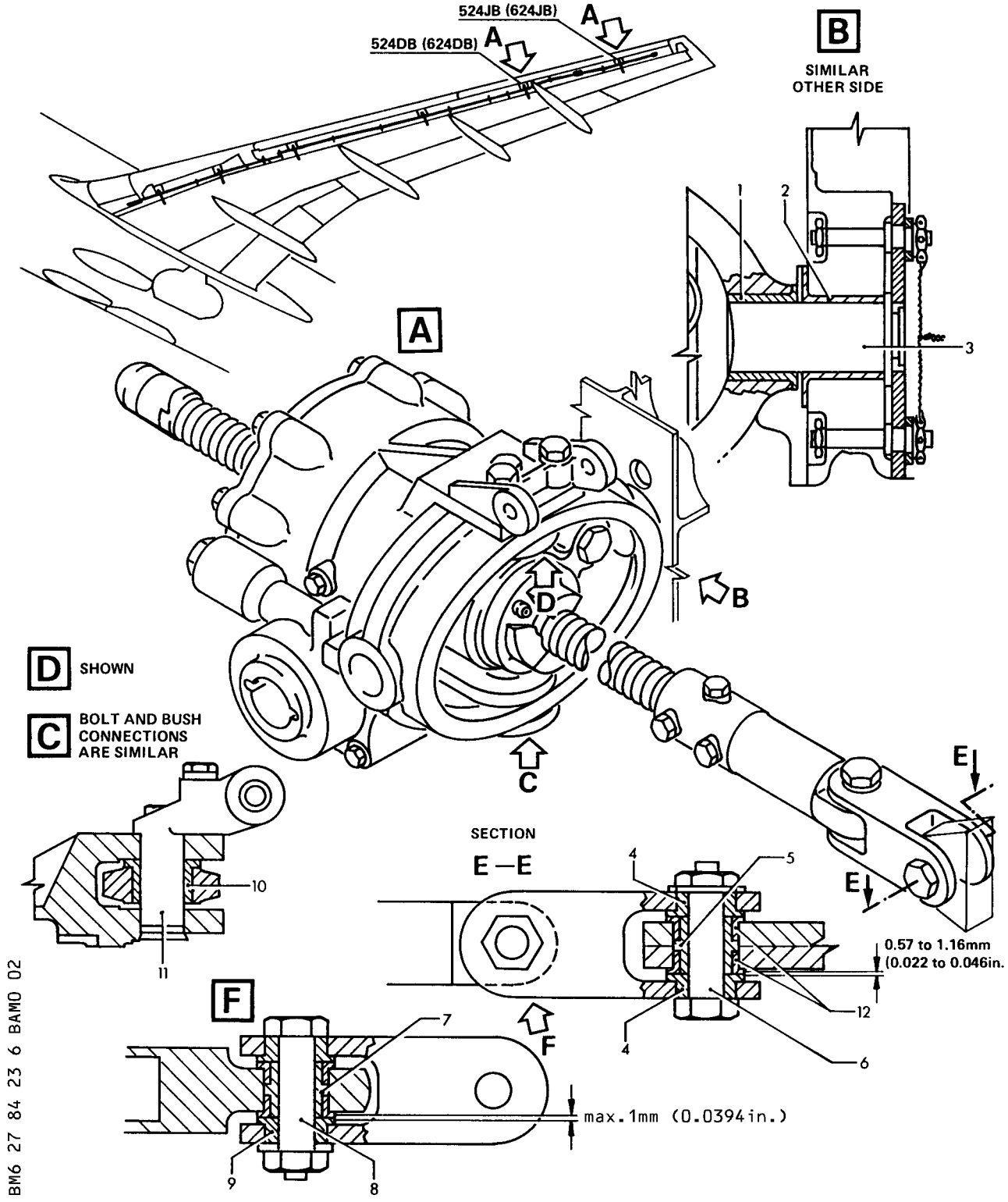
(1)Install screws and angles below access doors 524DB (624DB) and 524JB (624JB).
(2)Make sure that work area is clean and clear of tools and miscellaneous items of equipment.
(3)Close access doors:
Screwjack 5 - 524CB (624CB), 524DB (624DB), 524EB (624EB)
Screwjack 6 - 524HB (624HB), 524JB (624JB), 524KB (624KB)
(4)Remove safety barriers.
(5)Remove access platform.

1. Reason for the Job

A. Check of Fits and Clearances after Removal

Table of Fits and Clearances
(Ref. Fig. 601)

Detail and item No.	Original Mfg Limits				In-Service Wear Limits		
	Dimension mm (in.)		Assy. Clearance mm (in.)		Dimension Limits mm (in.)		Max. Allow. clear mm(in.)
	Min.	Max.	Min.	Max.	Min.	Max.	
B ID 1	19.070 (0.7507)	19.100 (0.7519)				19.162 (0.7544)	
			0.027 (0.0014)	0.070 (0.0027)			0.191 (0.0075)
OD 3	19.030 (0.7492)	19.043 (0.7497)			18.971 (0.7469)		
B ID 2	19.050 (0.7500)	19.083 (0.7513)				19.129 (0.7531)	
			0.007 (0.0003)	0.053 (0.0021)			0.140 (0.0055)
OD 3	19.030 (0.7492)	19.043 (0.7497)			18.989 (0.7476)		
E-E ID 4	12.700 (0.5000)	12.718 (0.5007)				12.751 (0.5020)	
			0.013 (0.0005)	0.043 (0.0017)			0.089 (0.0035)
OD 6	12.675 (0.4990)	12.687 (0.4995)			12.662 (0.4985)		
E-E ID 5	12.700 (0.5000)	12.718 (0.5007)				12.751 (0.5020)	
			0.013 (0.0005)	0.043 (0.0017)			0.089 (0.0035)
OD 6	12.675 (0.4990)	12.687 (0.4995)			12.662 (0.4985)		



Slat Screwjacks 5 and 6
Figure 601

R

	Detail and item No.	Original Mfg Limits: Dimension mm Min.	Original Mfg Limits: Dimension mm Max.	Original Mfg Limits: Assy. Clearance mm Min.	Original Mfg Limits: Assy. Clearance mm Max.	In-Service Wear Limits: Dimension Limits mm Min.	In-Service Wear Limits: Dimension Limits mm Max.	In-Service Wear Limits: Max. Allow. clear mm(in.)
	E-E							
	ID 12	15.893 (0.6257)	15.918 (0.6267)				15.982 (0.6292)	
R R				0.034 (0.0013)	0.068 (0.0027)			0.191 (0.0075)
	OD 5	15.849 (0.6240)	15.859 (0.6244)			15.791 (0.6217)		
	F							
	ID 7	12.700 (0.5000)	12.718 (0.5007)			12.700 (0.5000)	12.803 (0.5040)	
				0.013 (0.0005)	0.043 (0.0017)			0.250 (0.001)
	OD 8	12.675 (0.7990)	12.687 (0.4994)			12.583 (0.4954)	12.687 (0.4994)	
	F							
	ID 9	12.700 (0.5000)	12.718 (0.5007)			12.700 (0.5000)	12.803 (0.5040)	
				0.013 (0.0005)	0.043 (0.0017)			0.250 (0.001)
	OD 8	12.675 (0.7990)	12.687 (0.4994)			12.583 (0.4954)	12.687 (0.4994)	
	C,D							
	ID 10	15.006 (0.59079)	15.033 (0.5918)			15.006 (0.5907)	15.140 (0.5960)	
R R				0.0060 (0.00023)	0.044 (0.0017)			0.250 (0.001)
R R	OD 11	14.989 (0.5901)	15.000 (0.5906)			14.890 (0.5862)	15.000 (0.5906)	

SLAT PCU INTERMEDIATE GEARBOX - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
R	A. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	B.	Circuit Breaker Safety Clips and Tags
	C. Material No. 05-002	Special Materials (Ref. 20-31-00)
	D. Material No. 05-005	Special Materials (Ref. 20-31-00)
	E. Material No. 05-054	Special Materials (Ref. 20-31-00)
	F. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 27-81-19, P. Block 401	Feedback Position Pick-Off Unit
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 27-85-12, P. Block 401	Instrumentation Position Pick-Off Unit
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)

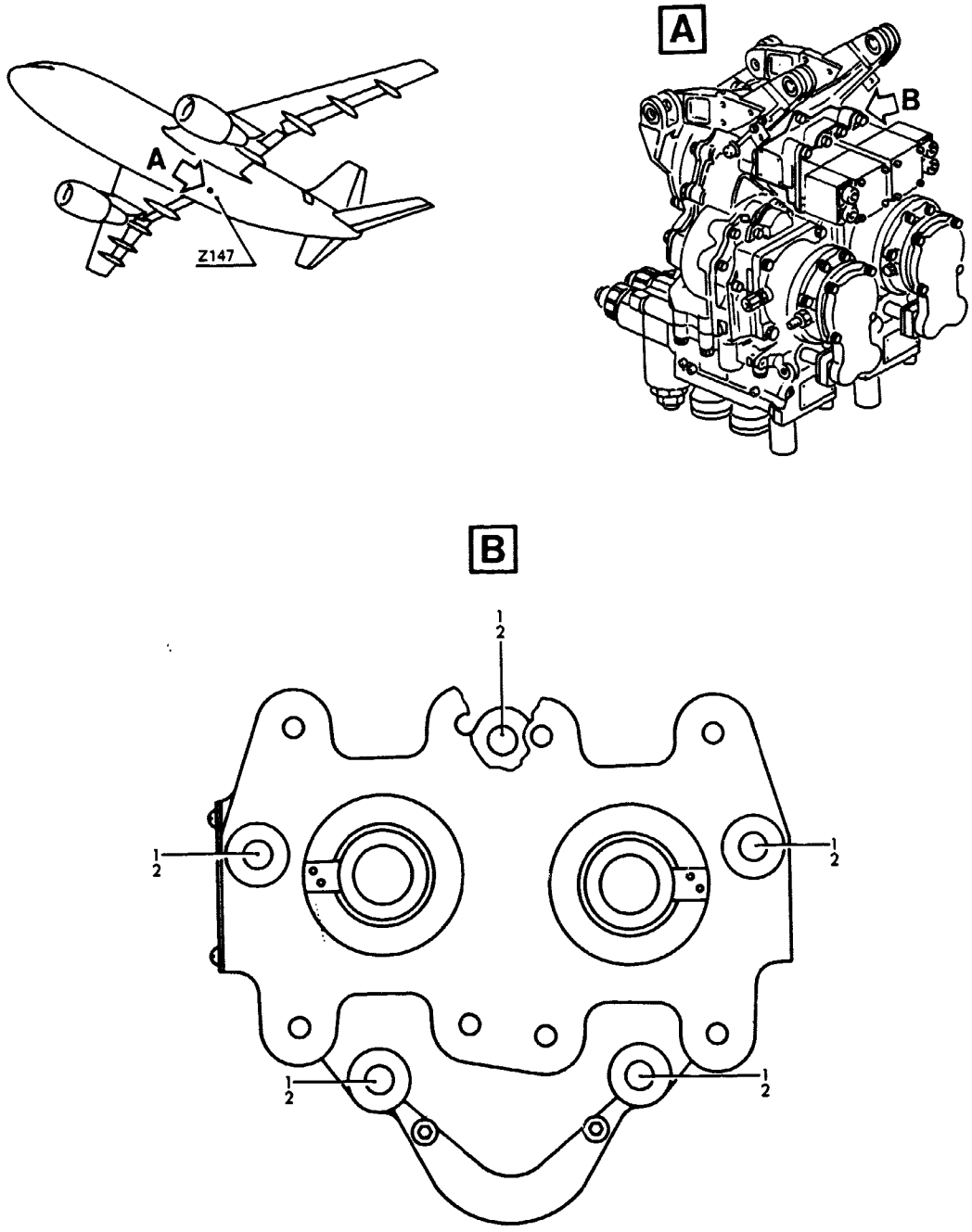
A. Job Set-Up

(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

R (2)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(3)Open LH main gear main door (Ref. 32-12-11, P. Block 301).



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Slat PCU Intermediate Gearbox
Figure 401

(4)Remove Instrumentation Position Pick-off Unit (IPPU) (Ref. 27-85-12, P. Block 401).
(5)Remove Feedback Position Pick-off Unit (FPPU) (Ref. 27-81-19, P. Block 401).

B. Removal
(1)Remove screws (1) washers (2) securing intermediate gearbox.
(2)Remove intermediate gearbox from PCU.

C. Preparation for Installation
(1)Using solvent (Material No. 11-004), remove all traces of anti-corrosion compound from PCU/intermediate gearbox mating surfaces.
(2)Apply anti-corrosion compound (Material No. 05-002) to threads of screws (1).
(3)Prepare a small quantity of a mixture comprising 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. 05-054).
NOTE : The above proportions are by weight.
(4)Apply a quantity of the mixture, prepared above, to the electrical bonding area on the intermediate gearbox/PCU mating surface.

D. Installation
(1)Position intermediate gearbox on PCU, secure with washers (2) and screws (1).
(2)TORQUE screws (1) to between 8.7 and 9.57 Nm (6.4 and 7.0 lbf.ft.).
(3)Apply corrosion preventive (Material No. 05-005) to screws (1).
(4)Install IPPU (Ref. 27-85-12, P. Block 401).
(5)Install FPPU (Ref. 27-81-19, P. Block 401).

E. Test
(1)Remove safety clips and tags and close circuit breakers 3CV, 4CV, 7CV, 8CV and 9CV.
(2)Remove safety guard from flap/slat control lever quadrant.
(3)Carry out operational test of slat system (Ref. 27-84-00, P. Block 501).

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close LH main gear main door (Ref. 32-12-11, P. Block 301).

SLAT PCU PRESSURE-OFF BRAKE - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A. 55638S0000	Extractor - Pressure Off Brake
B.	Torque Wrench, 8.7 to 9.6 Nm (77 to 85 lbf.in.)
C.	O-Rings
D.	Gasket
E. Material No. 03-003	Oils (Ref. 20-31-00)
F. Material No. 05-002	Special Materials (Ref. 20-31-00)
G. Material No. 05-054	Special Materials (Ref. 20-31-00)
H. Material No. 06-001	Lubricants (Ref. 20-31-00)
I. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 12-13-27, P. Block 1	Flight Controls Replenishing
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 27-84-34, P. Block 401	Slat PCU Hydraulic Motor
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open LH main gear door (Ref. 32-12-11, P. Block 301).

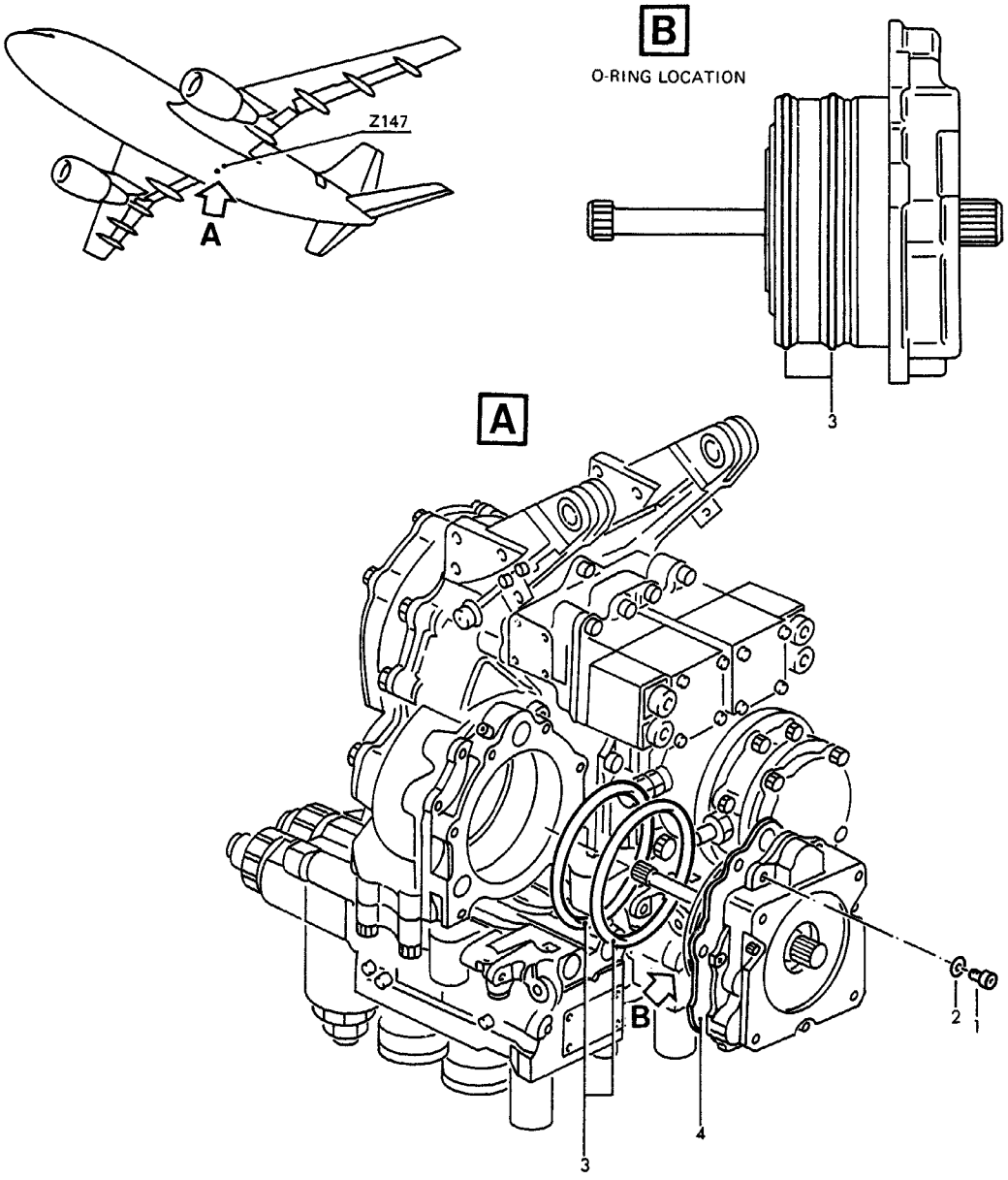
(2)Remove hydraulic motor associated with Pressure-Off Brake (POB) being removed (Ref. 27-84-34, P. Block 401).

(3)Drain lubricant from Power Control Unit (PCU) (Ref. 12-13-27, P. Block 1).

B. Removal

(1)Remove six screws (1) washers (2) securing POB.

(2)Install extractors in 2 hydraulic motor attaching bolt holes on POB and remove POB from PCU housing.



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Slat PCU Pressure-Off Brake
Figure 401

NOTE : Considerable force may be required to separate POB from PCU.

(3)Remove and discard O-rings (3) from POB.

(4)Remove and discard gasket (4) from between POB and PCU.

C. Preparation for Installation

(1)Using Material No. 11-004 remove all traces of jointing compound from mating surfaces of POB and PCU.

(2)Install new O-rings on POB and lubricate with oil (Material No. 03-003).

(3)Spray splined surfaces of POB input and output with lubricant (Material No. 06-001).

(4)Prepare a small quantity of a mixture comprising 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. 05-054) and apply it to the threads of screws (1).

NOTE : The above proportions are by weight.

D. Installation

(1)Position new gasket between POB and PCU, install POB, taking care not to displace O-rings; if necessary using extractors to aid installation.

NOTE : Some early POB/PCU gaskets were installed with a sealant coating, this is no longer necessary.

(2)Secure POB with washers (2) screws (1).

(3)TORQUE screws (1) to between 8.7 and 9.6 Nm (77 and 85 lbf.in.).

R (4)Repeat step (3) after 2 hours.

R (5)Install hydraulic motor (Ref. 27-84-34, P. Block 401).

R (6)Fill PCU with lubricant (Ref. 12-13-27, P. Block 1) and make certain there are no leaks from POB/PCU joint or PCU drain plug.

E. Test

(1)Carry out operational test (Ref. 27-84-00, P. Block 501) and additionally stop and restart the slats at a variety of selections checking that stopping and starting of slat system is accomplished without judder.

F. Close-Up

(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(2)Close main gear door (Ref. 32-12-11, P. Block 301).

SLAT PCU VALVE BLOCK 25CV, 26CV - REMOVAL/INSTALLATION

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1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.8 m (9 ft.).
B.	Torque Wrench, 2.2 to 2.43 Nm (20 to 22 lbf.in.)
C.	Torque Wrench, 2.8 to 3.1 Nm (25 to 27.5 lbf.in.)
D.	Torque Wrench, 16.6 to 18.2 Nm (12.25 to 13.4 lbf.ft.)
E.	Torque Wrench, 60 to 63 Nm (44.3 to 46.5 lbf.ft.)
F.	Torque Wrench, 90 to 94.5 Nm (66.6 to 69.5 lbf.ft.)
G.	Ohmmeter 0-20 milliohms
H.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
I.	Hydraulic Blanks and Plugs
J.	Electrical Connector Protective Caps
K.	Container for Collecting Spilt Fluid
L.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
M.	Circuit Breaker Safety Clips and Tags
N.	O-Rings
O. Material No. 05-002	Special Materials (Ref. 20-31-00)
P. Material No. 05-005	Special Materials (Ref. 20-31-00)
Q. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
R. Material No. 05-054	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 12-12-29, P. Block 1	Hydraulics
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 27-84-34, P. Block 401	Slat PCU Hydraulic Motor

- 29-10-00, P. Block 301 Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301 Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301 Main Gear Main Door - (Ground Door(s) Opening)

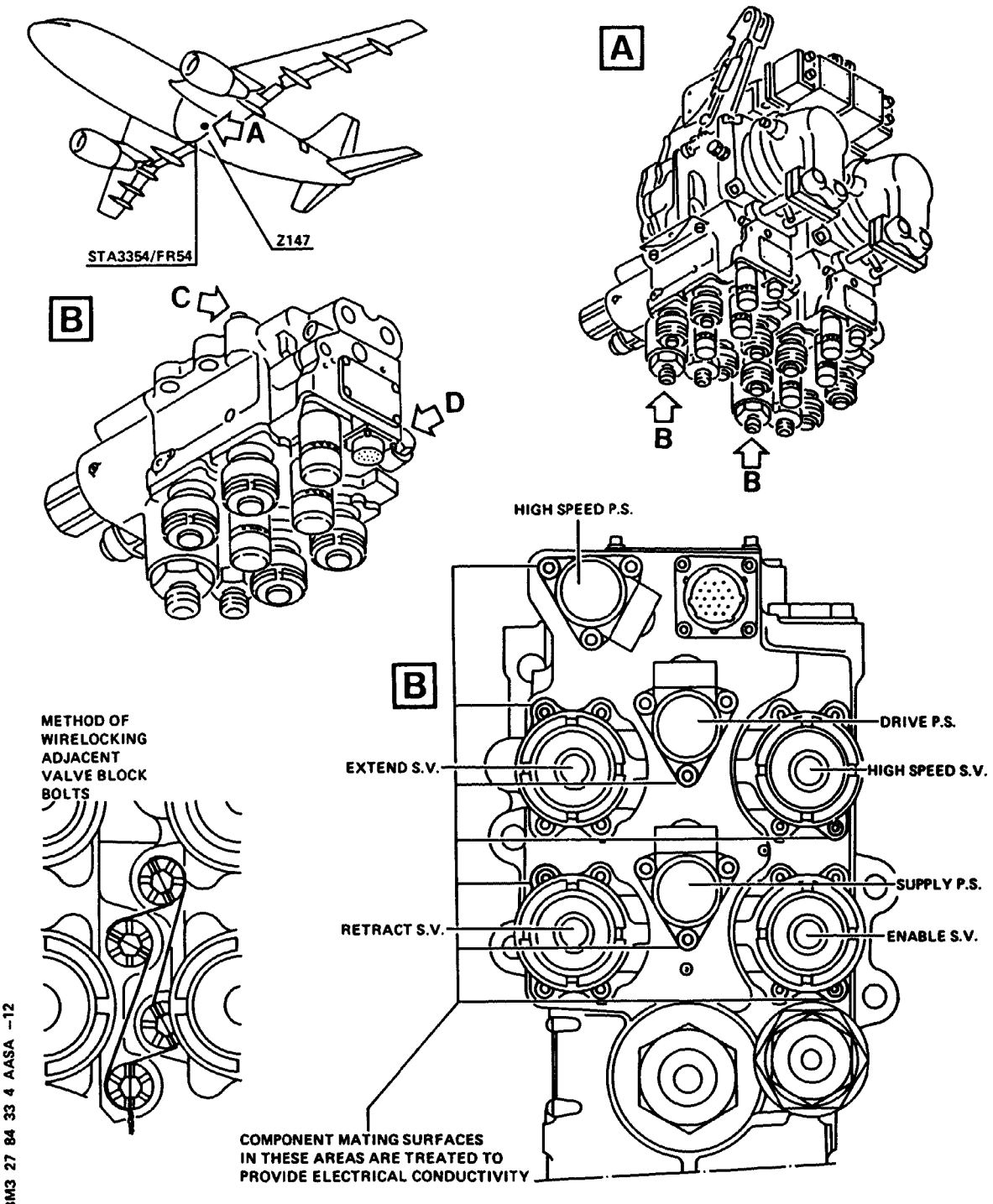
2. Procedure
(Ref. Fig. 401) (Sheet 1/3)
(Ref. Fig. 401) (Sheet 2/3)
R (Ref. Fig. 401) (Sheet 3/3)

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers:

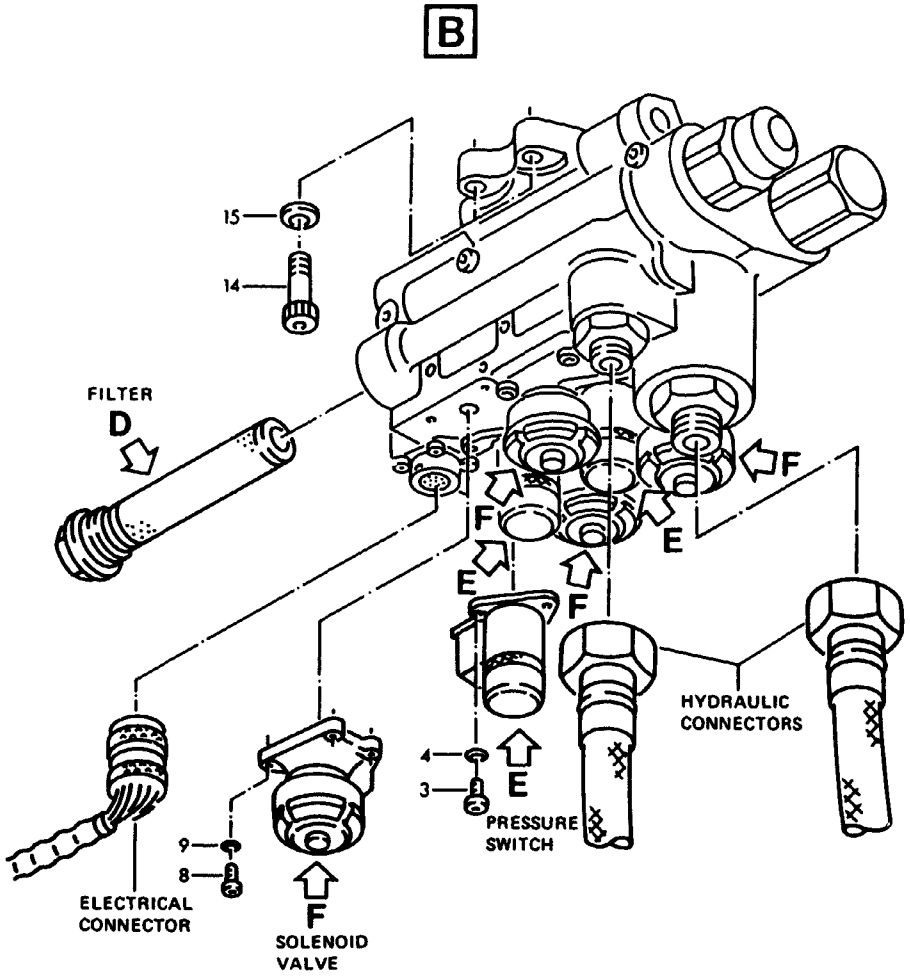
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

(2)Open LH or RH main landing gear door (Ref. 32-12-11, P. Block 301).
(3)Position access platform.
(4)Depressurize hydraulic system supplying component to be removed (Ref. 29-10-00, P. Block 301).
(5)Depressurize hydraulic reservoir of system supplying component to be removed (Ref. 29-14-00, P. Block 301).
(6)Display notice prohibiting pressurization of hydraulic systems.
(7)Position container to collect any spilt fluid.

B. Removal
(1)For removal of filter only, proceed as follows:
(a)Cut and discard lockwire.
(b)Slacken filter and remove from valve block assembly.
(c)Discard O-ring (1).
(2)For removal of pressure switch only, proceed as follows;
(a)Cut and discard lockwire.
(b)Remove screws (3) and washers (4).
(c)Extract pressure switch from valve block assembly.
(d)Discard O-rings (5),(7) and back-up rings (6).
(3)For removal of solenoid valve only, proceed as follows:
(a)Cut and discard lockwire.
(b)Remove screws (8) and washers (9).
(c)Extract solenoid valve from valve block assembly.
(d)Discard O-rings (10), (11), (12).
(4)For removal of valve block assembly complete, proceed as follows:
NOTE : The valve block (26CV) of slat system 2 is located on the RH side and valve block (25CV) of slat system 1 is located on the LH side of the power control unit (in flight direction).



PCU Valve Block (Sheet 1/3)
Figure 401



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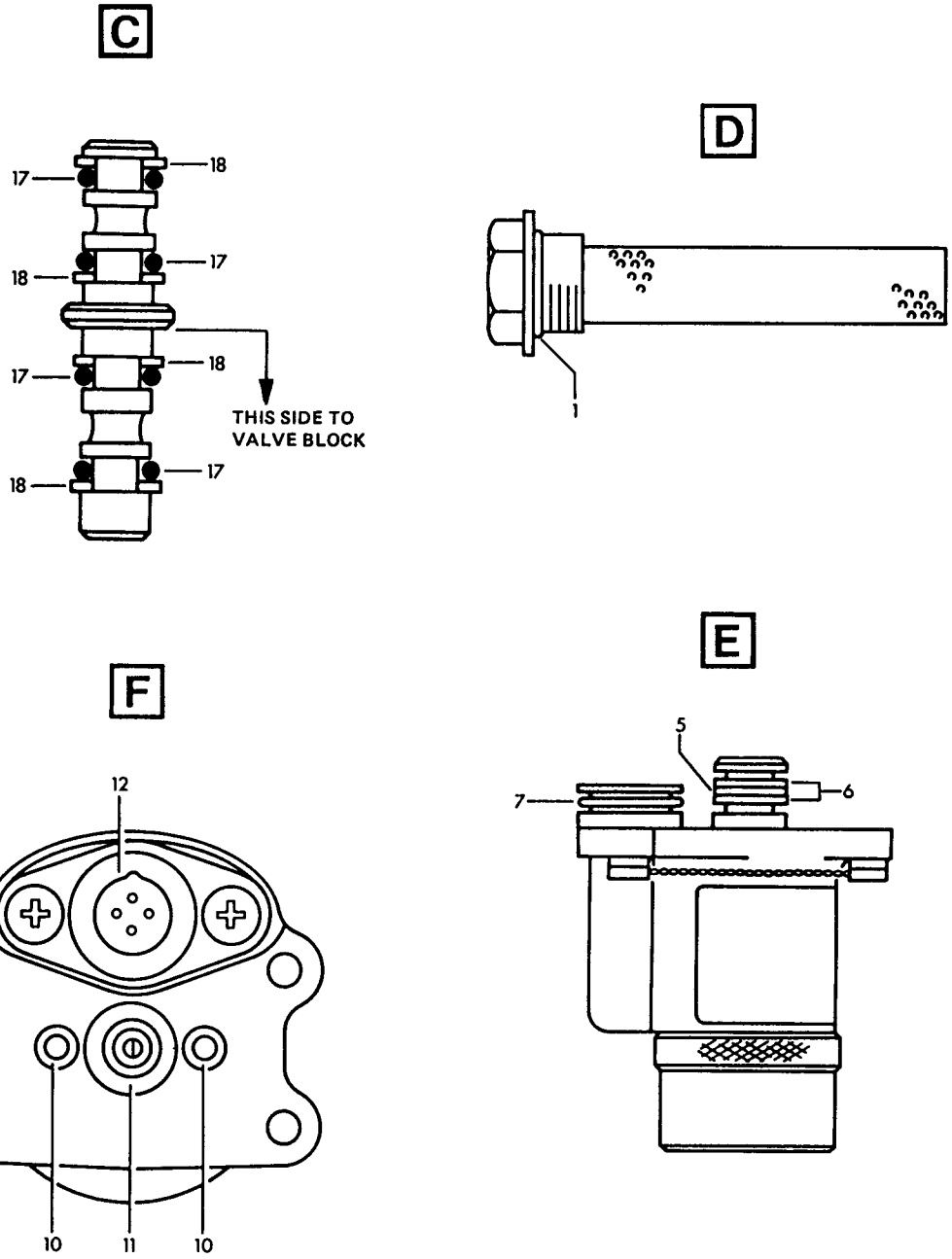
PCU Valve Block (Sheet 2/3)
Figure 401



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PCU Valve Block (Sheet 3/3)
Figure 401

R

(a)Remove hydraulic motor associated with valve block to be removed (Ref. 27-84-34, P. Block 401).
(b)Cut and discard lockwire, disconnect electrical connector.
(c)Install protective caps on electrical connector and plug.
(d)Disconnect both hydraulic pipes and install blanking plugs and caps on hydraulic connectors and pipes.
(e)Disconnect hydraulic pipe from filter and install hydraulic blanks.
(f)Cut and discard lockwire and slacken screws (14).
(g)Support valve block and remove screws (14) and washers (15).
(h)Carefully lower valve block assembly clear of PCU, making certain that Pressure-off Brake (POB) transfer tube between PCU and valve block is not damaged.
(i)Extract POB transfer tube and discard O-rings (17).

C. Preparation for Installation
(1)Using solvent (Material No. 11-004), remove all traces of sealant from component mating surfaces.
(2)Soak O-rings in operating fluid before installation.
(3)For filter only, install new O-ring (1).
(4)For pressure switch only, install new O-rings (5),(7) and back-up rings (6), making certain that O-ring (5) is correctly positioned between the two back-up rings (6) apply anti-corrosion compound (Material No. 05-002) to threads of screws (3).
(5)For solenoid valve only, install new O-rings (10) (11) (12) and apply anti-corrosion compound (Material No. 05-002) to threads of screws (8).
(6)For installation of complete valve block, solenoid valves or pressure switches only prepare a small quantity of a mixture composed of 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. 05-054).
NOTE : Proportions quoted are by weight.
(7)For valve block assembly complete, proceed as follows:
(a)Remove storage plugs and O-rings from POB transfer tube port and motor transfer tube ports.
(b)Install new O-rings (17) on POB transfer tube, correctly located in relation to retaining rings (18).
(c)Install POB transfer tube in valve block, so that shoulder is located in recess in valve block housing.
(d)Apply a quantity of the mixture prepared above to the non-anodised portion of the valve block mating surface.
(e)Apply anti-corrosion compound (Material No. 05-002) to threads of screws (14).
(8)Apply mixture prepared above to areas of components indicated to ensure electrical conductivity.

D. Installation
(1)For installation of filter only, proceed as follows:
(a)Install filter in valve block and tighten.
(b)TORQUE to between 90 and 94.5 Nm (66.6 and 69.5 lbf.ft.).
(c)Safety with lockwire.
(2)For installation of pressure switch only, proceed as follows:
(a)Position pressure switch on valve block, secure with washers (4) and

screws (3).
(b)TORQUE screws (3) to between 2.2 and 2.43 Nm (20 and 22 lbf.in.).
(c)Measure electrical resistance between pressure switch and PCU housing (at main bonding point), resistance must not exceed 20 milliohms.
(d)Safety screws (3) with lockwire.
(e)Apply corrosion-preventive (Material No. 05-005) to screws (3).
(3)For installation of solenoid valve only, proceed as follows:
(a)Position solenoid valve on valve block, secure with washers (9) screws (8).
(b)TORQUE screws (8) to between 2.8 and 3.1 Nm (25 and 27.5 lbf.in.).
(c)Measure electrical resistance between solenoid valve and PCU housing (at main bonding point), resistance must not exceed 20 milliohms.
(d)Safety screws (8) with lockwire.
(e)Apply corrosion-preventive (Material No. 05-005) to screws (8).
(4)For installation of valve block complete, proceed as follows:
(a)Position valve block on PCU, making certain that POB transfer tube is correctly seated and that O-rings are not damaged during assembly.
(b)Secure valve block with washers (15) and screws (14).
(c)TORQUE screws (14) to between 16.6 and 18.2 Nm (12.25 and 13.4 lbf.ft.).
(d)Measure electrical resistance between valve block and PCU housing (at main bonding point), resistance must not exceed 20 milliohms.
(e)Safety screws (14) with lockwire.
NOTE : Due to restricted access, it may be necessary to wirelock screws (14) closest to PCU centerline to corresponding screws on
R other valve block.
(f)Apply corrosion-preventive (Material No. 05-005) to screws (14).
(g)Install hydraulic motor (Ref. 27-84-34, P. Block 401).
(h)Remove hydraulic blanks and connect hydraulic pipes.
(i)Remove protective caps and connect electrical connector.
(j)Safety electrical connector with lockwire.
(5)Pressurize hydraulic reservoir of system supplying replaced component (Ref. 29-14-00, P. Block 301).
(6)Check fluid level in reservoir of system supplying replaced component (Ref. 12-12-29, P. Block 1), replenish as required.
(7)Position safety barriers in area of slat extension.
(8)Remove safety clips and tags and close circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV.
(9)Remove notice prohibiting pressurization of hydraulic system.
WARNING : BEFORE OPERATING SLATS, MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACES IS CLEAR.
(10)Using only system supplying replaced component, carry out operational test of slats (Ref. 27-84-00, P. Block 501).
(11)Check all disturbed hydraulic connections, making certain that there are no leaks.
(12)Check that no fault indications are present on front faces of computers SFCC1 and SFCC2.

E. Close-Up
(1)Check fluid level in hydraulic reservoirs of system supplying replaced

component (Ref. 12-12-29, P. Block 1), replenish as required.
(2)Remove container.
(3)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(4)Remove access platform.
(5)Close main landing gear door (Ref. 32-12-11, P. Block 301).
(6)Remove safety barriers.

SLAT PCU HYDRAULIC MOTOR - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

	ITEM	DESIGNATION
R	A. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	B.	Torque Wrench, 3.75 to 4.1 Nm (33. to 36 lbf.in.)
	C.	Torque Wrench, 16.6 to 18.3 Nm (146.9 to 161.9 lbf.in.)
	D.	Access Platform 2.7 m (9 ft.)
	E.	Ohmmeter, 0 to 20 milliohms
	F.	O-Rings
	G.	Lockwire, Corrosion-Resistant Steel, Dia. 0.63 mm (0.025 in.)
	H.	Circuit Breaker Safety Clips and Tags
	I.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
	J.	Container for Collecting Spilt Fluid
	K.	Safety Barriers
	L. Material No. 05-002	Special Materials (Ref. 20-31-00)
	M. Material No. 05-005	Special Materials (Ref. 20-31-00)
	N. Material No. 05-054	Special Materials (Ref. 20-31-00)
	O. Material No. 06-001	Lubricants (Ref. 20-31-00)
	P. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
	Q. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
	Referenced Procedures	
	- 12-12-29, P. Block 1	Hydraulics
	- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
	- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

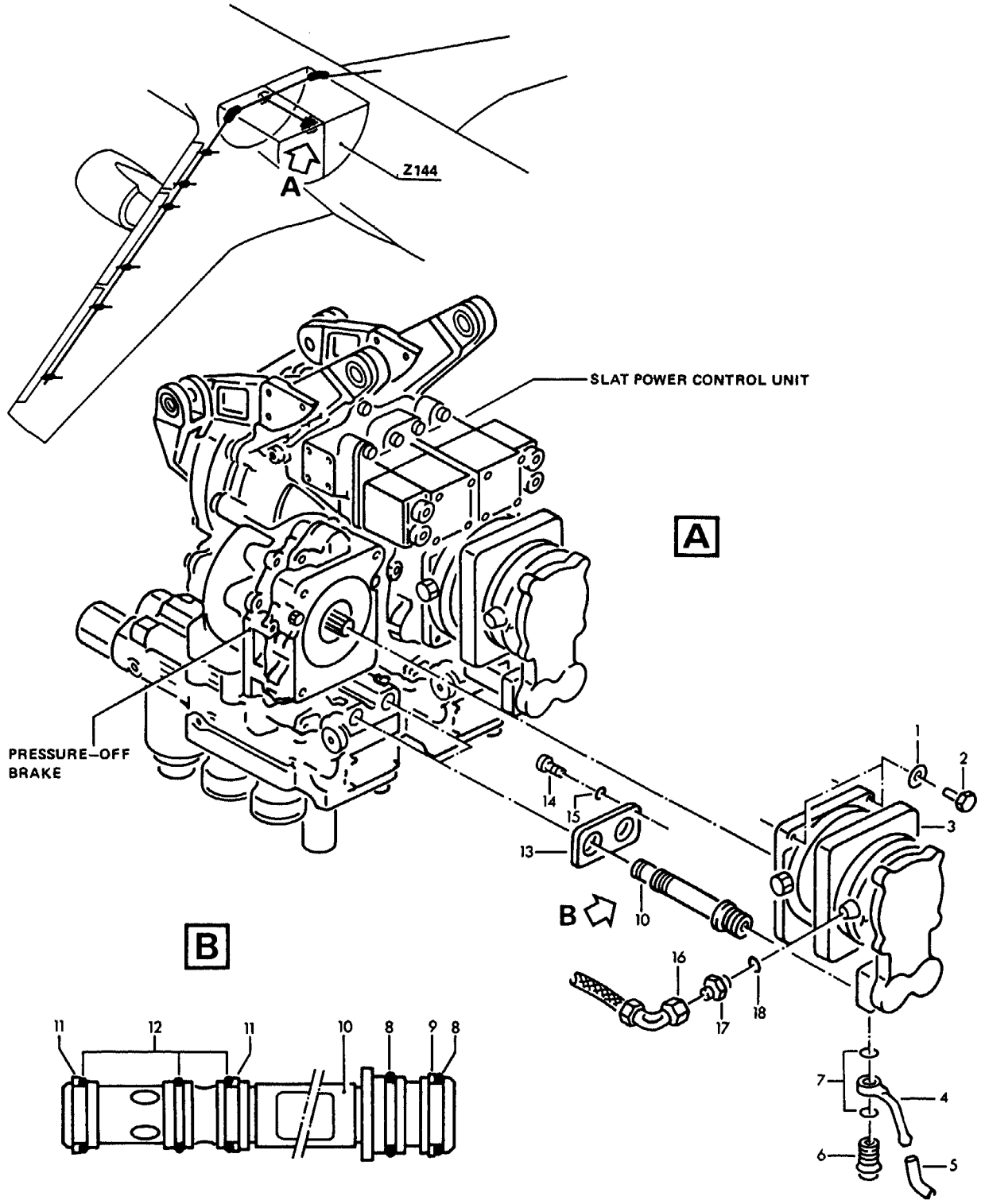
R (2)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(3)Position access platform.
(4)Open LH main gear main door (Ref. 32-12-11, P. Block 301).
(5)Depressurize hydraulic system supplying motor to be removed (Ref. 29-10-00, P. Block 301).
(6)Depressurize hydraulic tank of system supplying motor to be removed (Ref. 29-14-00, P. Block 301).
(7)Display notice prohibiting pressurization of hydraulic systems.
(8)Position container beneath Power Control Unit (PCU) to collect any spilt fluid.

B. Removal

(1)Remove case drain hose (16) from union (17) of case drain port.
(2)Remove seal drain hose (5) from drain pipe (4) of seal drain port.
(3)Cut and remove lockwire securing bolts (2).
(4)Remove bolts (2) and washers (1) attaching hydraulic motor on pressure-off brake of slat power control unit.
(5)Remove hydraulic motor (3) together with transfer tube assy (10) from slat power control unit.
(6)Cut and remove lockwire from bolts (14).
(7)Remove bolts (14), washers (15) and attaching plate (13) from hydraulic motor (3).
(8)Remove transfer tubes (10) from hydraulic motor (3).
(9)Remove union (17) and O-ring (18) from case drain port. Discard O-ring.
(10)Remove banjo bolt (6), drain pipe (4) and O-rings (7) from seal drain port. Discard O-rings.
(11)Remove O-rings (8),(12) from transfer tubes (10). Discard O-rings.

C. Preparation for Installation

(1)Lubricate all new O-rings with hydraulic fluid (Material No. 02-003).
(2)Position new O-rings (8),(12) on transfer tubes (10).
NOTE : Make certain that O-rings (8),(12) are correctly fitted in relation to retainer (9),(11).
(3)Position new O-ring (18) on union (17).
(4)Position new O-rings (7) and drain pipe (4) on banjo bolt (6).



Slat PCU Hydraulic Motor
Figure 401

R

(5)Prepare mating surfaces of hydraulic motor (3) and pressure-off brake as follows:
(a)Clean mating surfaces with scraper blade and solvent (Material No. 11-004) to remove old sealant mixture.
(b)Prepare a small quantity of a mixture of 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. 05-054).
NOTE : Proportions quoted are by weight.
(c)Coat this mixture on electrical bonding areas of hydraulic motor and pressure-off brake.
(d)Apply lubricant (Material No. 06-001) to splines of pressure-off brake.
(6)Apply anti-corrosion compound (Material No. 05-002) to threads of bolts (2),(14).

D. Installation
CAUTION : DO NOT INSTALL TRANSFER TUBES FROM FLAP POWER CONTROL UNIT ON SLAT POWER CONTROL UNIT.
(1)Insert carefully transfer tubes (10) to hydraulic motor (3).
(2)Attach plate (13) with bolts (14) and washers (15) on hydraulic motor (3).
(3)TORQUE bolts (14) to between 3.75 and 4.10 Nm (33 and 36 lbf.in.).
(4)Safety bolts (14) with lockwire, corrosion-resistant steel, dia. 0.63 mm (0.025 in.).
(5)Align splines of hydraulic motor (3) and pressure-off brake.
(6)Insert transfer tubes (10) together with hydraulic motor (3) on slat power control unit.
(7)Attach hydraulic motor (3) with bolts (2) and washers (1) on pressure-off brake of slat power control unit.
(8)TORQUE bolts (2) to between 16.6 and 18.3 Nm (146.9 and 161.9 lbf.in.).
(9)Safety bolts (2) with lockwire, corrosion-resistant steel, dia. 0.63 mm (0.025 in.).
(10)Install banjo bolt (6) together with drain pipe (4) and new O-rings (7) on seal drain port of hydraulic motor (3).
(11)Install seal drain hose (5) on drain pipe (4) of seal drain port.
(12)Install union (17) together with new O-ring (18) on case drain port of hydraulic motor (3).
(13)Install case drain hose (16) on union (17) of case drain port.
(14)Measure electrical resistance at main bonding point between hydraulic motor and slat power control unit.
NOTE : Resistance must not exceed 20 milliohms.
(15)Apply corrosion preventive (Material No. 05-005) to bolts (2).

E. Test
(1)Pressurize hydraulic tank of system supplying replaced motor (Ref. 29-14-00, P. Block 301).
(2)Check contents of hydraulic tank of system supplying replaced motor (Ref. 12-12-29, P. Block 1), replenish as required.
(3)Position safety barriers.
(4)Remove safety clips and tags and close circuit breakers 3CV, 4CV, 7CV, 8CV, and 9CV.
(5)Remove safety guard from flap/slat control lever quadrant.
(6)Remove notice prohibiting pressurization of hydraulic system.

WARNING : BEFORE OPERATING SLATS, MAKE CERTAIN THAT TRAVEL RANGE OF THE SURFACES IS CLEAR.

R (7)Using only system supplying replaced motor, carry out operational test of slats (Ref. 27-84-00, P. Block 501).
R (8)During operation of slats, make certain that no fluid is discharged from seal drain pipe.
R (9)Check all disturbed hydraulic connections, making certain that there are no leaks.

F. Close-Up
(1)Check contents of hydraulic tank of system supplying replaced motor (Ref. 12-12-29, P. Block 1), replenish as required.
(2)Remove container from beneath PCU.
(3)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(4)Close LH main gear main door (Ref. 32-12-11, P. Block 301).
(5)Remove safety barriers.
(6)Remove access platform.

POSITION INDICATING (SLATS) - DESCRIPTION AND OPERATION

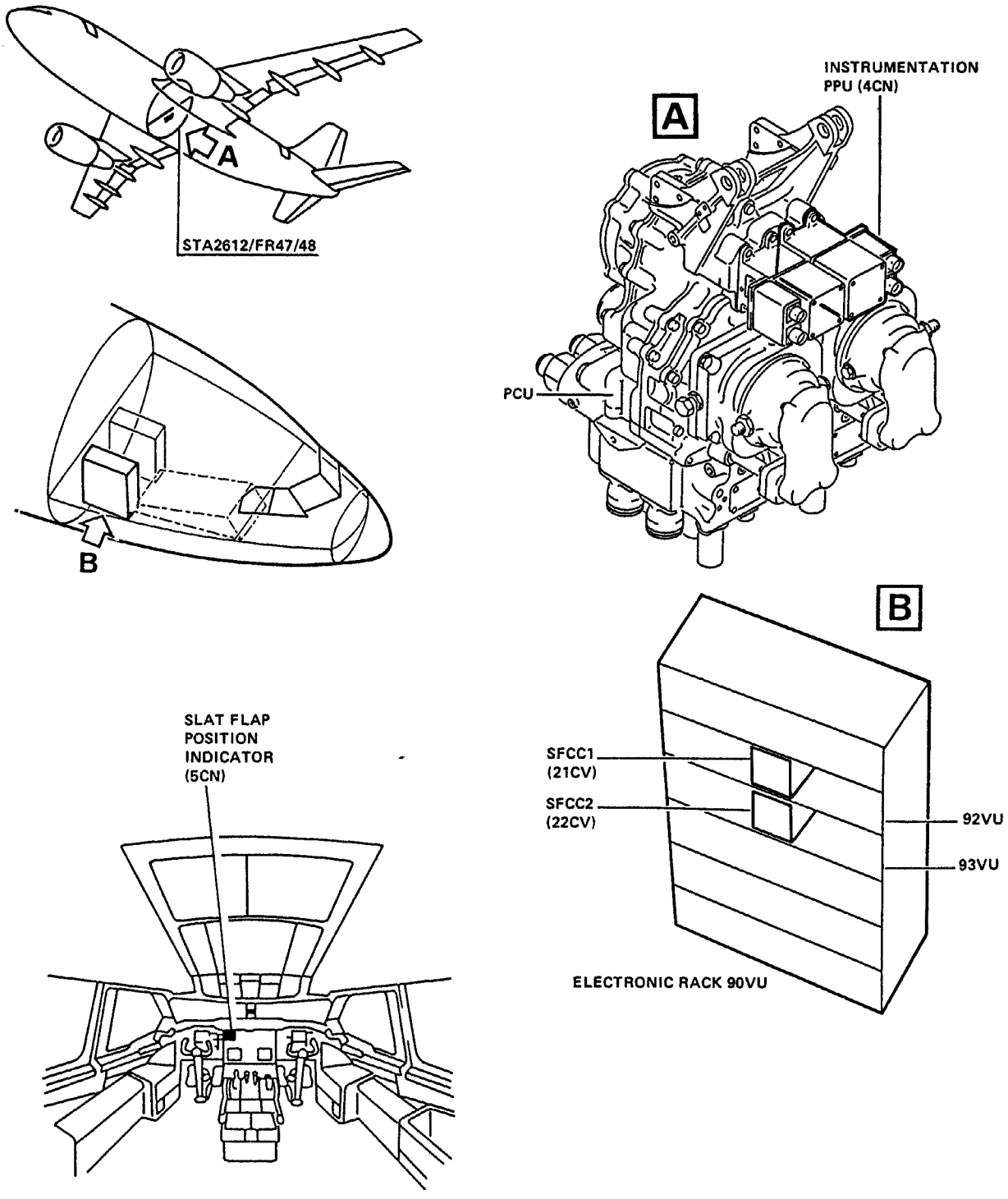
R 1. General

R Slat position is indicated by a servo-driven slat/flap position indicator
R which operates in conjunction with an Instrumentation Position Pick-off
R Unit (IPPU) mounted on the slat Power Control Unit (PCU). Slat position and
R status signals are also generated by the Slat/Flap Control Computers
R (SFCC) for use by other systems.
R External markings are installed on LH and RH inboard slat. They show the
R actual slat position and are visible from the cabin window between FR37
R and FR38.
R A triangle on the cabin side wall panel identifies the window through which
R you can observe the external slat position markings.

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
4CN	POSITION PICK-OFF UNIT-INSTRUMENTATION		148		27-85-12
5CN	INDICATOR-SLAT FLAP POSITION	4VU	212		27-55-11



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Component Location
Figure 001

3. Description

A. The IPPU is located on the PCU.

B. The slat/flap position indicator is located on the center instrument panel and provides servo-driven displays of flap and slat positions. The slat/flap position indicator is driven from an IPPU output.

C. The SFCC are located in avionics racks 92VU and 93VU and supply status information to the slat/flap position indicator, and status and position information to other systems.

4. Component Description
(Ref. Fig. 002)
(Ref. Fig. 003)

A. Instrumentation Position Pick-Off Unit (4CN)
The slat IPPU is similar to the Feedback Position Pick-off Unit (FPPU). A full description of the FPPU is given in 27-84-00.

B. Slat/Flap Position Indicator (5CN)
The slat/flap position indicator, located on the center instrument panel, provides visual indication of slat and flap angles, related airspeed limitations (VFE) and system status, as follows:

(1) SLATS Position Indicator.
This indicator comprises a servo-driven, vertical display read against two scales. One scale is marked 0,15,20,30 (degrees - corresponding to the slat/flap control lever SLATS positions) and the other scale is marked 245, 210, 195, 180 (knots - corresponding to maximum permissible airspeed at the associated slat flap setting). The indicator displays the actual slat angle.

(2) FLAPS Position Indicator
The FLAPS position indicator is described in 27-55-00.

(3) Annunciator lights
The following annunciator lights are fitted:

(a) SLATS amber warning light - illuminates when slat drive is arrested by wing tip brakes (Ref. 27-86-00).

(b) KRUGER amber warning light - (Ref. 27-89-00).

(c) FLAPS amber warning light - (Ref. 27-55-00).

(d) ALPHA-LOCK blue indicator light - flashes when the alpha-lock function is engaged (Ref. 27-81-00).

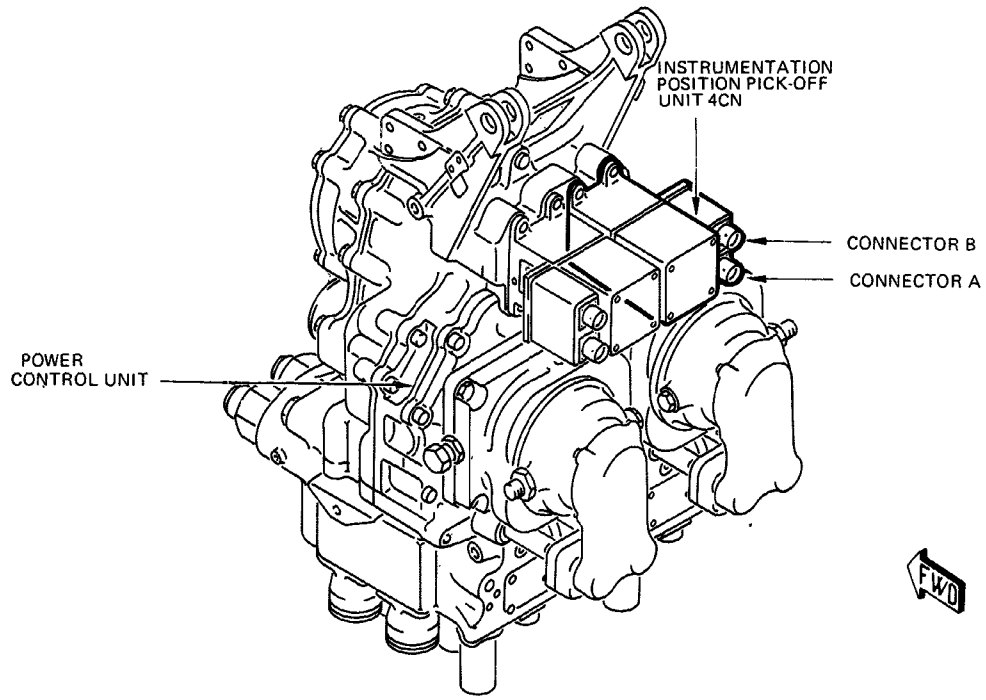
(e) SPD BRK amber warning light - (Ref. 27-65-00).

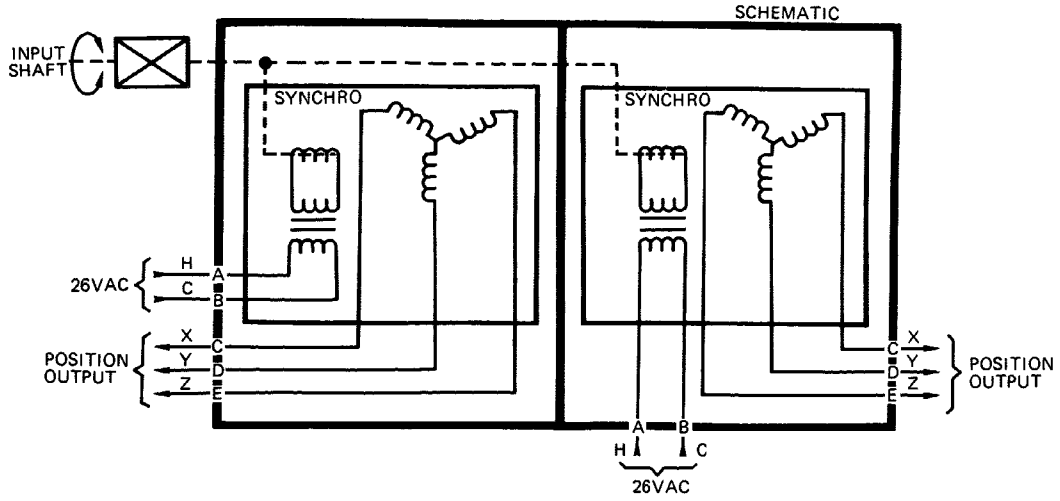
(f) Spare.

C. Slat Flap Control Computers (21CV, 22CV)
The SFCC are described in 27-51-00.

5. Operation
(Ref. Fig. 004)

A. SLATS Indicator Drive





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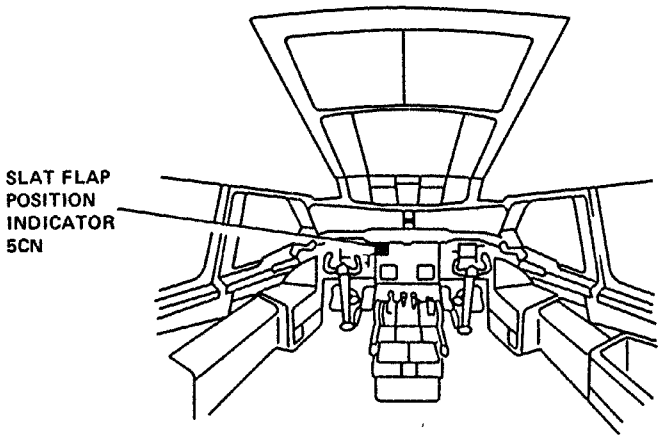
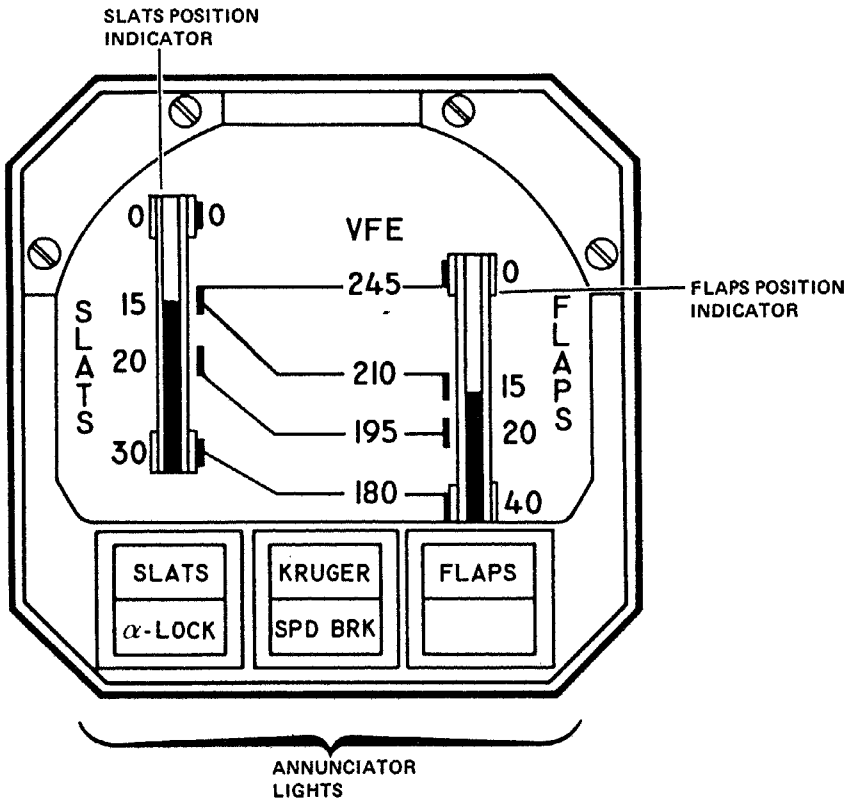
Instrumentation Position Pick-Off Unit
Figure 002





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Slat Flap Position Indicator
Figure 003

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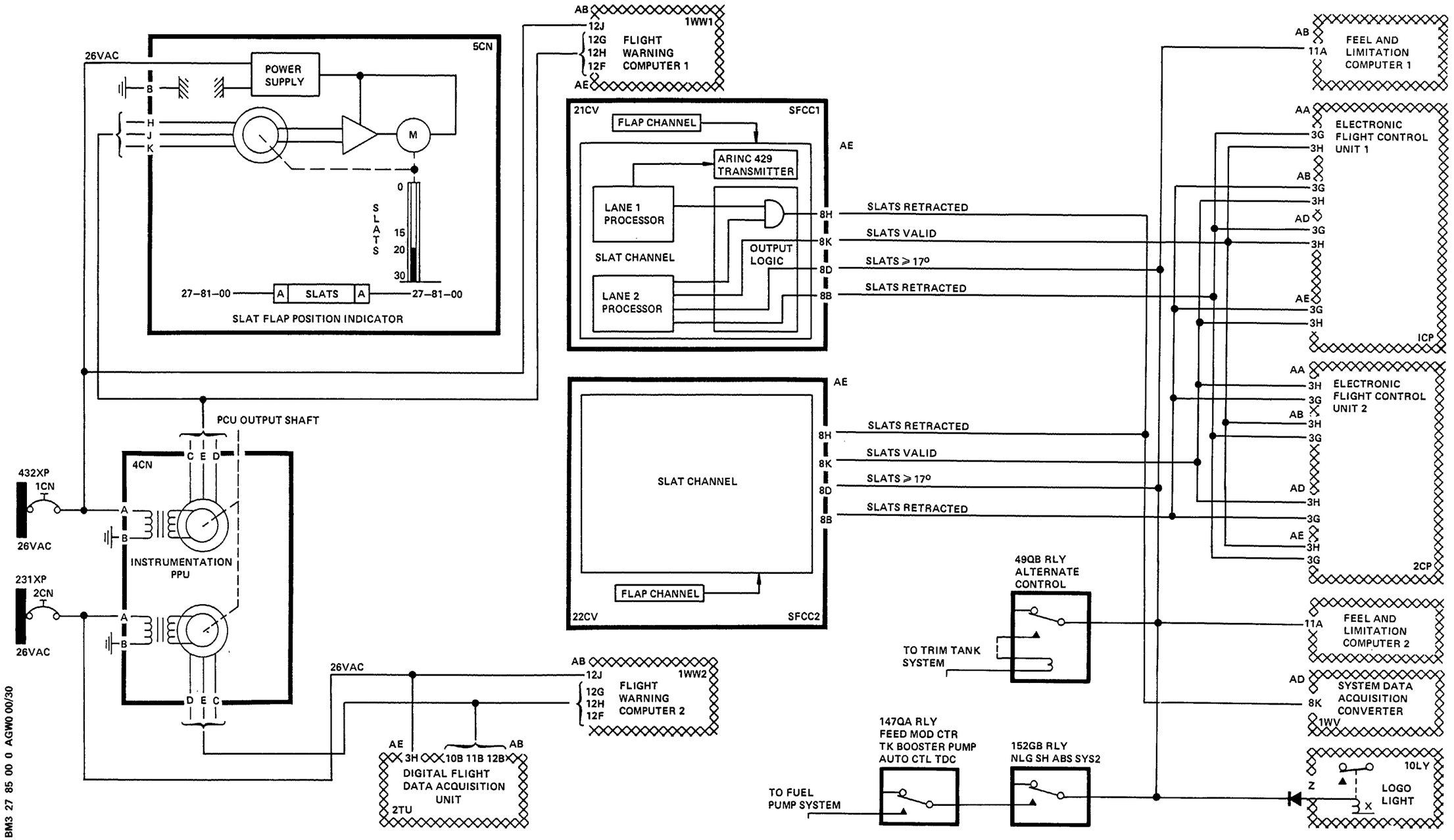


Position Indicating - Schematic Diagram
Figure 004

Slat position synchro signals from the IPPU are applied to the slat/flap position indicator, together with the 26 V AC synchro excitation supply. The synchro signals are fed to a synchro resolver, the rotor of which is driven by the SLATS indicator servomotor. The resolver outputs an error signal which represents the difference between the slat position and the indicator position. The error signal is routed to the input of a servo-amplifier driving the servo motor. As the motor rotates to move the SLATS indicator to the demanded position, the error signal is reduced. When it reaches the null position, the servomotor stops.

B. Slat Position Signals for Other Systems

The IPPU and both SFCC1 and SFCC2 provide slat position information for other systems. The following types of signals are provided:

- Synchro data
- Position discretes
- Digital data

(1) Synchro Data

The two control transmitters in the instrumentation PPU provide 3-wire synchro outputs. The synchro connected to the slat/flap position indicator also provides an input to flight warning computer 1 (FWC1). The remaining synchro provides inputs to FWC2 and the flight data recorder.

(2) Position Discretes

Lane processors 1 and 2 in both SFCC generate slat position discretes based on FPPU input. These discretes are summed using AND logic. The outputs from SFCC1 and SFCC2 are connected together and distributed to the relevant consumers. In all cases, the SFCC outputs are set to the logic 0 state in the event of SFCC power loss.

(3) Digital Data

(Ref. Fig. 005)

Lane processors 1 in both SFCC provide slat position information, derived from the FPPU, for the corresponding flap channels. The flap channels convert this information to ARINC 429 serial digital format which is transmitted to the flight augmentation computers (SFCC 1 supplies flight augmentation computer 1, SFCC 2 supplies flight augmentation computer 2).

6. Power Supplies

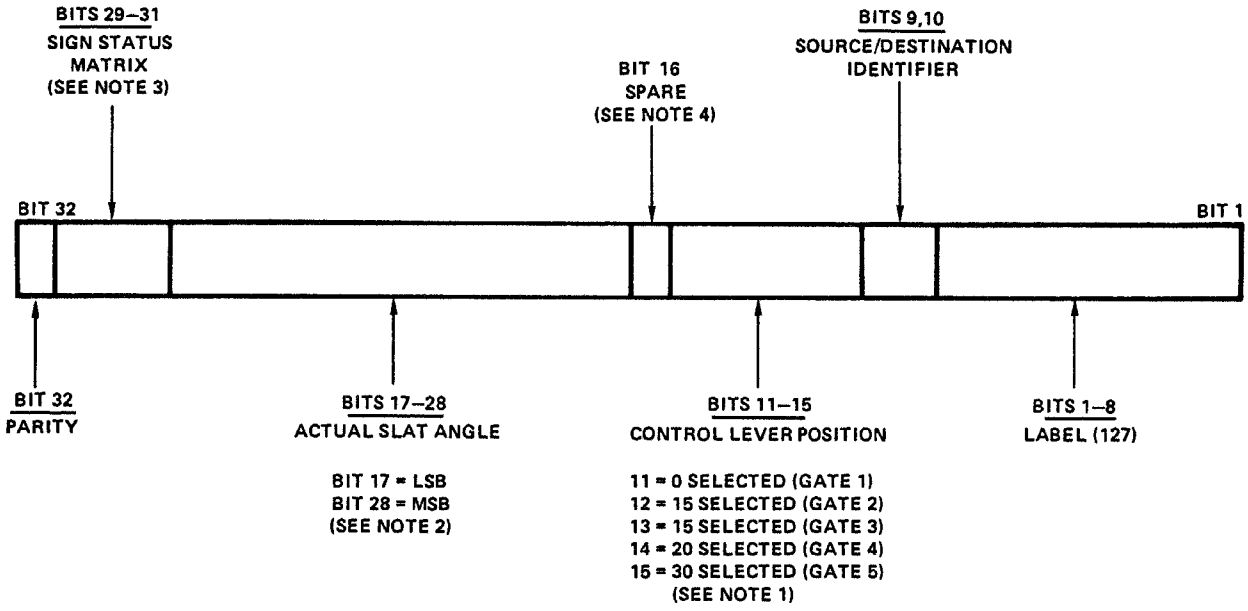
The 26 V AC required by the slat/flap position indicating system is provided by circuit breakers 1CN and 2CN.

1CN provides 26 V AC for:

- IPPU (4CN)
- the slat/flap position indicator (5CN) for the servo system and power supplies
- FWC1 for phase referencing the synchro inputs.

2CN provides 26 V AC for:

- IPPU (4CN)
- FWC2 and the flight data recorder for phase referencing the synchro inputs.



NOTE:

1. IF VALID LEVER POSITION IS NOT AVAILABLE, BITS 11–15 ARE SET TO LOGIC 0.
2. TRANSMITTED IN 2's COMPLEMENT, FRACTIONAL NOTATION; ENCODED AS 0–179.999 DEG IN 11 BIT RESOLUTION AND ONE SIGN BIT
3. IF NO VALID SLAT ANGLE AVAILABLE, BITS 29–31 ARE SET TO "NO COMPUTED DATA" CODE. IF SFCC FAILURE IS DETECTED, BITS 29–31 SET TO "FAILURE WARNING " CODE. IF BITE IS PERFORMED, BITS 29–31 ARE SET TO "FUNCTIONAL TEST".
4. BIT 16 IS SET TO 0 BECAUSE THE SFCC IS CONNECTED TO SLAT 15 WHEN CONTROL LEVER IS IN POSITION 3.

BM3 27 85 00 0 AJM0 16

Output Data Word Format
Figure 005

INSTRUMENTATION POSITION PICK-OFF UNIT (4CN) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS, OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.6 m (8 ft. 8 in.)
B.	Torque Wrench, 8.7 to 9.57 Nm (6.4 to 7.0 lbf.ft.)
C.	Ohmmeter 0 to 20 milliohms
D.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
E.	Safety Barriers
F. Material No. 05-002	Special Materials (Ref. 20-31-00)
G. Material No. 05-054	Special Materials (Ref. 20-31-00)
Referenced Procedures	
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

NOTE : The following procedure describes the removal/installation of Instrumentation Position Pick-Off Units (IPPU) set at mechanical and electrical zero, this being the condition of new IPPU. Removal/installation of IPPU is possible with the system at positions other than zero, due to the IPPU self-locking facility, provided that the same IPPU is refitted and no movement of the system transmission has occured between removal and installation of the IPPU.

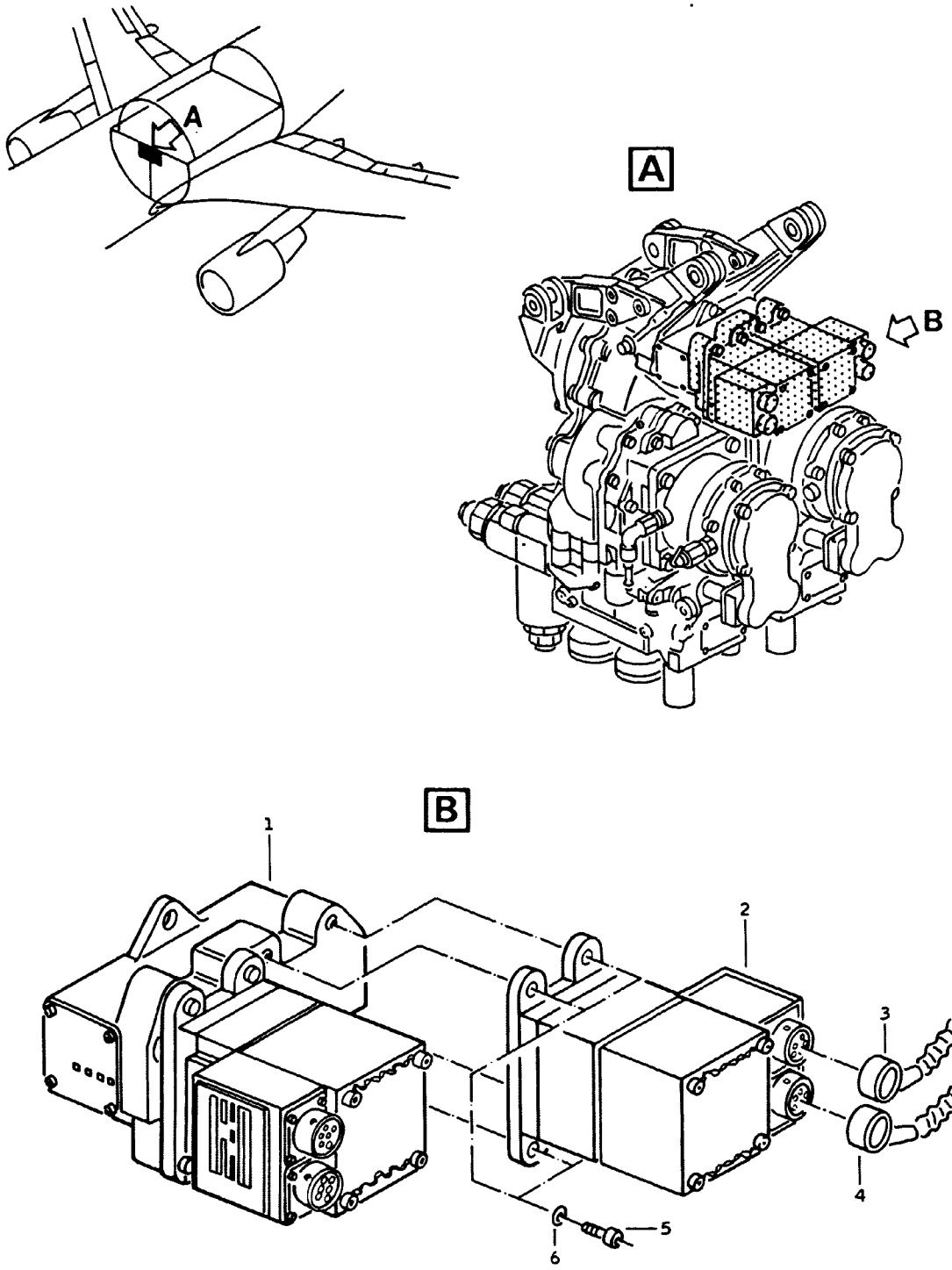
A. Job Set-Up
(1)Position safety barriers.
(2)Open main gear main doors (Ref. 32-12-11, P. Block 301).
(3)Position access platform.
(4)Make certain that slats are in retracted position (Ref. 27-80-00, P. Block 301).
(5)Display a warning notice prohibiting pressurization of hydraulic systems.
(6)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

B. Removal
(Ref. Fig. 401)
CAUTION : INSTRUMENTATION POSITION PICK-OFF UNIT MUST NOT BE REMOVED IF PRESSURE-OFF BRAKES HAVE BEEN REMOVED FROM POWER CONTROL UNIT.
(1)Disconnect electrical connectors (3),(4).
(2)Remove screws (5) and washers (6).
(3)Carefully remove IPPU (2) from gearbox (1).
(4)Fit blanking caps to electrical plugs, receptacles and exposed holes.
(5)Fit a red tie-wrap behind the locking plate to prevent retraction of locking plate.

C. Preparation for Installation
(1)Prepare a small quantity of a mixture of 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. 05-054).
NOTE : Proportions quoted are by weight.
(2)Apply a quantity of mixture prepared above to area free of anodic finish on IPPU and intermediate gearbox surfaces.

D. Installation (Ref. Fig. 401)
CAUTION : A NEW IPPU IS DELIVERED LOCKED IN THE MECHANCIAL AND ELECTRICAL ZERO POSITION. BEFORE INSTALLATION OF THE IPPU, THE SYSTEM MUST ALSO BE IN ITS ZERO POSITION.
(1)Remove blanking caps.
(2)Position IPPU (2) on intermediate gearbox.
NOTE : Fitting the IPPU requires the simultaneous alignment of the housing keyway, the drive shaft splines, the locating dowel and the securing screw holes, but not more than moderate hand pressure should be required. A slight additional pressure is required to depress the IPPU locking plate and engage the drive fully.
(3)Coat screw threads with anti-corrosion compound (Material No. 05-002).
(4)Install screws (5) and washers (6).



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Instrumentation Position Pick-Off Unit - Slats
Figure 401

(5)TORQUE screws (5) to between 8.7 and 9.57 Nm (6.4 and 7.0 lbf.ft.).
(6)Measure electrical resistance between IPPU and main bonding point of Power Control Unit. Resistance must not exceed 20 milliohms.
(7)Connect electrical connectors (3),(4).

E. Test
(1)Remove safety clips and tags and close circuit breakers 3CV, 7CV, 8CV, 4CV and 9CV.
(2)Remove warning notice prohibiting pressurization of the hydraulic systems.
(3)Carry out operational test of slat system (Ref. 27-84-00, P. Block 501).

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close main gear main doors (Ref. 32-12-11, P. Block 301).
(4)Remove safety barriers.

ASYMMETRY AND POWER TRANSMISSION MONITORING (SLATS)-DESCRIPTION AND OPERATION

1. General

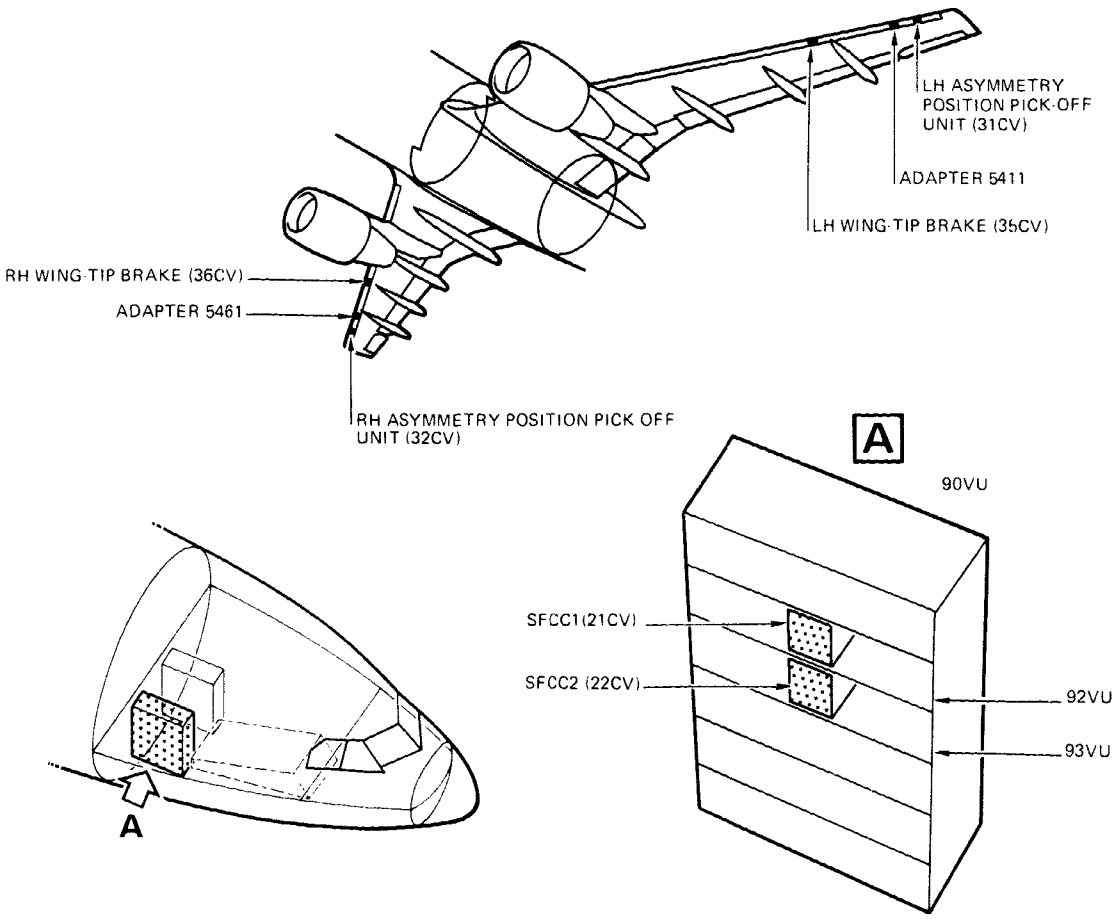
The slat/flap control computers (SFCCs) operate in conjunction with position pick-off units to monitor system performance. If any of the following conditions are detected by both SFCCs, the slat drive transmission shafts are locked using wing-tip brakes:

- Asymmetry
- Symmetrical runaway
- Overspeed

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
5411	ADAPTER-ASYMMETRY PPU, LH		524	524KB	27-86-12
5461	ADAPTER-ASYMMETRY PPU, RH		624	624KB	27-86-12
31CV	POSITION PICK-OFF UNIT, ASYMMETRY LH		524	524KB	27-86-11
32CV	POSITION PICK-OFF UNIT, ASYMMETRY RH		624	624KB	27-86-11
35CV	BRAKE-WING TIP, LH		524	524FB	27-86-13
36CV	BRAKE-WING TIP, RH		624	624FB	27-86-13



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Component Location
Figure 001

3. Description
(Ref. Fig. 002)

A. Slat/Flap Control Computers (21CV, 22CV)
The SFCCs are located in avionics racks 92VU and 93VU and are described in 27-51-00.

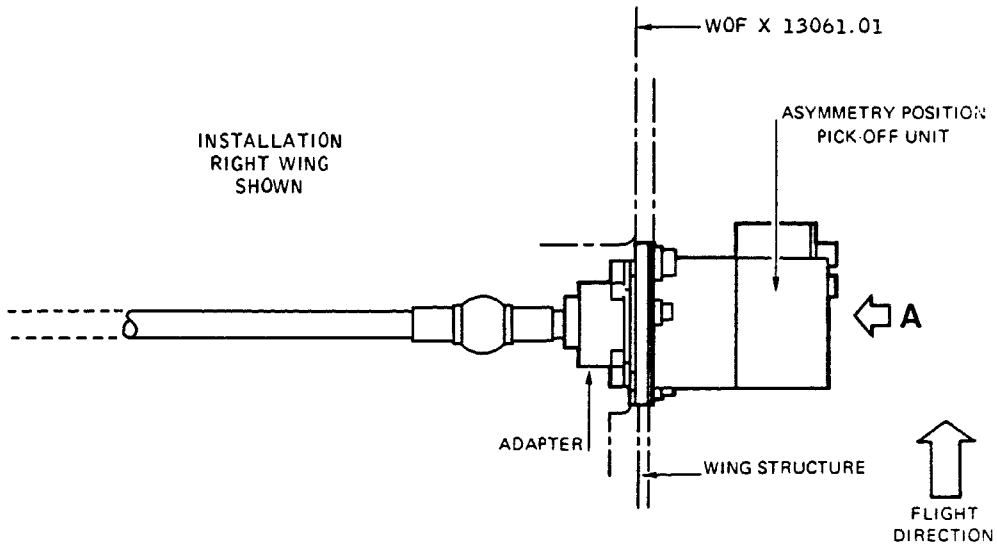
B. Asymmetry Position Pick-OFF Units (31CV, 32CV)
(1) An asymmetry position pick-off unit (APPU) is installed in the slat transmission run in each wing and provides position information for the SFCCs.
(2) Each APPU contains two size 11, brushless, transformer-coupled synchro transmitters which are mechanically driven by the adapter which, in turn, is driven by the slat drive transmission system. The synchro rotors are connected to the adapter via a gear linkage which ensures that synchro rotation is less than 360 deg. at full slat travel.
(3) The input shaft of the APPU is provided with a self-engaging locking device which allows removal and installation of the APPU without disturbing rotor/stator alignment. Electrical connections are made through two multiway connectors at the side of the unit.

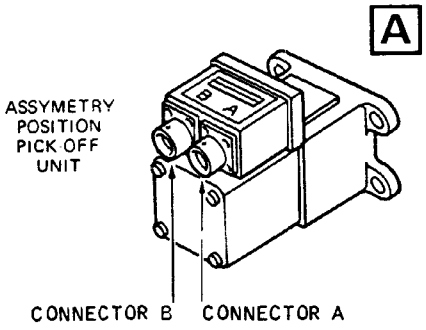
C. Valve Blocks
The valve blocks are an integral part of the slat PCU and contain the solenoid control valves which control the hydromechanical drive system. The SFCC supplies the control voltages to the solenoid control valves. These control voltages are removed if the SFCCs are inhibited.

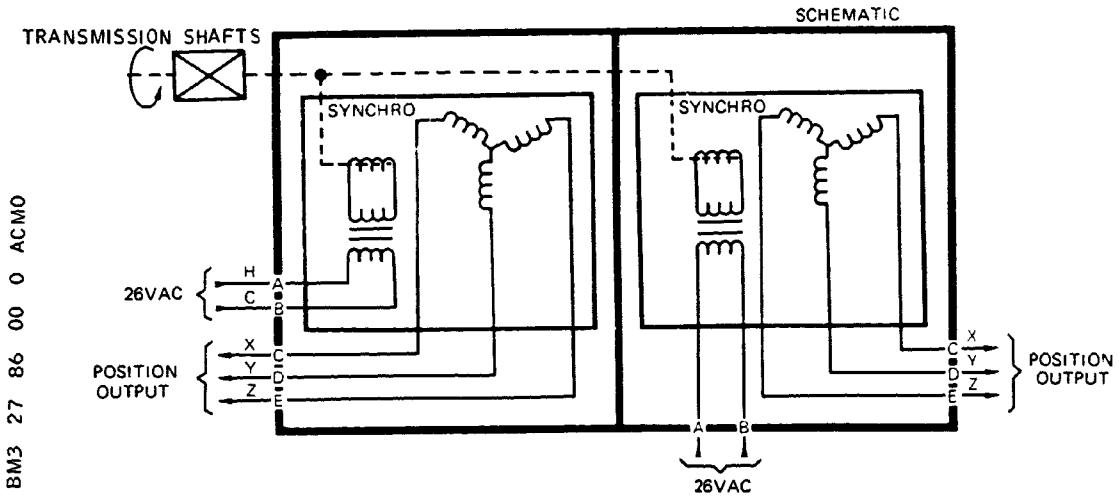
D. Wing-Tip Brakes (35CV, 36CV)
(1) The wing-tip brakes are connected directly to the slat transmission run, between screw jacks 5 and 6. They serve to lock the transmission system when commanded by the SFCCs.
(2) The wing-tip brakes are similar to those used for flap asymmetry protection and are described in 27-56-00.

4. Operation
(Ref. Fig. 003)
(Ref. Fig. 004)

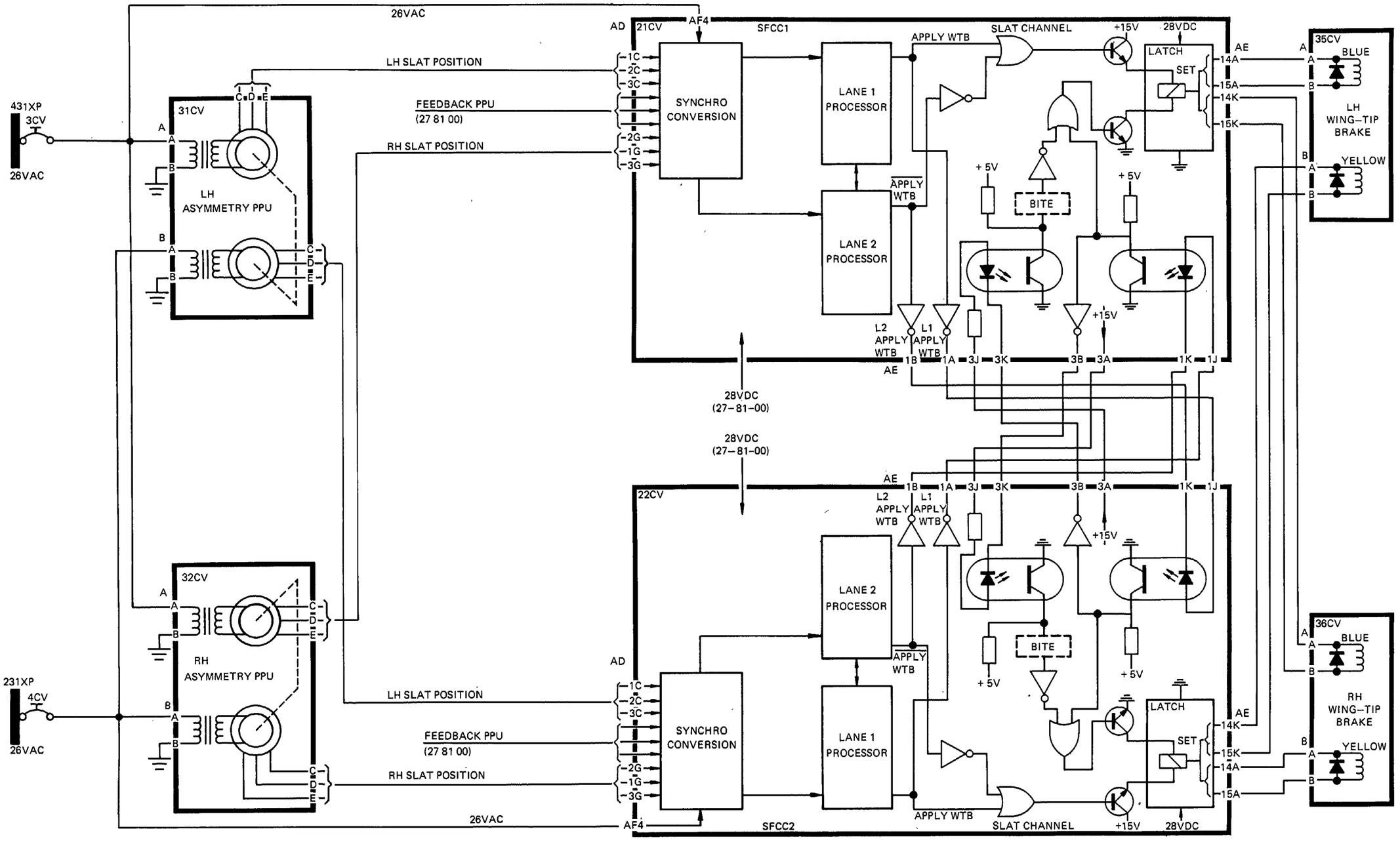
A. Asymmetry, Runaway and Overspeed Monitoring
(1) Actual slat position information is transmitted to SFCC 1 and 2 slat channels by the FPPU (Ref. 27-81-00) and by the APPUs.
Lane processors 1 and 2 monitor and compare the inputs as follows:
- The synchro inputs from the APPUs are compared with each other. If the synchro inputs disagree, a slat asymmetry condition is assumed by the lane processor(s).
- The inputs from the APPUs are compared with the input from the FPPU. If the APPUs disagree with the FPPU, a symmetrical runaway condition is assumed by the lane processor(s).
- Rate-of-change of position is computed from the APPU inputs.







Slat Asymmetry Position Pick-off Unit
Figure 002



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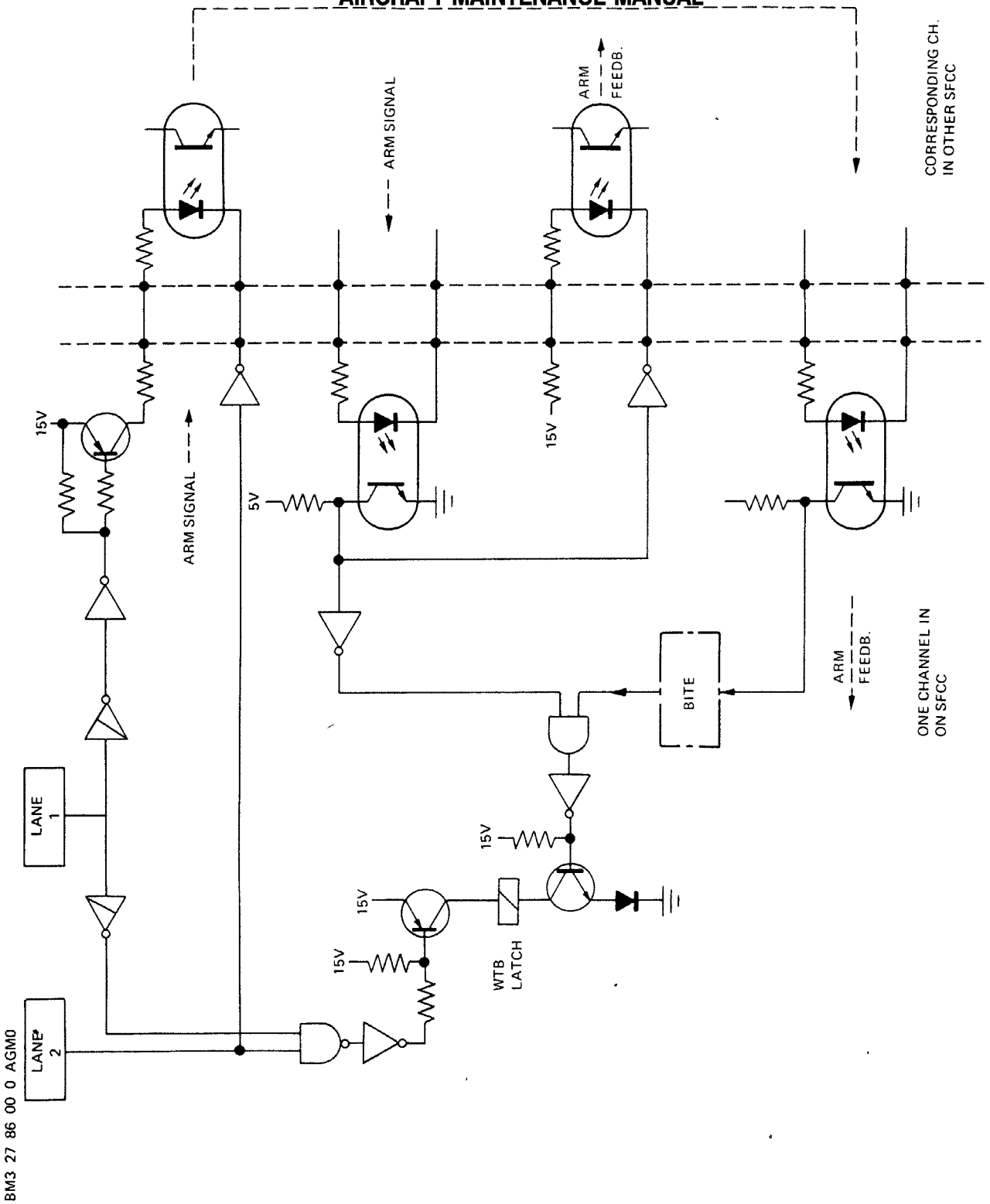
Asymmetry and Transmission Monitoring - Schematic Diagram
Figure 003



Wing Tip Brake-Arm Logic
Figure 004

The resultant signals, which represent torque shaft speed, are compared with the demanded value. If a difference in values occurs, an overspeed condition is assumed by the lane processor(s).

(2) Each lane processor generates fault and status signals which are processed by the output logic in both SFCCs. If one lane processor detects asymmetry, runaway or overspeed, the following actions are initiated:
- The "enable" drive command for the associated power control unit (PCU) valve block is set to the invalid state to inhibit motor drive (Ref. 27-84-00).
- A "wing-tip brake arm" discrete is transmitted to the slat channel output logic in the other SFCC.
- The "slat fault" warning discrete is generated causing the FAULT caption on the appropriate fault annunciator (19CV) to come on.
- The "LH ASYM PPU" or "RH ASYM PPU" fault indication code is set on SFCC 1 or 2 front panel, as applicable, and the associated BITE DISPLAY maintenance indicator comes on (Ref. 27-81-00).

(3) If a wing-tip brake arm discrete is also received from lane processor 1 or 2 in the other SFCC, the following actions are initiated:
- Non-volatile latches in both SFCCs are set, causing the wing-tip brake solenoid valves to be energized, thereby applying the brakes in both wings.
- A "slat locked" warning discrete is transmitted to the electronic centralized aircraft monitoring (ECAM) system.
- A "slat locked" indication discrete is transmitted to the slat/flap position indicator, causing the amber SLATS warning light to come on.
- The appropriate fault indication code ("ASYMMETRY" or "RUNAWAY") is set on SFCC 1 and 2 front panels and the BITE DISPLAY maintenance indicators come on (Ref. 27-81-00).

The non-volatile latches are non-resettable in flight. Once the wing-tip brakes have been applied, they can only be released when the aircraft is on the ground.

(4) A "wing-tip brake arm" discrete is generated in the event of a malfunction in the system and will cause the brakes to be applied if the other computing lane also generates a "wing-tip brake arm" discrete. In the event of a computer failure, the "wing-tip brake arm" discrete is automatically set, permitting the other computer to control the brakes.

(5) Each wing-tip brake is supplied by the BLUE and the YELLOW hydraulic systems, each system being enabled by a separate solenoid valve. The BLUE solenoid valves are enabled by SFCC 1 and the YELLOW solenoid valves are enabled by SFCC 2, thus ensuring brake operation if either hydraulic system or either SFCC fails. When a solenoid valve is energized, hydraulic pressure actuates the brake pistons, causing the friction disc pack to lock the slat drive transmission.

B. Wing-tip Brake Testing

(1) The continuous monitoring and interruptive BITE circuits in each SFCC slat channel monitor the operation of the wing-tip brake control circuits within the SFCC and performs continuity tests on the associated brake solenoids.

(2)The LEFT WING and RIGHT WING pushbuttons on the LH section of the SFCC 1 and 2 front panel allow the wing-tip brakes to be tested. If the LEFT WING pushbutton on SFCC 1 front panel is pressed, the slat channel provides the energizing supply for the BLUE solenoid valve in the LH wing-tip brake. If the brake is functioning normally, subsequent movement of the slat/flap control lever results in non-movement of the slat surfaces (on both wings). The RIGHT WING pushbutton on SFCC 1 provides a similar facility using the BLUE solenoid valve in the RH wing-tip brake. SFCC 2 provides wing-tip brake test facilities for the YELLOW solenoid valves.

5. Power Supply

A. Power supplies for the APPUs are normally derived from 26 V AC busbars 431XP and 231XP, via circuit breakers 3CV and 4CV respectively.

B. Power supplies for the SFCCs are derived from 28 V DC busbars 101PP and 110PP via circuit breakers 7CV and 8CV respectively. In the "land recovery" configuration, bus 101PP is replaced by 305PP (via circuit breaker 9CV when the LAND RECOVERY pushbutton is pressed. The wing tip brakes are supplied with 28 V DC from busbars 110PP and 307PP via circuit breakers 14CV and 13CV respectively.

ASYMMETRY AND POWER TRANSMISSION MONITORING (SLATS) - ADJUSTMENT/TEST

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE. FLIGHT CONTROLS - MAKE CERTAIN GROUND SAFETIES AND NOTICES ARE IN POSITION.

1. Adjustment of Position Pick-Off Units (PPU)

A. Reason for the Job

(1)Zeroing adjustment of PPU in slat system.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 5.2 m (17 ft.)
(2)	Circuit Breaker Safety Clips and Tags
Referenced Procedures	
- 27-56-00, P. Block 501	Asymmetry and Power Transmission Monitoring (Flaps)
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-81-19, P. Block 401	Feedback Position Pick-Off Unit
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 27-85-12, P. Block 401	Instrumentation Position Pick-Off Unit
- 27-86-11, P. Block 401	Asymmetry Position Pick-Off Unit
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure

(Ref. Fig. 501)

(1)Job Set-Up

(a)Position access platform.

(b)Open access door 524KB for LH and 624KB for RH Asymmetry Position Pick-off Units (APPU).

(c)Open one of the main gear main doors (Ref. 32-12-11, P. Block 301) for access to Feedback Position Pick-off Unit (FPPU) and Instrumentation Position Pick-off Unit (IPPU) at slat power control unit.

(d)Retract slats to zero position (Ref. 27-80-00, P. Block 301).

(e)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC/NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/SLATS/26VAC/SYS2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ FLAPS/SYS 1	10CV	335/R67

(f)Remove appropriate APPU (Ref. 27-86-11, P. Block 401), FPPU (27-81-19, P. Block 401) or IPPU (Ref. 27-85-12, P. Block 401).

(2)Adjustment
(Ref. 27-56-00, P. Block 501).

(3)Close-Up

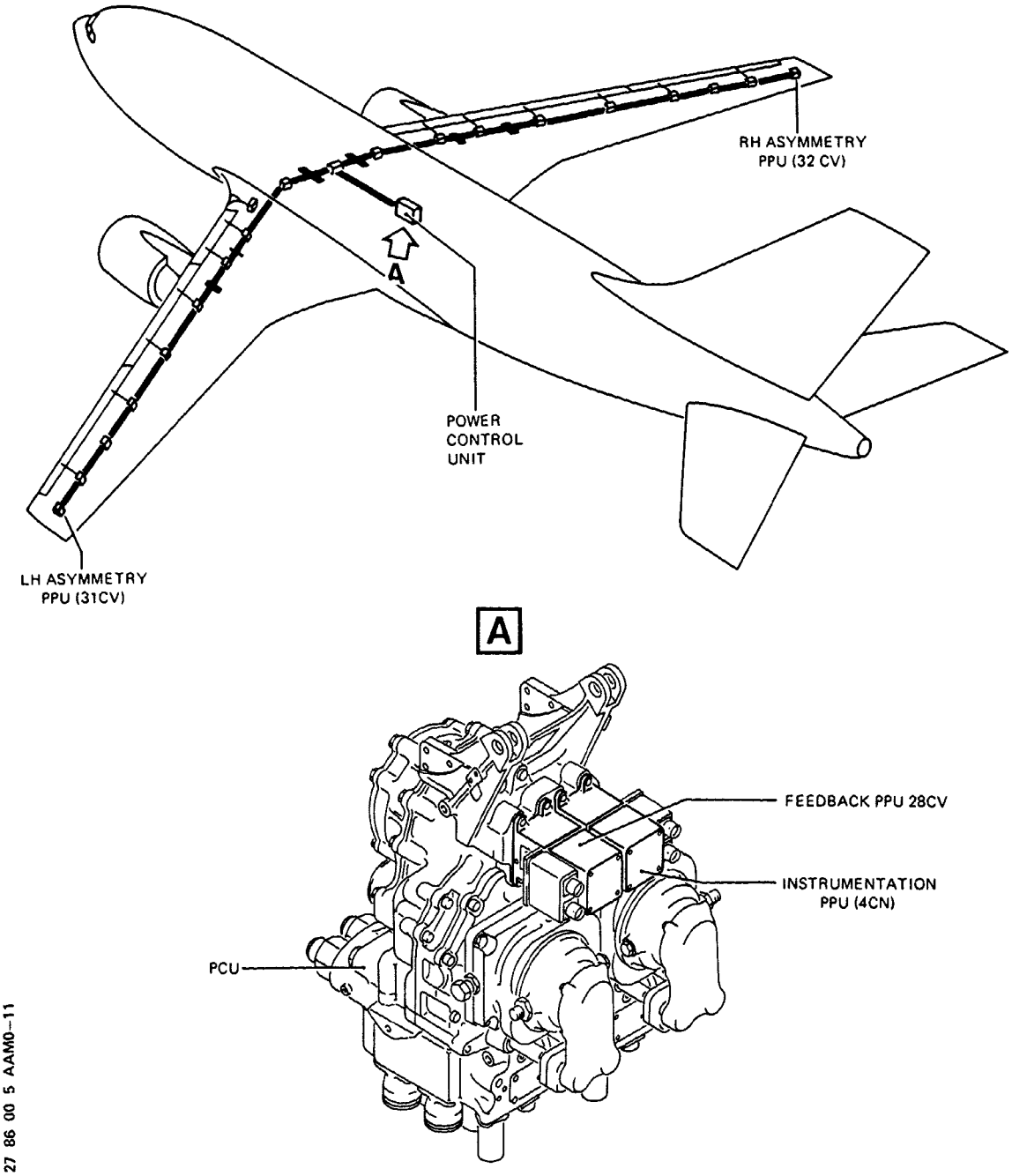
(a)Install APPU (Ref. 27-86-11, P. Block 401), FPPU (Ref. 27-81-19, P. Block 401) or IPPU (Ref. 27-85-12, P. Block 401).

(b)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(c)Remove safety clips and tags and close circuit breakers 1CV, 2CV, 3CV, 4CV, 5CV, 6CV, 7CV, 8CV, 9CV and 10CV.

(d)Close access doors and remove access platform.

(e)Operate slats through two full cycles and check system for correct function (Ref. 27-84-00, P. Block 501).



Location of Slat PPUs
Figure 501

2. Test of the Wing Tip Brake (WTB) Static Torque and Test of the Integrity of the Slat Transmission System

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, adjustable to 5 m (16.4 ft.)
(2)98A27503003000	Guard - Safety, Flap/Slat CTL Lever
(3)98A27808022000	Check Tool - Wing Tip Brake, Slat
or	
98A27808023000	
R or	
R STANDARD TORQUE MULTIPLIER	
(4)	Torque Wrench, 4 to 4.2 m.daN (29.5 to 30.1 lbf.ft).
(5)	Circuit Breaker Safety Clips and Tags

Reference Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 27-84-00, P. Block 601	Hydraulic Actuation and Power Transmission (Slats)
- 27-84-21, P. Block 401	Transmission Shafts
- 27-84-21, P. Block 601	Transmission Shafts
- 27-86-13, P. Block 601	Wing Tip Brake (35CV, 36CV)
- 29-22-00, P. Block 301	Blue Auxiliary Power (Power Transfer Unit)
- 29-23-00, P. Block 301	Yellow Auxiliary Power (Power Transfer Unit)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure

(Ref. Fig. 502)

(1)Job Set-Up

(a)Position access platform.

(b)Open access doors 513RL (613RR), 512BB (612BB), 512DB (612DB), 512EB (612EB), 512FB (612FB), 512GB (612GB), 512JB (612JB), 512KB (612KB), 523AB (623AB), 523BB (623BB), 523CB (623CB), 523EB (623EB), 523FB (623FB), 523GB (623GB), 523JB (623JB), 523LB (623LB), 523MB (623MB), 524BB (624BB), 524CB (624CB), 524EB (624EB), 524FB (624FB), 524GB 624GB), 524HB (624HB) and 524KB (624KB).

(c)Open the main doors of the main gear (Ref. 32-12-11, P. Block 301).

(d)Open access door 147BZ.

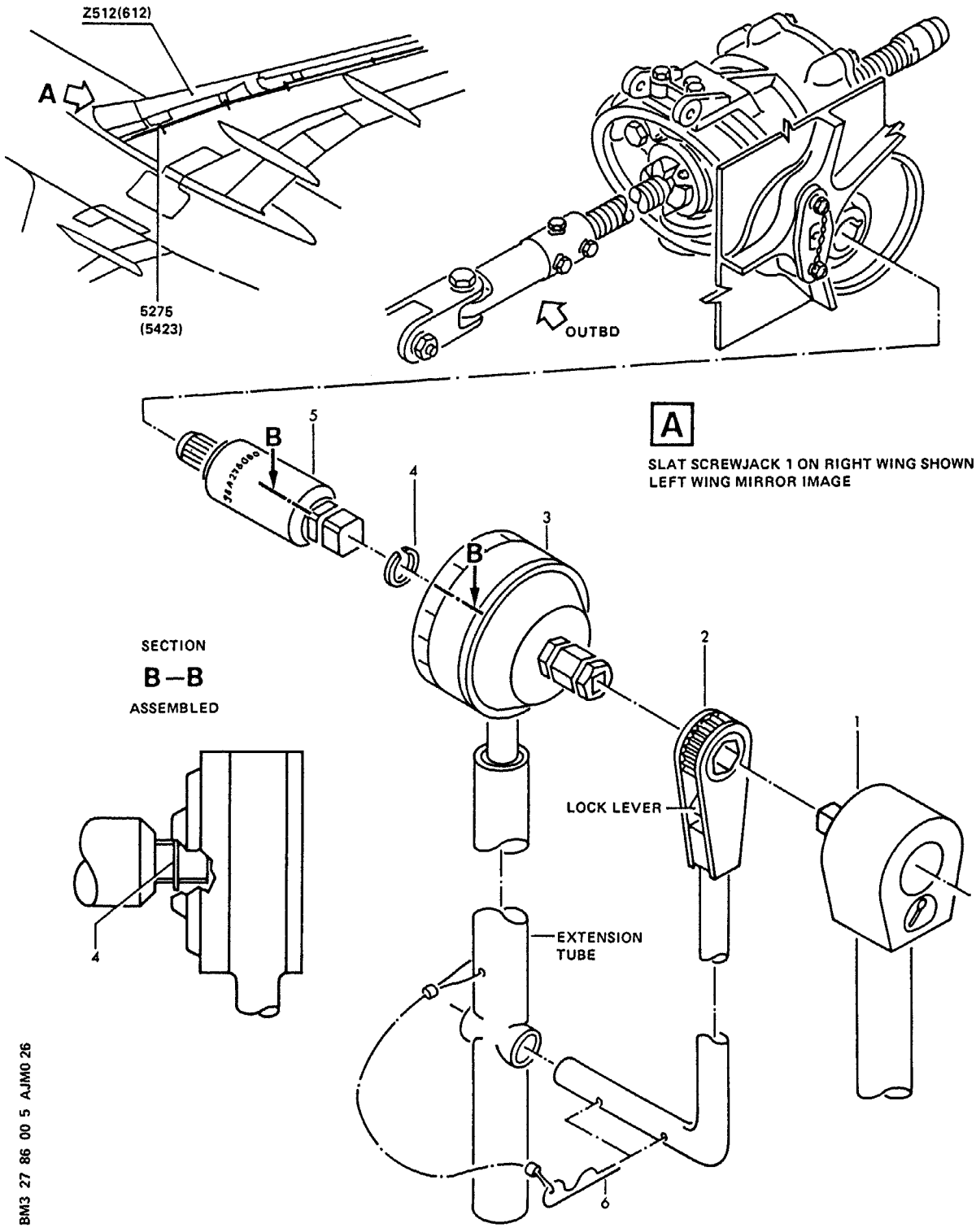
(e)Gain access to the avionics compartment by opening access door 121BL or 211PZ.

(f)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(g)Make certain that electronics rack ventilation is correct.

(h)Extend slats to 15° position (Ref. 27-80-00, P. Block 301).

(i)Open, safety and tag the following circuit breakers:



Application of WTB-Check Tool
Figure 502

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY SLATS/SYS 1	9CV	333/R66

(j)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(k)Mark the relative positions of the input connection (rotating part) and the protection tube at WTB.
(l)Mark the relative positions of the transmission shaft (rotating part) outboard of screw jack 1 and fixed structure.
(m)Disconnect electrical connector 28CV-A from the Feedback Position Pick-Off Unit (FPPU) and 25CV-A and 26CV-A from the valve blocks of the slat Power Control Unit (PCU).
(n)Remove transmission shafts 5275 and 5423 (Ref. 27-84-21, P. Block 401).

(2)Test

WARNING : BE VERY CAREFUL WHEN APPLYING TORQUE LOAD TO THE TRANSMISSION SYSTEM. THE SYSTEM ACTS AS A TORSION BAR. MAKE SURE THAT THE WRENCHES HAVE NO OIL OR GREASE ON THEM AND ARE CORRECTLY POSITIONED.

NOTE: If the WTB fails or any component in the transmission system becomes damaged during test, replace the appropriate component and repeat the test.

ACTION	RESULT
1. Install the check tool adapter (5) of check tool PN 98A27808022000 or PN 98A27808023000 or STANDARD TORQUE MULTIPLIER to the torque multiplier (3) and secure with the circlip (4).	
2. Install the anti-backlash ratchet (2) to the torque multiplier (3) and safety with spring clips (6).	
3. Insert the check tool set in the LH slat screwjack 1 input.	
4. Make certain that the extension tube of the torque multiplier (3) rests on the access platform in a safe position to counteract in opposite direction to input force.	

ACTION	RESULT
5. Pressurize the BLUE and YELLOW hydraulic systems (Ref. 29-22-00, P. Block 301 and 29-23-00, P. Block 301).	
6. Remove safety clips and tags and close circuit breakers 3CV, 7CV and 9CV	On center instrument panel on slat/flap position indicator 5CN: - the SLATS warning light comes on. The LH and RH wing tip brakes of system 1 are applied.
7. Connect torque wrench (1) to the multiplier (3) and apply a torque of between 4 and 4.2 m.daN (29.5 and 30.1 lbf.ft.) in an anti-clockwise direction to the LH transmission. NOTE : The transmission will be wound up more than half a turn by means of several pulls on the torque wrench. NOTE : The torque output from the torque multiplier (3) is six times greater than the input.	- Left WTB does not rotate - transmission system withstands the torque loads without slip or failure.
8. Hold the torque with the torque wrench and release the torque load gradually in steps by releasing lock lever and resetting at end of travel.	NOTE : Make sure that the reference marks on the WTB protection tube and screwjack 1 transmission shaft are still aligned as before. Because of play in the system it may be necessary to turn the transmission slightly to obtain exact alignment of the marks.
9. On the FPPU: - Connect electrical connector 28CV-A	
10. In the avionics compartment on the Slat/Flap Control Comuter (SFCC) 1 - Press the RESET pushbutton.	LH and RH wing tip brakes are reset. On the slat/flap position indicator 5CN: - the SLATS warning lights goes off.
11. Open safety and tag circuit breakers 3CV, 7CV and 9CV.	

ACTION	RESULT
12. On the FPPU: - disconnect electrical connector 28CV-B.	
13. Remove safety clips and tags and close circuit breakers 4CV and 8CV.	On the slat/flap position indicator 5CN: - the SLATS warning light comes on. The LH and RH wing tip brakes of system 2 are applied.
14. Rebuild the extension tube of the torque multiplier (3) so that it counteracts on the access platform in opposite direction as before.	
15. Apply a torque of between 4 and 4.2 m.daN (29.5 and 30.1 lbf.ft.) in the clockwise direction to the LH transmission.	- Left WTB does not rotate - transmission system withstands the torque loads without slip or failure.
16. Hold the torque with the torque wrench and release the torque load gradually in steps by releasing lock lever and resetting at end of travel.	NOTE : Ref. step 8
17. Remove the complete check tool set from LH screwjack 1 and insert check tool in RH screwjack 1 input connection.	
18. Make certain that the extension tube of the torque multiplier (3) acts on the access platform in a safe position to counteract in opposite direction to input force.	
19. Perform steps 5 thru 16 for the RH system.	
20. Remove the complete check tool set from RH screwjack 1.	
21. Open safety and tag circuit breakers 4CV and 8CV.	
22. Depressurize the BLUE and YELLOW hydraulic systems (Ref. 29-22-00, P. Block 301 and 29-23-00, P. Block 301).	

(3)Close-Up
(a)Make certain that the transmission system is still in its original position.
(b)Install the transmission shafts 5275 and 5423 (Ref. 27-84-21, P. Block 401).
(c)Visually inspect the complete transmission system (Ref. 27-84-21, P. Block 601).
R (d)Inspect the universal joints for the presence of the VESPEL
R bushes (Ref. 27-84-00, P. Block 601).
R (e)Inspect WTB (Ref. 27-86-13, P. Block 601).
R (f)Connect electrical connector 28CV-B to the FPPU and the electrical connectors 25CV-A and 26CV-A to the valve blocks of the slat PCU.
R (g)Remove safety clips and tags and close circuit breakers 3CV, 4CV, 7CV, 8CV and 9CV.
R (h)Press the RESET pushbutton on the Slat/Flap Control Computers (SFCC) 1 and 2. Make certain that no fault codes are set.
R (j)Make sure that the warning light SLATS on the slat/flap position indicator is off.
R (k)Set ANN LT switch on maintenance panel 472VU to READ position.
R (l)Press MFA RESET button on maintenance panel 471VU. Make certain that the SFCC 1/BITE DISPLAY and SFCC 2/BITE DISPLAY annunciators are off.
R (m)Return the ANN LT switch on maintenance panel 472VU to OFF position.
R (n)Remove safety guard from flap/slat control lever quadrant.
R (p)Carry out the operational test of the slat system (Ref. 27-84-00, P. Block 501) ending with the slats in 0° position.
R (q)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
R (r)Close access door 121BL or 211PZ which was opened previously.
R (s)Install all access doors at the leading edge of the wing which were removed.
R (t)Install access door 147BZ.
R (u)Close the main door of the main gear (Ref. 32-12-11, P. Block 301).
R (v)Remove access platform.

ASYMMETRY POSITION PICK-OFF UNIT - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS, OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 4.6 m (15 ft.)
R B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C.	Torque Wrench, 7.8 to 9.6 Nm (5.8 to 7.1 lbf.ft.)
D.	Safety Barriers
E.	Electrical Blanking Caps
F.	Circuit Breaker Safety Clips and Tags
G.	Tie-Wrap
H. Material No. 05-002	Special Materials (Ref. 20-31-00)
I. Material No. 05-005	Special Materials (Ref. 20-31-00)
J. Material No. 09-001	Sealants (Ref. 20-31-00)

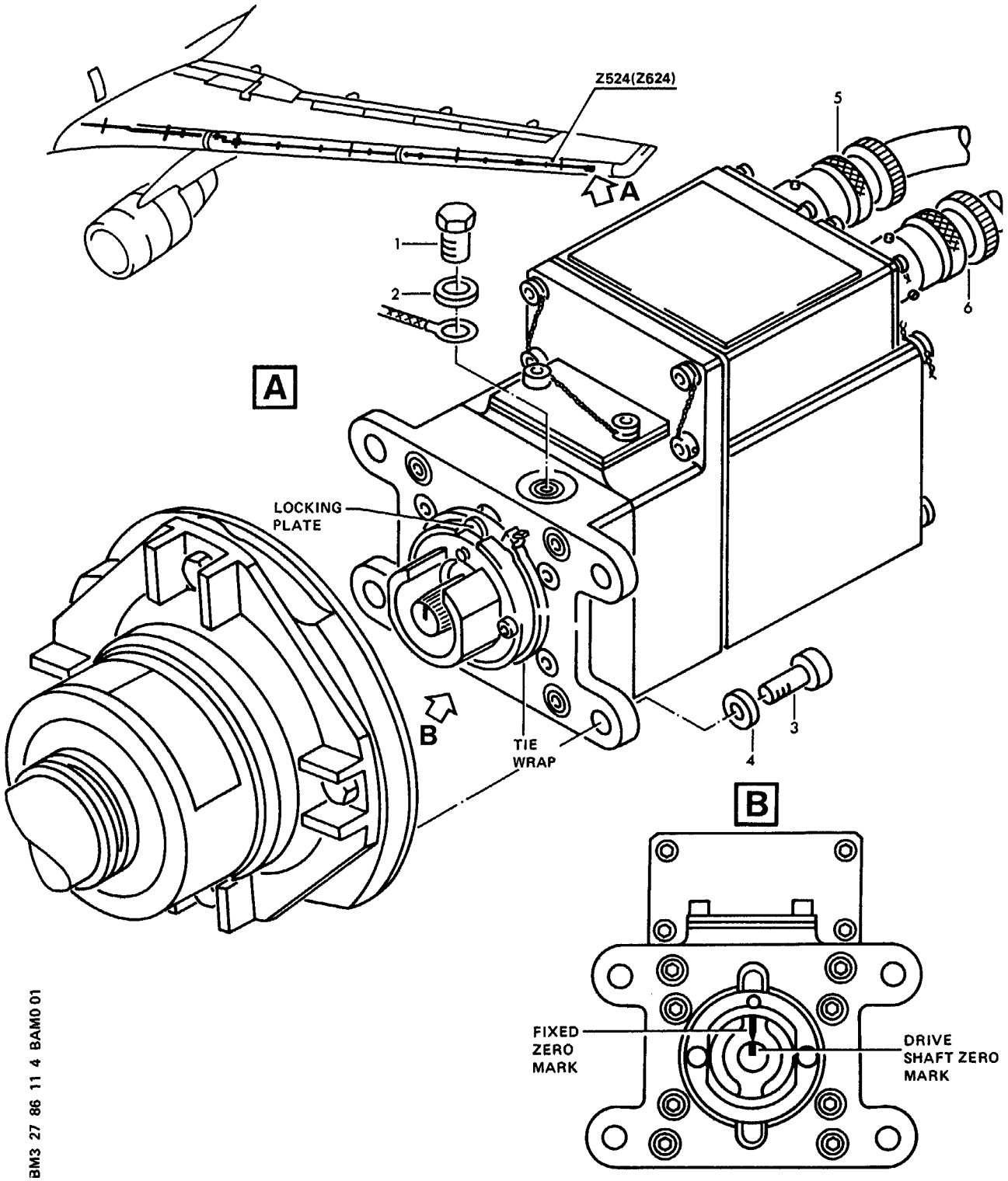
Referenced Procedures

- 20-28-11, P. Block 1	Electrical Bonding
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-80-00, P. Block 501	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)

2. Procedure

(Ref. Fig. 401)

NOTE : The following procedure describes removal/installation of Asymmetry Position Pick-off Unit (APPU) set at mechanical and electrical zero, this being the condition new APPU are in when delivered. Removal/ Installation of APPU is possible with the system at positions other than zero, due to the APPU self-locking facility, provided that the same APPU is refitted and no movement of the system transmission has occured between removal and installation of APPU.



Asymmetry Position Pick-Off Unit
Figure 401

A. Job Set-Up
(1)Position safety barriers.
(2)Fully retract slats (Ref. 27-80-00, P. Block 301).
R (3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

(5)Position access platform.
(6)Open access door 524KB (624KB).

B. Removal
(1)Disconnect electrical connectors (5) and (6) from APPU.
(2)Cap electrical connectors.
(3)Remove bolt (1) and washer (2); disconnect bonding strap.
(4)Support and remove bolts (3) with washers (4).
(5)Remove APPU.
(6)Fit a tie-wrap behind the locking plate to prevent retraction of locking plate.

C. Installation
CAUTION : A NEW APPU IS DELIVERED LOCKED IN THE MECHANICAL AND ELECTRICAL ZERO POSITION. THE SYSTEM MUST ALSO BE IN ITS ZERO POSITION BEFORE THE APPU IS INSTALLED.
(1)Make certain that slat transmission is in zero position (Ref. 27-80-00, P. Block 501).
(2)Check end of drive shaft to make certain APPU is set to zero position (drive shaft zero mark and fixed zero mark are aligned).
(3)Apply anti-corrosion compound (Material No. 05-002) to mating surfaces of APPU and adapter.
(4)Remove tie-wrap from APPU.
(5)Position APPU on adapter and install bolts (3) and washers (4). TORQUE bolts (3) to between 7.8 and 9.6 Nm (5.8 and 7.1 lbf.ft.).
NOTE : Fitting the APPU requires the simultaneous alignment of the housing keyway, the drive shaft splines, the locating dowel and the securing bolt holes, but not more than moderate hand pressure should be required. A slight additional pressure is required to depress the APPU locking plate and engage the drive fully.
(6)Apply corrosion preventive (Material No. 05-005) to bolts (3) and washers (4).
(7)Position bonding strap: install bolt (1) and washer (2) (Ref. 20-28-11, P. Block 1).
(8)Apply sealant (Material No. 09-001) to bolt head and washer.

(9)Remove electrical blanking caps from electrical connectors.
(10)Connect electrical connectors (5) and (6) to APPU.
(11)Remove safety clips and tags; close circuit breakers 3CV, 4CV, 7CV, 8CV and 9CV.
(12)Remove safety guard from flap/slat control lever quadrant.

D. Test
(1)Carry out operational test (Ref. 27-84-00, P. Block 501).

E. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 524KB (624KB).
(3)Remove safety barriers.
(4)Remove access platform.

ASYMMETRY POSITION PICK-OFF UNIT ADAPTER - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS, OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 4.6 m (15 ft.)
R B. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
C. LL517A034	Alignment Plug
D.	Safety Barriers
E.	Wiper Ring
F.	Circuit Breaker Safety Clips and Tags
G. Material No. 04-004	Common Greases (Ref. 20-31-00)
H. Material No. 05-002	Special Materials (Ref. 20-31-00)
I. Material No. 05-005	Special Materials (Ref. 20-31-00)
J. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 27-86-11, P. Block 401	Asymmetry Position Pick-Off Unit

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Position safety barriers.

(2)Fully retract slats (Ref. 27-80-00, P. Block 301).

R (3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

(5)Position access platform.
(6)Open access door 524KB (624KB).

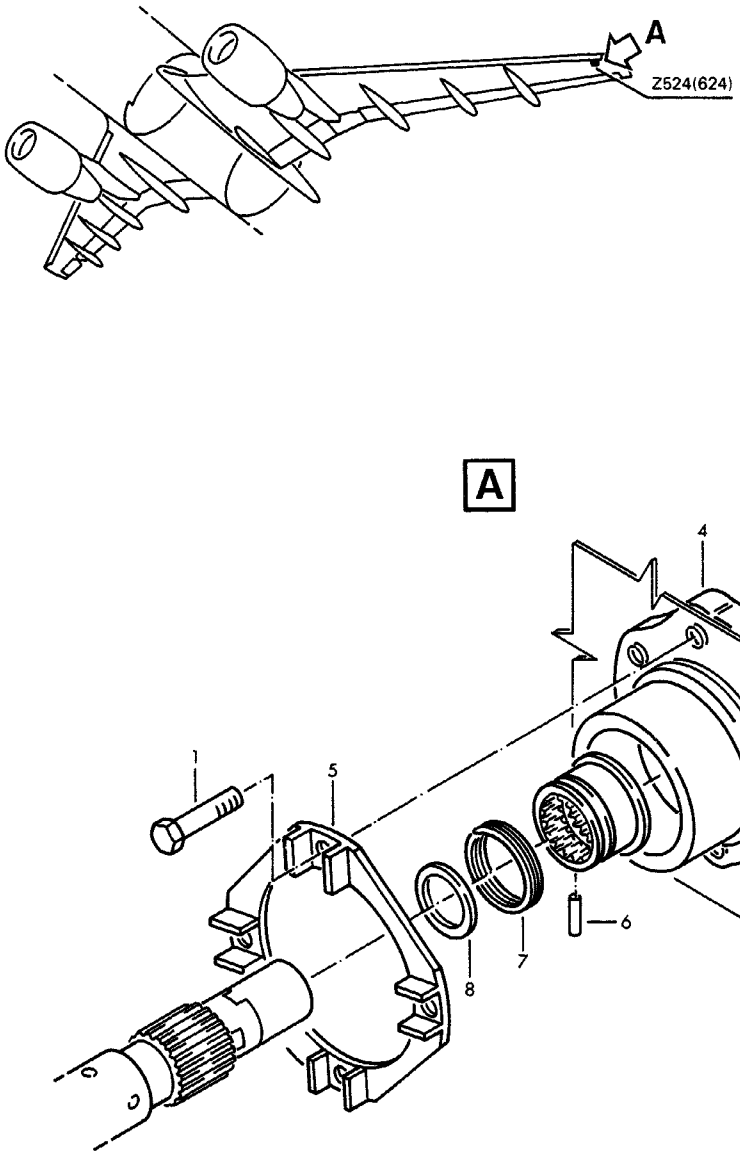
B. Removal
(1)Remove asymmetry position pick-off unit (Ref. 27-86-11, P. Block 401).
(2)Remove retaining spring (7) and pin (6).
(3)Rotate cover plate (3) to gain access to nuts (2) in adapter mounting (4).
(4)Remove nuts (2).
(5)Remove adapter mounting (4), asymmetry position pick-off unit adapter complete with locking ring (5) and bolts (1).
(6)Remove and discard wiper ring (8).

C. Preparation for Installation
(1)Clean wiper ring recess in adapter using white spirit (Material No. 11-002).
(2)Install new wiper ring (8) using alignment plug.

D. Installation
(1)Apply anti-corrosion compound (Material No. 05-002) to contact face of adapter mounting (4).
(2)Apply grease (Material No. 04-004) to spline on slat torque shaft.
(3)Position asymmetry position pick-off unit adapter complete with locking ring (5) and bolts (1) on slat torque shaft.
(4)Position adapter mounting (4); install nuts (2) and tighten.
(5)Rotate cover plate (3).
(6)Install pin (6) and lock with retaining spring (7).
(7)Apply corrosion preventive (Material No. 05-005) to nuts and bolt heads.
(8)Install asymmetry position pick-off unit (Ref. 27-86-11, P. Block 401).
NOTE : Installation of the asymmetry position pick-off unit locks cover plate in position.
(9)Remove safety clips and tags and close circuit breakers 3CV, 4CV, 7CV, 8CV and 9CV.
(10)Remove safety guard from flap/slat control lever quadrant.

E. Test
(1)Carry out operational test (Ref. 27-84-00, P. Block 501).

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 524KB (624KB).
(3)Remove safety barriers.
(4)Remove access platform.



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Asymmetry Position Pick-Off Unit Adapter
Figure 401

(5)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.

WING TIP BRAKE/SOLENOID VALVE (35CV, 36CV) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS. CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SURFACES THEY OPERATE.

1. Reason for the Job

A. Following removal/installation procedure are described:
(1)Wing tip brake solenoid valve.
(2)Wing tip brake assy.

2. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 5.2 m (17 ft.)
	B. LL517A034	Alignment Plug
R	C. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	D. 98A27808009000	Turning Jig - Slat Drive Shaft
	E.	Torque Wrench, 2.8 to 3.1 Nm (2.07 to 2.29 lbf.ft.)
	F.	Torque Wrench, 10 to 12.4 Nm (7.4 to 9.1 lbf.ft.).
	G.	Safety Barriers
	H.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
	I.	Electrical Blanking Caps
	J.	Hydraulic Blanking Caps
	K.	Circuit Breaker Safety Clips and Tags
	L.	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	M.	Cotter Pins
	N.	O-Rings
	O.	Wiper Rings
	P.	Ohmmeter 0-20 milliohms
	Q. Material No. 04-004	Common Greases (Ref. 20-31-00)
	R. Material No. 05-002	Special Materials (Ref. 20-31-00)
	S. Material No. 05-005	Special Materials (Ref. 20-31-00)
	T. Material No. 05-054	Special Materials (Ref. 20-31-00)
	U. Material No. 09-008	Sealants (Ref. 20-31-00)
	V. Material No. 09-018	Sealants (Ref. 20-31-00)
	W. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

3. Procedure
(Ref. Fig. 401)
(Ref. Fig. 402)

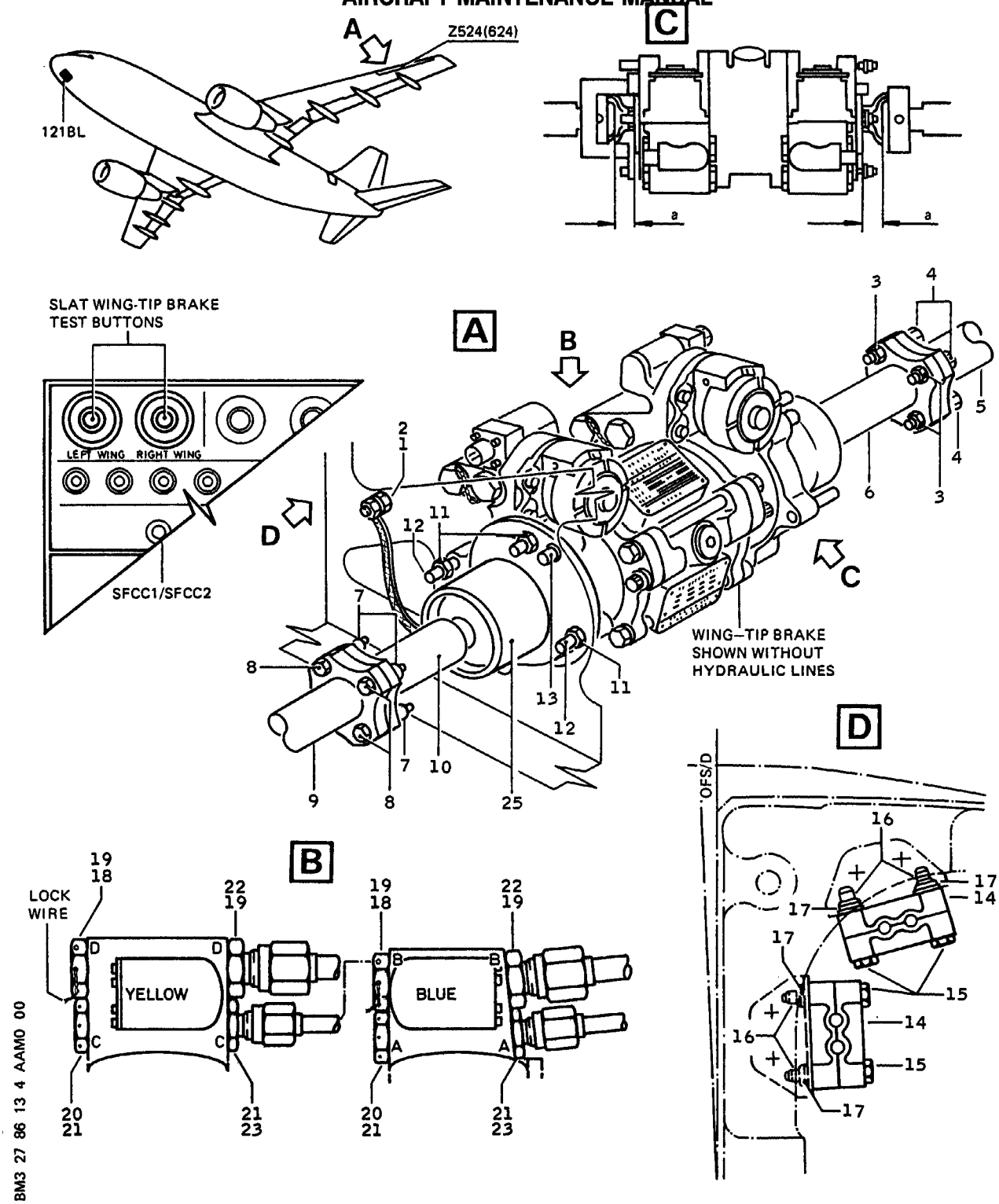
A. Job Set-Up
(1)Position safety barriers.
(2)Retract slats to 0° position (Ref. 27-80-00, P. Block 301).
R (3)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.
(4)Open one of the main gear main doors (Ref. 32-12-11, P. Block 301).
(5)Depressurize YELLOW and BLUE hydraulic systems (Ref. 29-10-00, P. Block 301).
(6)Depressurize YELLOW and BLUE hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(7)Position warning notice prohibiting pressurization of hydraulic systems.
(8)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

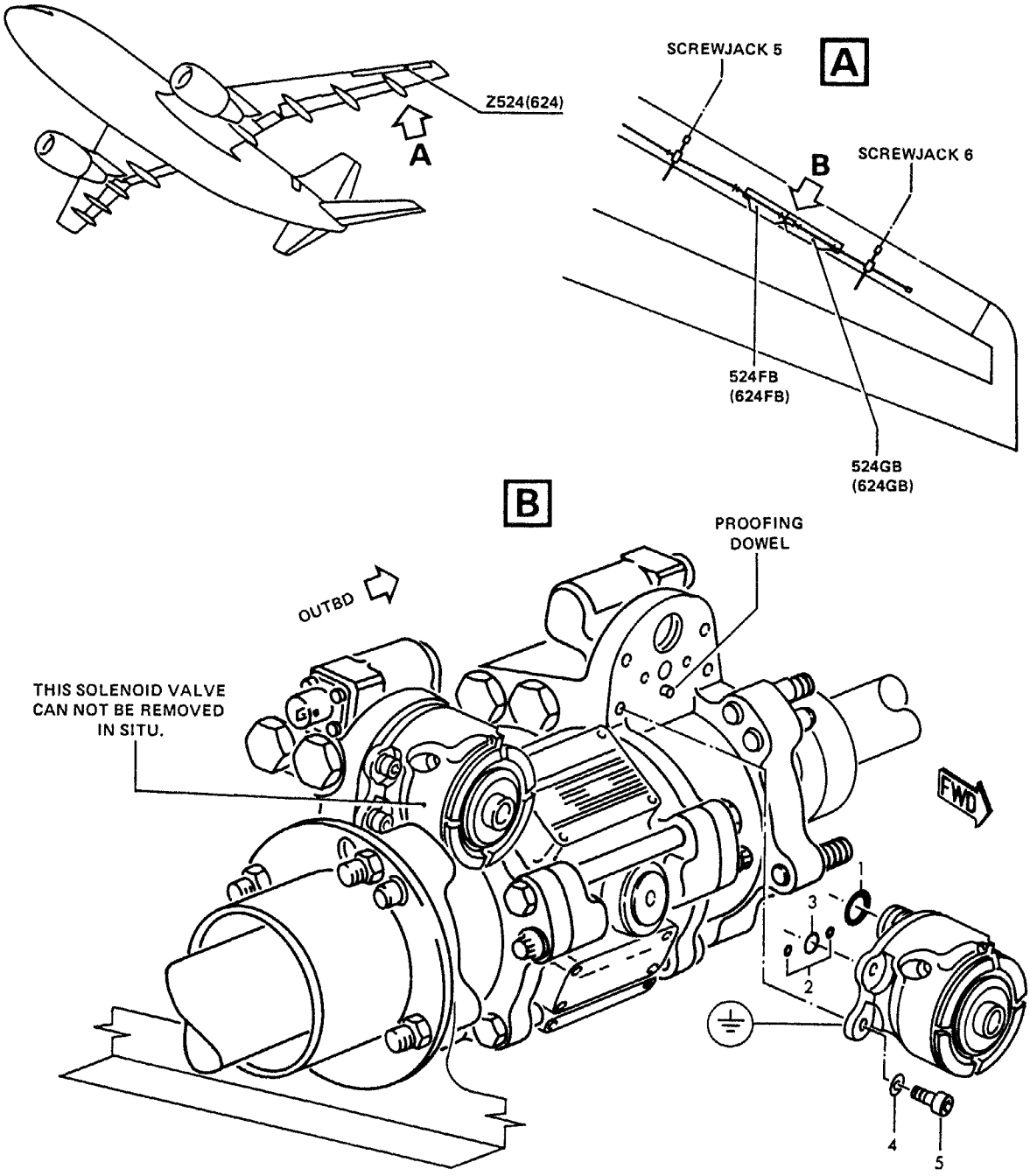
(9)Position access platform.
(10)Open access doors 524DB (624DB), 524GB (624GB), 524FB (624FB), 524JB (624JB), 121BL and 147BZ.

B. Removal
(1)Solenoid Valve
NOTE : Only the outboard solenoid valve can be removed in situ.
(a)Cut and remove lockwire (If applicable).
(b)Remove screws (5) and washers (4).
(c)Remove solenoid valve from wing tip brake.
(d)Remove and discard O-rings (1,2,3).

(2)Wing Tip Brake



Wing Tip Brake (Slats)
Figure 401



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Solenoid Valve
Figure 402

(a)Disconnect electrical connectors and cap open ends.
(b)Remove nuts (17), washers (16), bolts (15) and fairleads (14).
(c)Disconnect hydraulic connections and cap open ends.
(d)Remove nut (1) and bolt (2), disconnect bonding strap from wing tip brake.
R (e)Make sure that there is no torque load in the transmission system.
R NOTE : There is no torque load in the transmission system if you can
R move the transmission shafts with your hands.
CAUTION : EXCESSIVE MISALIGNMENT OF THE TORQUE SHAFTS CAN DAMAGE THE UNIVERSAL JOINTS.
R (f)Support torque shaft (5) from adjacent structure with lockwire.
R (g)Support universal joint (6) and remove nuts (3) and bolts (4), carefully separate flanges of universal joint (6) and torque shaft (5); withdraw universal joint (6) from wing tip brake, remove universal joint (6).
R (h)Support torque shaft (9) from adjacent structure with lockwire.
R (j)Support universal joint (10); remove nuts (7) and bolts (8), carefully separate flanges of universal joint (10) and torque shaft (9); withdraw universal joint (10) from wing tip brake, remove universal joint (10).
R (k)Support wing tip brake and remove nuts (11).
R (l)Remove wing tip brake and protective cowl (25).

C. Preparation of Replacement Component
(1)If a new wing tip brake is to be installed, proceed as follows:
(a)Cut lockwire and remove blanking plugs (18),(20) and fittings (22),(23) with O-rings (19),(21) from old component. Discard O-rings.
(b)Install blanking plugs (18),(20) and fittings (22),(23) with new O-rings (19),(21) on new component. TORQUE blanking plugs and fittings to between 10 and 11 Nm (7.4 and 8.1 lbf.ft.).
(c)Safety blanking plugs (18),(20) with lockwire Dia. 0.8 mm (0.032 in.).
(d)Install attached new wiper rings into wing tip brake using alignment plug.
(2)If the removed wing tip brake is to be replaced, remove and discard wiper ring from splined ends. Clean splined surfaces with white spirit (Material No. 11-002) and install new wiper ring using alignment plug.
(3)Make sure that wing tip brake solenoid valve attachment screws (5) are wirelocked.

D. Installation
(1)Solenoid Valve
(a)Prepare a small quantity of a mixture composed of 58% anti-corrosion compound (Material No. 05-002) and 42% zinc powder (Material No. 05-054).
NOTE : Proportions quoted are by weight.
(b)Apply a quantity of mixture prepared above to area provided for electrical bonding on solenoid valve and wing tip brake.
(c)Apply anti-corrosion compound (Material No. 05-002) to threads of screws (5).
(d)Install new O-rings (1,2,3) in solenoid valve.
CAUTION : TO PREVENT INSTALLATION OF INCORRECT SOLENOID VALVES, THE WTB IS PROVIDED WITH A PROOFING DOWEL. MAKE CERTAIN THAT SOLENOID VALVE

TO BE INSTALLED HAS THE CORRESPONDING HOLE IN ITS MOUNTING SURFACE.

(e)Install solenoid valve on wing tip brake.

(f)Install washers (4) and screws (5). TORQUE screws (5) to between 2.8 and 3.1 Nm (2.07 and 2.29 lbf.ft.).

NOTE : Complete wing tip brakes are supplied with the solenoid valve attachment screws (5) wirelocked. It is not necessary to renew this wire locking when replacing a solenoid valve with the wing tip brake in situ. It is, however, advisable to wirelock screws (5) if adequate access is available, for example if the wing tip brake has been removed from the aircraft.

(g)Using an ohmmeter to measure electrical resistance between solenoid valve and wing tip brake housing (at main bonding point), resistance must not exceed 20 milliohms.

(2)Wing Tip Brake

(a)Apply sealant (Material No. 09-018) to mounting face of wing tip brake and to flange of protective cowl (25).

(b)Position wing tip brake on outboard face of rib. Make certain that studs (12) and dowel (13) engage correctly in holes provided in rib.

(c)Support wing tip brake; position protective cowl (25) and install nuts (11). Seal nuts with corrosion preventive (Material No. 05-005).

(d)Apply synthetic grease (Material No. 04-004) to splined end of universal joint (10).

(e)Install universal joint (10) in wing tip brake.

(f)Cut and remove supporting lockwire and support torque shaft (9) by hand.

(g)Make certain that holes in flange of universal joint (10) align with holes in flange of torque shaft (9). If necessary, rotate universal joint by hand until correct alignment is achieved.

(h)Install bolts (8) and nuts (7). TORQUE nuts to between 10.2 and 12.4 Nm (7.5 and 9.1 lbf.ft.). Seal with corrosion-preventive (Material No. 05-005).

(i)Apply synthetic grease (Material No. 04-004) to splined end of universal joint (6).

(j)Approximately align holes in flange of universal joint (6) with holes in flange of torque shaft (5). Install universal joint (6) in wing tip brake.

(k)Cut and remove supporting lockwire and support torque shaft (5) by hand.

(l)Make certain that holes in flange of universal joint (6) align with holes in flange of torque shaft (5).

NOTE : If required, turning jig PN 98A27808009000 may be used to rotate slat drive shaft.

(m)Install bolts (4) and nuts (3). TORQUE nuts to between 10.2 and 12.4 Nm (7.5 and 9.1 lbf.ft.). Seal with corrosion preventive (Material No. 05-005).

(n)Make certain that measurement 'a' is not less than 11.8 mm (0.46 in.) and indicator groove on sliding splined connection is not visible.

(o)Install bolt (2), position free end of bonding strap on bolt (2) and install nut (1); apply sealant (Material No. 09-008) to exposed

areas of nut and bolt.
(p)Remove protective caps; connect hydraulic connections.
(q)Position fairleads (14) on brackets, install bolts (15), washers (16) and nuts (17).
(r)Remove protective caps; connect electrical connectors.

E. Test
(1)Remove safety clips and tags and close circuit breakers 3CV, 7CV, 9CV, 8CV and 4CV.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
(4)Remove warning notice prohibiting pressurization of hydraulic systems.
(5)Check hydraulic fluid level in YELLOW and BLUE hydraulic reservoirs and top up if required (Ref. 12-12-29, P. Block 1).
(6)Pressurize YELLOW and BLUE hydraulic reservoirs (Ref. 29-14-00, P. Block 301).
(7)Pressurize GREEN, YELLOW and BLUE hydraulic systems (Ref. 29-10-00, P. Block 301).
(8)Bleed hydraulic supplies to wing tip brake.
NOTE : SFCC 1 controls BLUE hydraulic supply to slat wing tip brakes.
SFCC 2 controls YELLOW hydraulic supply to slat wing tip brakes.
(a)On electronics rack 92VU locate SFCC 1; on electronics rack 93VU locate SFCC 2.
(b)ON SFCC 1, press required slat wing tip brake test button, hold for approximately two to three seconds and release. Wait approximately two to three seconds, press test button again. Repeat operation ten times.
NOTE : Slat wing tip brake in LH wing is operated by pressing slat wing tip brake test button identified as LEFT WING.
Slat wing tip brake in RH wing is operated by pressing slat wing tip brake test button identified as RIGHT WING.
(c)Repeat step (b) using required slat wing tip brake test button on SFCC 2.
NOTE : Bleeding procedure for each hydraulic system should take approximately 40 to 60 seconds.
(9)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61

(10)Remove safety guard from flap/slat control lever quadrant.
(11)Testing of brake function.
WARNING : MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.
Initial Conditions:
- Torque limiter lock-out indicators of slat screwjacks 5 and 6 are in neutral position

- System torque limiter lock-out indicator is not visible
- Slats in 0° position

ACTION	RESULT
1. On center pedestal - Move slat/flap control lever to SLATS 15/FLAPS 0.	Slats extend to 15° position.
2. On SFCC 1 on electronic rack 92VU - Press slat wing tip brake test button (LEFT WING or RH WING as required); keep button depressed until steps 3. thru 6. are completed.	On SFCC 1 front panel - Failure code LH WTB (RH WTB) appears after approx. 8 s.
3. Wait 10 s.	
4. On center pedestal - Move slat/flap control lever to SLATS 20/FLAPS 20.	Slats do not move. Relevant system torque limiter in air conditioning compartment locks out. On overhead panel 428VU - SLATS/SYS 1/FAULT and SLATS/SYS 2/FAULT lights come on after approx. 4s. On SFCC2 front panel - Failure code JAM appears after approx. 8s.
5. Check that torque limiters at slat screwjacks 5 and 6 are not locked out, if necessary reset lock-out indicator.	
6. On center pedestal - Return slat/flap control lever to SLATS 15/FLAPS 0.	On overhead panel 428VU - SLATS/SYS 1/FAULT and SLATS/SYS 2/FAULT light goes off.
7. On SFCC 1 front panel - Release slat wing tip brake test button.	
8. Reset SFCC1 and SFCC2.	ON SFCC 1 and SFCC 2 front panel - Failure codes disappear.
9. On center pedestal - Move slat/flap control lever to SLATS 0/FLAPS 0 and then back to SLATS 15/FLAPS 0	Slats retract to 0° position and then extend to 15° position on further selection.

ACTION	RESULT
10. After releasing the wing tip brake test button the torque limiters of slat screwjacks 5 and 6 may lock out. If necessary reset lock-out indicator.	
11. Reset system torque limiter lock-out indicator.	
12. On SFCC2 on electronic rack 93VU - Repeat steps 2. thru 11. using relevant slat wing tip brake test button.	As steps 2. thru 11. applicable to system 2.
13. On center pedestal - Move slat/flap control lever to SLATS 0/FLAPS 0.	Slats move to fully retracted position.
14. ON maintenance panel 472VU - Set ANN LT switch to READ.	On maintenance panel 471VU - SFCC 1 and SFCC 2/BITE DISPLAY and all other memorized fault annunciators having stored a fault come on.
15. Record all indications other than SFCC 1 and SFCC 2/BITE DISPLAY which appear on maintenance panel 471VU.	
16. On maintenance panel 471VU - Press MFA RESET pushbutton switch to clear SFCC 1 and SFCC 2/BITE DISPLAY indication.	
17. On maintenance panel 472VU - Set ANN LT switch to OFF.	

F. Close-Up

(1) Close access door 147BZ.
(2) Close main gear main door (Ref. 32-12-11, P. Block 301).
(3) Remove safety clips and tags and close circuit breakers 1CV and 2CV.
(4) Depressurize GREEN, YELLOW and BLUE hydraulic systems and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(5) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(6) Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(7) Close access doors 524DB (624DB), 524GB (624GB), 524FB (624FB), 524JB

(624JB) and 121BL.
(8)Remove safety barriers.
(9)Remove access platform.

WING TIP BRAKE (35CV, 36CV) - ADJUSTMENT/TEST

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reasons for the Job

A. To test correct functioning of each wing tip brake.

B. To check BLUE system and YELLOW system hydraulic supply to each wing tip brake.

C. To test bi-directional operation of each system torque limiter.

D. To check lock-out indication on each system torque limiter.

E. To test functioning of reverse selection capability of each system torque limiter.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3.5 m (11.3 ft.)
B.	Torch
C.	Circuit Breaker Safety Clips and Tags
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-56-13, P. Block 501	Wing Tip Brake (33CV, 34CV)
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-86-13, P. Block 601	Wing Tip Brake (35CV, 36CV)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

3. Procedure

A. Job Set-Up

(1)Connect electrical ground power unit and energize the aircraft

electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)Pressurize GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62

NOTE : On overhead panel 428VU, FLAPS/SYS 1/FAULT and FLAPS/SYS 2/FAULT lights come on.

(5)Make certain that following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/FLAPS & SLATS/POS/ECAM	2CN	334/S65
133VU	FLT CTL/FLAPS & SLATS/POS/IND	1CN	334/S66
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SLATS/WTB 2	14CV	336/Q64
133VU	FLT CTL/SLATS/WTB 1	13CV	336/Q65

R (6)Make sure that pushbutton switches B, G and Y on SERVO CTL section
R of panel 428VU are pressed in (OFF legends are not on).
R (7)Extend slats to 15° position (Ref. 27-80-00, P. Block 301).
R (8)Open one of the main gear main doors (Ref. 32-12-11, P. Block 301).
R (9)Open access panel 147BZ.
R (10)Position access platform.
R (11)Open access panels 524DB (624DB) and 524JB (624JB).
R (12)Open access door 121BL or 211PZ.

B. Operational Test of Wing Tip Brakes and System Torque Limiters

NOTE : Operational test of slat wing tip brakes, system torque limiters and pressure-off brakes using wing tip brake test tool is carried out in conjunction with test of flap system (Ref. 27-56-13, P. Block 501).

Initial Conditions
- Torque limiter lock-out indicators of slat screwjacks 5 and 6 are in neutral position
- System torque limiter lock-out indicator is not visible
- SFCCs on electronic racks 92VU and 93VU are clear
- Slats in 15° position

ACTION	RESULT
1. On SFCC 1 on electronic rack 92VU - Press slat wing tip brake test button **LEFT WING**; keep button depressed until steps 2 thru 5 are completed.	On SFCC 1 front panel - Failure code **LH WTB** appears after approx. 8s.
2. Wait 10s.	
3. On center pedestal - Move slat/flap control lever to **SLATS 20/FLAPS 20**.	Slats do not move. Left system torque limiter in air conditioning compartment locks out. On overhead panel 428VU - **SLATS/SYS 1/FAULT** and **SLATS/SYS 2/FAULT** lights come on after approx. 4s. On SFCC 2 front panel - Failure code **JAM** appears after approx. 8s.
4. Check that torque limiters at slat screwjacks 5 and 6 are not locked out, if necessary reset lock-out indicator.	
5. On center pedestal - Return slat/flap control lever to **SLATS 15/FLAPS 0**.	On overhead panel 428VU - **SLATS/SYS 1/FAULT** and **SLATS/SYS 2/FAULT** lights go off.
6. On SFCC 1 front panel - Release slat wing tip brake test button.	
7. Reset SFCC 1 and SFCC 2.	On SFCC 1 and SFCC 2 front panel - Failure codes disappear.
8. On center pedestal - Move slat/flap lever to **SLATS 0/FLAPS 0** and then back to **SLATS 15/FLAPS 0**.	Slats retract to 0° position and then extend to 15° position on further selection.
9. After releasing the wing tip brake test button, the torque limiters of slat screwjacks 5 and 6 may lock out, if necessary reset lock-out indicator.	

ACTION	RESULT
10. Reset left system torque limiter lock-out indicator.	
11. On SFCC 2 on electronic rack 92VU - Press slat wing tip brake test button **LEFT WING**; keep depressed until steps 12 thru 15 are completed.	On SFCC 2 front panel - Failure code **LH WTB** appears after approx. 8s.
12. Wait 10s.	
13. On center pedestal - Move slat/flap control lever to **SLATS 0/FLAPS 0**.	Slats do not move. Left system torque limiter in air conditioning compartment locks out. On overhead panel 428VU - **SLATS/SYS 2/FAULT** and **SLATS/SYS 1/FAULT** lights come on after approx. 4s. On SFCC 1 front panel - Failure code **JAM** appears after approx. 8s.
14. Check that torque limiters at slat screwjacks 5 and 6 are not locked out, if necessary reset lock-out indicator.	
15. On center pedestal - Return slat/flap control lever to **SLATS 15/FLAPS 0**.	On overhead panel 428VU - **SLATS/SYS 2/FAULT** and **SLATS/SYS 1/FAULT** lights go off.
16. On SFCC 2 front panel - Release slat wing tip brake test button.	
17. Reset SFCC 1 and SFCC 2.	On SFCC 1 and SFCC 2 front panel - Failure codes disappear.
18. On center pedestal - Move slat/flap lever to **SLATS 20/FLAPS 20** and then back to **SLATS 15/FLAPS 0**.	Slats extend to 20° position and then retract to 15° position on further selection.
19. After releasing the wing tip brake test button, the	

ACTION	RESULT
torque limiters of slat screwjacks 5 and 6 may lock out, if necessary reset lock-out indicator.	
20. Reset left system torque limiter lock-out indicator.	
21. Repeat steps 1 thru 20 for the RH slat half system.	
22. ON maintenance panel 472VU - Set ANN LT switch to READ.	On maintenance panel 471VU - SFCC 1 and SFCC 2/BITE DISPLAY and all other memorized fault annunciators having stored a fault come on.
23. Record all indications other than SFCC 1 and SFCC 2/BITE DISPLAY which appear on maintenance panel 471VU.	
24. On maintenance panel 471VU - Press MFA RESET pushbutton switch to clear SFCC 1 and SFCC 2/BITE DISPLAY indication.	
25. On maintenance panel 472VU - Set ANN LT switch to OFF.	

C. Close-Up

(1) Inspect wing tip brakes for leaks, cracks and security (Ref. 27-86-13, P. Block 601).
(2) Fully retract slats (Ref. 27-80-00, P. Block 301).
(3) Remove safety clips and tags and close circuit breakers 1CV and 2CV.
NOTE : On overhead panel 428VU, FLAPS/SYS 1/FAULT AND FLAPS/SYS 2/FAULT lights go off.
(4) Close access panel 147BZ.
(5) Close main gear main door (Ref. 32-12-11, P. Block 301).
(6) Depressurize GREEN, BLUE and YELLOW hydraulic systems (Ref. 29-10-00, P. Block 301).
(7) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(8) Close access doors 524DB (624DB) and 524JB (624JB).
(9) Close access door 121BL or 211PZ.
(10) Remove access platform.

WING TIP BRAKE (35CV, 36CV,) - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS. CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

1. General Visual Check

A. Reason for the Job

(1)General visual check of wing-tip brake, attachments and connections.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 4.2 m (14 ft.)
R (2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
(3)	Circuit Breaker Safety Clips and Tags

C. Procedure

(Ref. Fig. 601)

(1)Job Set-Up

(a)Position access platform.

R (b)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(c)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66

(d)Open access doors 524GB (624GB) and 524FB (624FB).

(2)Inspection/Check

(a)Inspect wing-tip brakes for satisfactory condition (absence of corrosion, cracks or other damage).

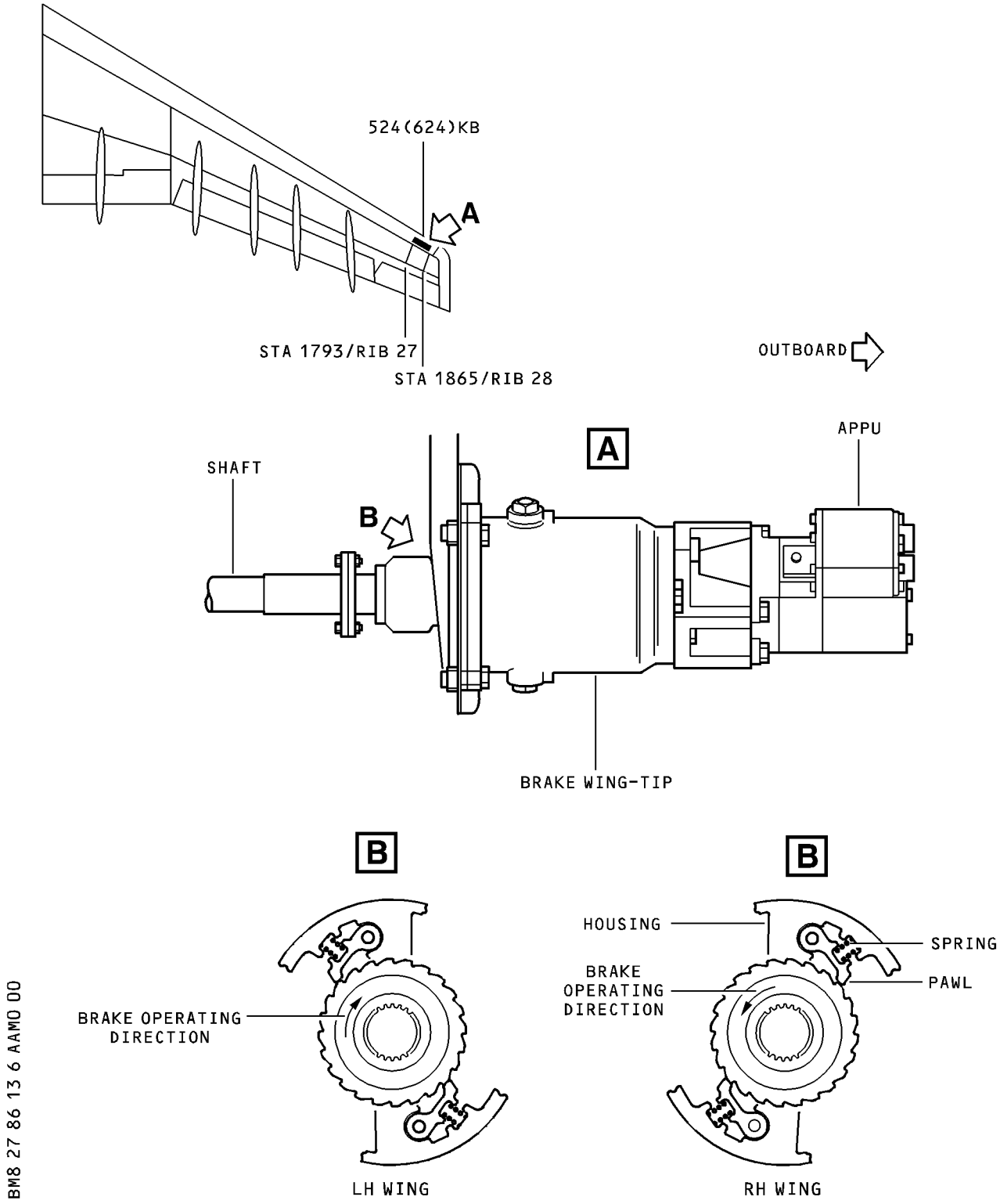
(b)At attachment points check that:

- all nuts and bolts are properly tightened
- all nuts, bolts and studs are in satisfactory condition (absence of corrosion).

(c)Check that bonding straps and attachment points are in satisfactory condition (absence of fraying or corrosion) and are correctly earthed.

(d)Check that electrical connectors are in satisfactory condition and are properly connected.

(e)Check that hydraulic connections are in satisfactory condition and



Wing Tip Brake
Figure 601

are properly connected and that there is no leakage of hydraulic fluid. Especially check vent hole in solenoid valves. Any fluid leakage at vent hole renders the solenoid valve unserviceable.

(f)Check for evidence of lubricant leakage. Any lubricant leakage renders the unit unserviceable.

(3)Close-Up

(a)Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.

(b)Remove safety guard from flap/slat control lever.

(c)Make certain that work area is clean and clear of tools and miscellaneous items of equipment, and close access doors 524GB (624GB) and 524FB (624FB).

(d)Remove access platform.

KRUEGER FLAP CONTROL - DESCRIPTION AND OPERATION

1. General

General

The function of the Krueger flaps is to complete the wing leading edge profile when the slats are extended. There are two Krueger flaps.
The system operates in conjunction with the slats. The Krueger flaps have two positions, fully extended or fully retracted.
Operational control is initiated from a slat/flap control lever on the center pedestal. When the lever is moved from position 1, it rotates a command sensor unit (CSU) which sends a slat position command to the slat/flap control computers, SFCC1 (21CV) and SFCC2 (22CV) (Ref. 27-51-00). On receipt of the command the computer sends an "extend" discrete to the Krueger selector solenoid valve which energizes the extend solenoid and directs hydraulic pressure to extend the Krueger flaps (Ref. 27-88-00).
When the control lever is returned to position 1, provided that the slats are no further out than 15 deg. and the alpha-lock has not been engaged, a "retract" discrete from SFCC1 and 2 energizes the retract solenoid and both flaps are retracted.
Four microswitches, two on each flap, indicate Krueger and flap position to the computers SFCC1 and 2. If the Krueger flaps are not in the commanded position, fault warnings are provided for flight crew and maintenance crew (Ref. 27-89-00).

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
50CV	SOLENOID VALVE-KRUEGER SELECTOR		148		27-88-12

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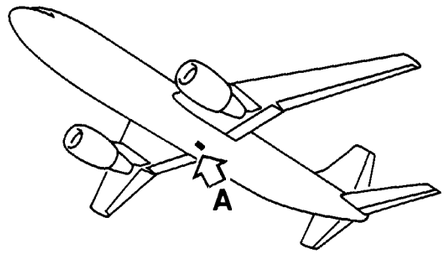
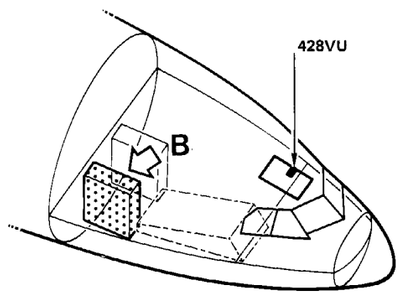
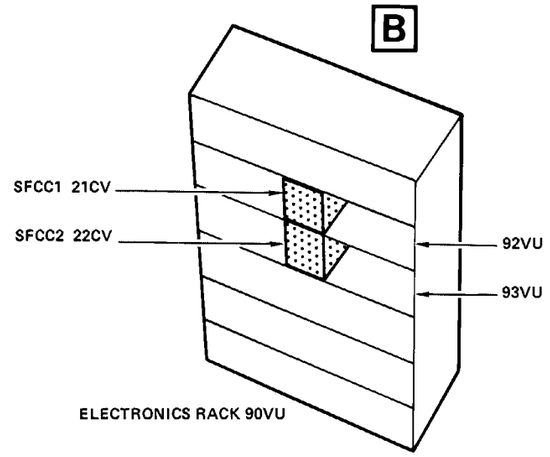
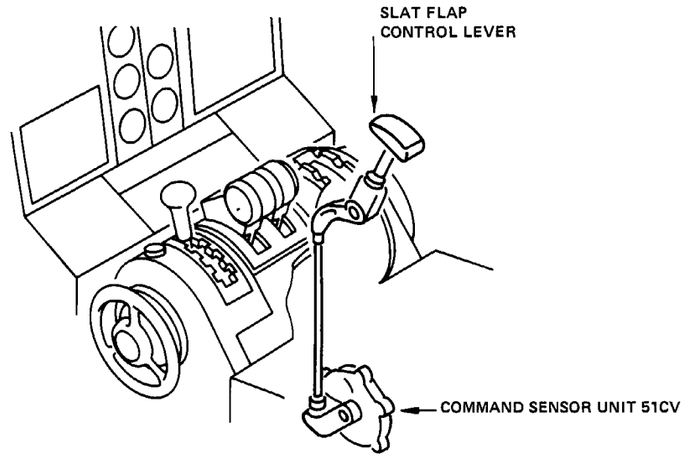
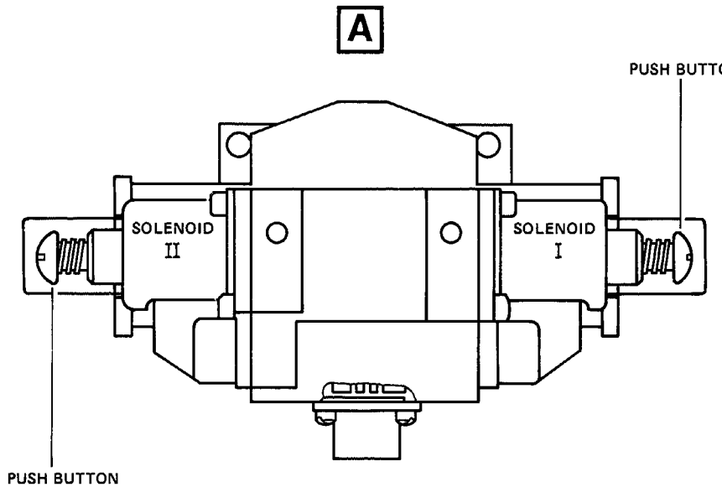
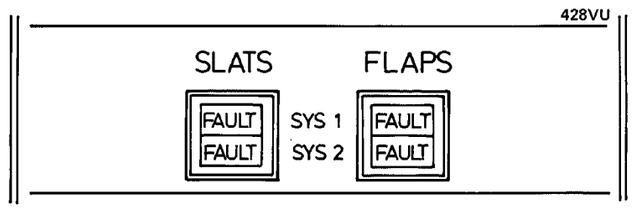












BM3 27 87 00 0 NAM0 00

Component Location
Figure 001

3. Description

A. General

The operational system for the Krueger flaps comprises:
- slat/flap control lever
- Command sensor unit (CSU)
- SFCC1 and 2
- Krueger flap assembly (RH and LH)
- Krueger flap actuator (RH and LH)
- One Krueger selector solenoid valve
- 4 position microswitches (two for each flap)

B. Control Lever Assembly and CSU

The slat/flap control lever is located on the center pedestal. The CSU is located in the electronic bay and is situated directly below the control lever. The control lever moves in a gated guide ramp and a detent mechanism in the handle retains it in the selected position. Movement of the control lever is transfered through a rod and link lever assembly to the CSU (Ref. 27-51-00).

C. Slat/flap Control Computer

Both SFCC1 and SFCC2 are located in the electronics rack (90CV) and are identical. An extended front panel contains BITE and test switches, annunciators and maintenance fault code indicators (Ref. 27-51-00).

D. Krueger Selector Solenoid Valve

The Krueger selector solenoid valve is located in the hydraulic bay (FR47). It is a three-position, four-port electromechanical valve. It consists of a cast body with a solenoid mounted at each end controlling a three-position shuttle valve. The valve is spring loaded to the center position where the ports are closed. The solenoids control the direction of hydraulic pressure from the output ports to the Krueger actuators determining direction of actuation (Ref. 27-88-00).

NOTE : The aileron droop unit will also receive hydraulic pressure.

Each solenoid has a manual pushbutton which allows the Krueger flaps and aileron droop actuators to be manually operated by the maintenance crew, when the normal control system is disabled.

E. Krueger Flaps

The Krueger flaps are located one on each wing root leading edge. Each flap is operated by individual hydraulic actuators powered by the Krueger selector solenoid valve.

F. Position Switches

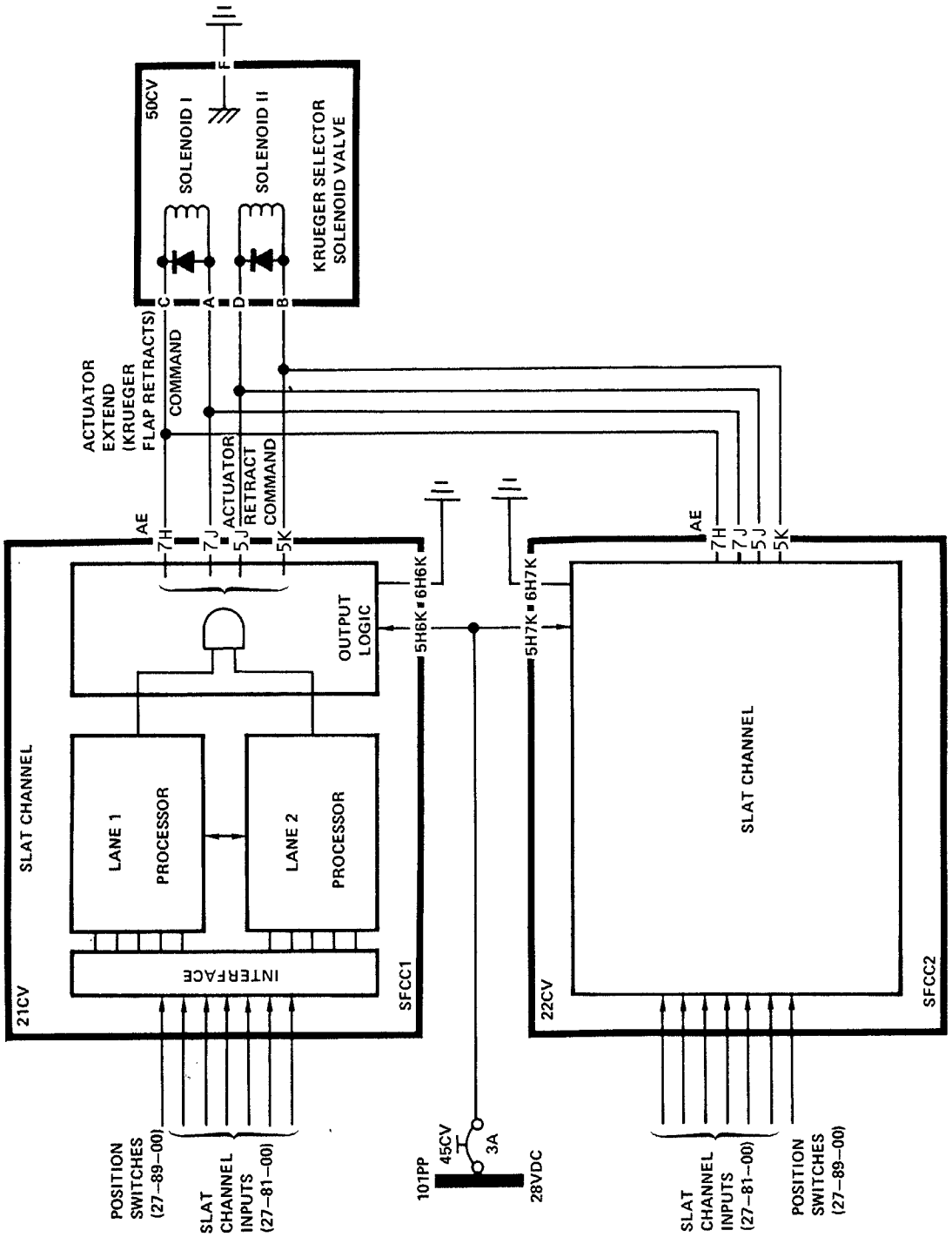
There are four position switches, two for each surface. They provide monitoring information for the slat channel in SFCC1 and SFCC2 and are not involved in the open loop control system (Ref. 27-89-00).

4. Operation

(Ref. Fig. 002)

A. General

To operate the Krueger flaps, SFCC1 and SFCC2 must be operating and the



BM6 27 87 00 0 NLM0 01

Krueger Flap - Electrical Control
Figure 002

R

green hydraulic system must be pressurized. The 28 V DC supply to SFCC1 and SFCC2 for the solenoid control is provided by circuit breaker 45CV.

B. Extend

NOTE : The operation of the Krueger flap actuator is such that the actuator retracts to extend the Krueger flap and extends to retract the flap.

When the slat/flap control lever is moved to any position other than position 1, SFCC1 and SFCC2 send a command discrete to solenoid II on the Krueger selector solenoid valve. The solenoid is energized and hydraulic pressure is directed to the retract side of the Krueger actuators and both Krueger flaps are extended.

When the Krueger flaps are fully extended, the position microswitches are operated. The contacts of the "extend" microswitch close and the contacts of the retract microswitches open. This action informs SFCC1 and SFCC2 that the Kruger flaps are in the commanded position.

Solenoid II remains energized until a retract command is received or the electrical power is removed from the system.

C. Retract

When the slat/flap control lever is moved to position 1 provided there is no alpha-lock and the slats have left the 15 deg. position, SFCC1 and SFCC2 send a command discrete to solenoid I on the Krueger selector solenoid valve and remove the discrete from solenoid II. Hydraulic pressure is directed to the extend side of the Krueger actuator and both the Krueger flaps are retracted. When the flaps are fully retracted the position microswitches operate to inform the computer that the flaps are in the commanded position. Solenoid I remains energized until an extend command is received or the electrical power is removed from the system.

D. Manual Operation

With no electrical control signal being applied to the Krueger selector solenoid valve, the valve piston is centered under spring tension. The Krueger actuators are hydraulically locked by the selector valve.

Pushing the pushbutton on solenoid I moves the piston and allows pressure through the valve to retract the Krueger flaps.

Pushing the pushbutton on solenoid II directs the pressure through the valve to extend the Krueger flaps.

NOTE : Aileron droop actuator will also operate at this time.

E. Interface with All Speed Ailerons

When supply pressure from the Krueger selector solenoid valve is directed to the Krueger actuators, it is also directed to the aileron droop actuator. This introduces a droop at the ailerons when the slats are extended (Ref. 27-88-00).

F. Monitoring

(1)KRUGER fault and maintenance alert

R SFCC1 and SFCC2 monitor the Krueger flap position. If either of the
R computers detect that Krueger flaps are not in the commanded position,

R a KRUGER fault discrete is generated and the KRUGER annunciator, on
R the slat/flap position indicator, comes on (Ref. 27-89-00).
R The discrete is produced by the SFCC output logic if both lane
R processors in the SFCC detect incorrect position switch inputs.

R The "Krueger not in position selected" warning discretes from SFCC 1 and
R 2 are fed to ECAM flight warning computers 1 and 2, respectively.
R This discrete is produced in a similar manner to the "Krueger fault"
R indication discrete.
R The lane processors also interface with the SFCC BITE circuits which,
R when enabled, cause the following indications:
R - the associated fault indication code ("LH extend switch", "RH extend
R switch", "LH retract switch" or "RH retract switch") is set on the
R SFCC front panel.
R - the BITE DISPLAY maintenance indicators come on.
R - the FAULT caption on the associated SLATS SYS control switch comes on.

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Operational Test

A. Reason for the Job
To check correct Krueger flap and aileron droop operation.
NOTE : A Krueger fault will not affect operation of the slats.
A slat fault affecting both slat systems will cause the Krueger to remain in the last commanded position.
A slat fault affecting only one slat system will not affect Krueger operation as commands are still generated by the "good" slat system.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips and Tags
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-88-12, P. Block 401	Krueger Selector Solenoid Valve
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-21-00, P. Block 301	Green Auxiliary Power
- 29-22-00, P. Block 301	Blue Auxiliary Power
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure
(1)Job Set-Up
(a)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electonics racks ventilation is correct.
(c)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301 or 29-10-00, P. Block 301).
NOTE : As only one hydraulic system is utilized the slats will operate at half normal speed.
(d)Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SLATS/26VAC/SYS2	4CV	335/R64
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SLATS/WTB 2	14CV	336/Q64
133VU	FLT CTL/SLATS/WTB 1	13CV	336/Q65
133VU	FLT CTL/SERVO CTL & THS/HYD/SEL	1CB	332/U63
133VU	FLT CTL/SERVO CTL & THS/JAM/DET	2CB	332/U64

(e)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 2/26VAC	2CV	334/S62
133VU	FLT CTL/FLAPS/SYS 1/26VAC	1CV	335/R61

NOTE : On overhead panel 428VU, FLAPS/SYS1/FAULT and FLAPS/SYS2/FAULT lights come on.

(f)Make certain that slats and Krueger flaps are fully retracted (Ref. 27-80-00, P. Block 301).

(g)Open access door 211PZ or 121BL.

(h)Open one main gear main door (Ref. 32-12-11, P. Block 301).

(i)Remove protective cover from Krueger selector solenoid valve (Ref. 27-88-12, P. Block 401).

(2)Extension/Retraction Test Using Both SFCCs

ACTION	RESULT
1. On maintenance panel 472VU - set ANN LT switch to READ position.	On maintenance panel 471VU, section FLIGHT CONTROLS - annunciators SFCC1 and SFCC2/BITE DISPLAY are off.
2. On avionics rack 90VU - check fault code indicators on SFCC1 and SFCC2, if necessary reset (record any fault codes).	- SFCC1 and SFCC2 fault code indicators are black.
3. Move flap/slat lever on center pedestal to second notch (SLATS 15/FLAPS 0).	- Slats extend to 15° - Krueger flaps extend fully - Ailerons droop.
4. Return flap/slat control lever to first notch (SLATS 0/FLAPS 0).	- Slats retract fully - Krueger flaps retract fully - Ailerons return to datum position.

ACTION	RESULT
5. On maintenance panel 471VU, section FLIGHT CONTROLS - check annunciators SFCC1 and SFCC2/BITE DISPLAY.	- Annunciators SFCC1 and SFCC2/BITE DISPLAY are off.
6. On maintenance panel 472VU - set ANN LT switch to OFF.	

(3)Extension/Retraction Test Using SFCC1 and SFCC2 Individually

ACTION	RESULT
1. On maintenance panel 472VU - set ANN LT switch to READ position.	On maintenance panel 471VU, section FLIGHT CONTROLS - annunciators SFCC1 and SFCC2/BITE DISPLAY are off.
2. On avionics rack 90VU - check fault code indicators on SFCC1 and SFCC2, if necessary reset (record any fault codes).	- SFCC1 and SFCC2 fault code indicators are black.
3. Pressurize BLUE hydraulic system (Ref. 29-22-00, P. Block 301 or 29-10-00, P. Block 301).	
4. Open circuit breakers 8CV and 9CV to check Krueger flap operation by SFCC1.	On overhead panel 428VU - SLATS/SYS2/FAULT light comes on.
5. Move flap/slat control lever on center pedestal to second notch (SLATS 15/FLAPS 0).	- Slats extend to 15° (at half normal speed, since green hydraulic motor is not activated) - Krueger flaps extend fully - Ailerons droop.
6. Return flap/slat control lever to first notch (SLATS 0/FLAPS 0).	- Slats retract fully - Krueger flaps retract fully - Ailerons return to datum position.
7. Close circuit breakers 8CV and 9CV.	On overhead panel 428VU - SLATS/SYS2/FAULT light goes off.
8. Depressurize BLUE hydraulic system (Ref. 29-22-00, P. Block 301 or 29-10-00, P. Block 301).	
9. Open circuit breaker 7CV to	On overhead panel 428VU

ACTION	RESULT
check Krueger flap operation by SFCC2.	- SLATS/SYS1/FAULT light comes on.
10. Move flap/slat control lever to second notch (SLATS 15/FLAPS 0).	- Slats extend to 15° (at half normal speed) - Krueger flaps extend fully - Ailerons droop.
11. Return flap/slat control lever to first notch (SLATS 0/FLAPS 0).	- Slats retract fully - Krueger flaps retract fully - Ailerons return to datum position.
12. On maintenance panel 471VU, section FLIGHT CONTROLS - check annunciators SFCC1 and SFCC2/BITE DISPLAY.	- Annunciators SFCC1 and SFCC2/BITE DISPLAY are off.
13. On maintenance panel 472VU - set ANN LT switch to OFF.	
14. Close circuit breaker 7CV.	On overhead panel 428VU - SLATS/SYS1/FAULT light goes off.

(4) Extension/Retraction Test Using Manual Pushbuttons on Krueger Selector Solenoid Valve

ACTION	RESULT
1. Open, safety and tag circuit breakers 7CV, 8CV and 9CV.	On overhead panel 428VU - SLATS/SYS1/FAULT and SLATS/SYS2/FAULT lights come on.
2. Push LH manual pushbutton (solenoid II) on Krueger selector solenoid valve in main hydraulic compartment at FR47 for approx. 8 s.	- Krueger flaps extend fully - Ailerons droop.
3. Push RH manual pushbutton (solenoid I) on Krueger selector solenoid valve for approx. 8 s.	- Krueger flaps retract fully - Ailerons return to datum position.
4. Remove safety clips and tags and close circuit breakers 7CV, 8CV and 9CV.	On overhead panel 428VU - SLATS/SYS1/FAULT and SLATS/SYS2/FAULT lights go off.

(5)Krueger Flap Position Switches Test

ACTION	RESULT
1. Open, safety and tag circuit breaker 45CV.	
2. Move flap/slat control lever on center pedestal to second notch (SLATS 15/FLAPS 0).	- Slats extend to 15° - KRUGER annunciator on flap/slat position indicator comes on after 10 s - Single chime sounds On left ECAM display unit the following messages appear: FLT CTL KRUGER NOT EXTENDED On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION light comes on
3. Return flap/slat control lever to first notch (SLATS 0/FLAPS 0).	- Slats retract fully - KRUGER annunciator on flap/slat position indicator goes off. On left ECAM display unit messages disappear On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION light goes off
4. Push LH manual pushbutton (solenoid II) on Krueger selector solenoid valve in main hydraulic compartment at FR47 for approx. 8 s.	- Krueger flaps extend fully - KRUGER annunciator on flap/slat position indicator comes on after 10 s - Single chime sounds On left ECAM display unit the following messages appear: FLT CTL KRUGER NOT RETRACTED MAX SPD.....300/.65 On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION light comes on
5. Remove safety clip and tag and close circuit breaker 45CV.	- Krueger flaps retract fully - KRUGER annunciator on flap/slat

ACTION	RESULT
	position indicator goes off. On left ECAM display unit messages disappear On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION light goes off

(6)Close-Up
(a)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301 or 29-10-00, P. Block 301).
(b)Remove safety clips and tags and close circuit breakers 1CV and 2CV.
NOTE : On overhead panel 428VU, FLAPS/SYS1/FAULT and FLAPS/SYS2/FAULT lights go off.
(c)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(d)Close access door 211PZ or 121BL.
(e)Install protective cover on Krueger selector solenoid valve (Ref. 27-88-12, P. Block 401).
(f)Close main gear main door (Ref. 32-12-11, P. Block 301).

Ref. : MMEL Sect. 1-27, Item 19

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.
R CAUTION : USAGE OF THIS PROCEDURE IS SUBJECT TO LIMITATIONS IMPOSED BY THE MMEL

1. Deactivation

A. Reason for the Job
This deactivation is accomplished in order to keep Krueger flaps in retracted position.

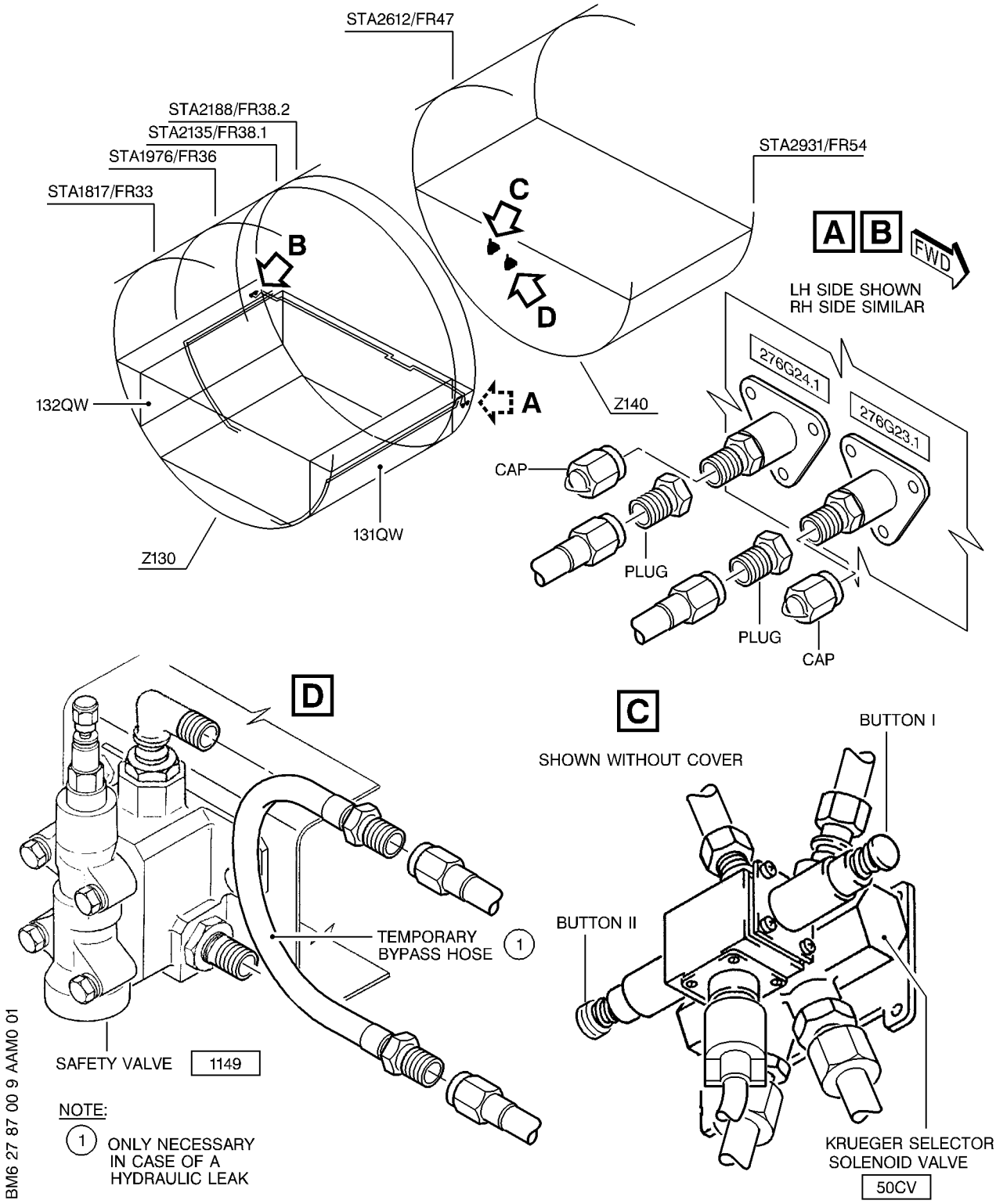
B. Equipment and Materials

ITEM	DESIGNATION
(1)	Container - Hydraulic Fluid
(2)98A27503003000	Safety Guard - Flap Slat Control Lever
(3)	Warning Notices
(4)	Blanking Plugs/Caps
(5)A271-80220-000	Hose - Temporary Bypass

Referenced Procedures

- 12-12-29, P. Block 1	Hydraulics
- 27-11-00, P. Block 501	Mechanical and Electrical Control - Aileron
- 27-80-00, P. Block 301	Lift Augmenting (Slab and Krueger Flaps)
- 27-88-11, P. Block 401	Krueger Flap Actuator
- 29-10-00, P. Block 301	Main Hydraulic Power
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-21-00, P. Block 301	Green Auxiliary Power
- 32-12-11, P. Block 301	Main Gear Main Door

C. Procedure
(Ref. Fig. 901)
(1)Job Set-Up
(a)Open one main gear main door (Ref. 32-12-11, P. Block 301).
(b)Make certain that flap slat control lever is in 0 deg. position.
(c)Install the safety guard PN 98A27503003000 on flap slat control lever quadrant.
(d)Make certain that Green hydraulic system is depressurized (Ref.



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Deactivation of Krueger Flap
Figure 901

29-10-00, P. Block 301).
(e)Display a warning notice on pressurization connector prohibiting pressurization of this system.
(f)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(g)Display a warning notice on pressurization connector prohibiting pressurization of reservoir.
(h)Gain access to the hydraulics compartment in the main gear bay.
(j)Make a bypass for the safety valve:

WARNING : AILERONS MAY DROOP WHEN UNIONS ARE DISCONNECTED. BYPASS LINE MUST BE MANUFACTURED TO WITHSTAND SYSTEM PRESSURE.

NOTE : Isolation of the safety valve using the temporary bypass hose is only necessary if there is an excessive hydraulic leak at the Krueger flap actuator.

1 In main gear bay, identify the hydraulic unions connecting the safety valve 1149 to the Krueger flaps and droop function supply lines.
2 Position hydraulic fluid container under the unions.
3 Disconnect the identified unions and install a temporary bypass hose PN A271-80220-000 or an alternative hydraulic hose to reconnect the Krueger flap supply lines.

(k)Pressurize the Green hydraulic system reservoir (Ref. 29-14-00, P. Block 301).

WARNING : AILERONS MAY MOVE WHEN SYSTEM IS PRESSURIZED.

(l)Pressurize the Green hydraulic system (Ref. 29-21-00, P. Block 301).

WARNING : RETRACTING THE KRUEGER FLAPS BY USING THE SELECTOR SOLENOID VALVE WILL CAUSE THE AILERONS TO RISE BY 10 DEGREES.

(m)On Krueger selector solenoid valve (50 CV), press button I to retract Krueger flaps.

NOTE : If one or both Krueger flaps are not fully retracted, replace the applicable actuator (Ref. 27-88-11, P. Block 401).

(n)Depressurize the Green hydraulic system (Ref. 29-21-00, P. Block 301).
(o)Depressurize the Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(p)Check that the Krueger actuators are locked by waiting 10 minutes to make sure that there is no movement of the Krueger flaps.
(q)In the forward cargo compartment, remove access panels 132 QW and 131 QW.
(r)Identify hydraulic connections 276 G23.1 and 276 G24.1.
(s)Position hydraulic fluid container under the unions.
(t)Disconnect the unions of hydraulic connections identified and let a small amount of hydraulic fluid flow out of the Krueger bulkhead

connections.
(u)Install pressure blanking plugs/caps to isolate the Krueger actuator hydraulic lines.
(v)If the safety valve has been bypassed, proceed as follows:
1 Position hydraulic fluid container under the temporarily fitted bypass.
2 Remove the bypass hose, and reconnect the disconnected unions.
(w)In flight compartment, display a warning notice to warn flight crew that one or both Krueger flaps are inoperative and that aircraft performance is consequently degraded to the limits given in the CDL (Configuration Degration List).
(x)In flight compartment, display notice that Krueger FAULT light comes on when slats are selected.

(2)Check
(a)Remove warning notice from Green reservoir pressurization connector.
(b)Remove warning notice from Green hydraulic system pressurization connector.
(c)Pressurize the Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(d)Pressurize the Green hydraulic system (Ref. 29-21-00, P. Block 301).
(e)Remove safety guard PN 98A27503003000 from flap and slat control lever quadrant.
(f)Set the flap slat control lever in 15 deg. position (Ref. 27-80-00, P. Block 301).
(g)Check for correct extension of the Krueger flap (if both Krueger flaps are not deactivated).
(h)Check for fluid leakage at blanking caps/plugs.
(j)Return flap slat control lever to 0 deg. position.
(k)Check for correct retraction of the Krueger flap (if both Krueger flaps are not deactivated).
(l)Carry out an operational test of the ailerons to ensure correct aileron droop operation (Ref. 27-11-00, P. Block 501).
(m)Depressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).

(3)Close-Up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove hydraulic fluid container.
(c)Install access panel 131QW and 132QW.
(d)Check Green hydraulic reservoir and top up if necessary (Ref. 12-12-29, P. Block 1).
(e)Close main gear main door (Ref. 32-12-11, P. Block 301).

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
A.	Container - Hydraulic Fluid
B. 98A27503003000	Safety Guard - Flap Slat Control Lever

ITEM	DESIGNATION
C.	Warning Notices

Referenced Procedures

- 12-12-29, P. Block 1	Hydraulics
- 29-10-00, P. Block 301	Main Hydraulic Power
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 29-21-00, P. Block 301	Green Auxiliary Power
- 32-12-11, P. Block 301	Main Gear Main Door

B. Procedure

(1)Job Set-Up

(a)Open one main gear main door (Ref. 32-12-11, P. Block 301).
(b)Retract slats to the 0 deg position (Ref. 27-80-00, P. Block 301).
(c)Install the safety guard PN98A27503003000 on flap slat control lever quadrant
(d)Make certain that Green hydraulic system is depressurized (Ref. 29-10-00, P. Block 301).
(e)Display a warning notice prohibiting pressurization of this system.
(f)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(g)Display a warning notice on pressurization connector prohibiting pressurization of reservoir.
(h)In forward cargo compartment, remove access panels 131QW and 132QW. and identify hydraulic connectors blanked off in the deactivation procedure.
(j)Position a hydraulic fluid container under the unions.
(k)Remove the blanking plugs/caps and connect the hydraulic lines to reinstate the Krueger actuator.
(l)Perform trouble shooting procedure (Ref. TSM 27-80-12).

(2)Check

(a)Remove warning notice from reservoir pressurization connector and pressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(b)Remove warning notice and pressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).
(c)Remove safety guard PN98A27503003000 and set slat control lever 15 deg. position (Ref. 27-80-00, P. Block 301).
(d)Make certain that Krueger flap moves freely.
(e)Check for hydraulic fluid leakage at the unions.
(f)Return flap and slat control lever to 0 deg. position.
(g)Depressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).

(3)Close-Up

(a)Remove warning notices.
(b)Remove hydraulic fluid container.
(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(d)In FWD cargo compartment, install the access panel 131QW and 132QW.

(e)Check hydraulic fluid level in reservoir and top up if required (Ref. 12-12-29, P. Block 1).
(f)Close main gear main door (Ref. 32-12-11, P. Block 301).

KRUEGER FLAP HYDRAULIC ACTUATION - DESCRIPTION AND OPERATION

1. General

Krueger flap control signals, provided by Slat/Flap Control Computer (SFCC) 1 and 2 slat channels, energize the extend solenoid or the retract solenoid of a four-port, three-way, Krueger selector solenoid valve (selector valve). The selector valve supplies GREEN system hydraulic pressure to the Krueger flap actuator installed in each wing.

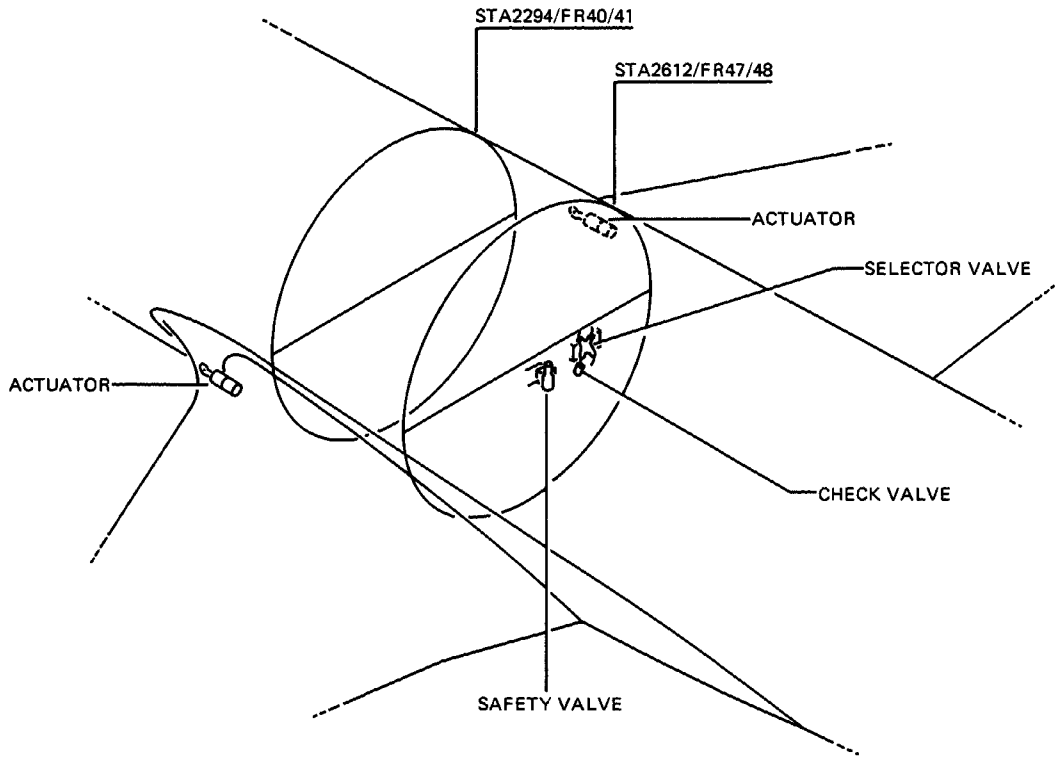
Retraction or extension of the actuators achieves extension or retraction of the Krueger flaps in accordance with the control signal received.

All-speed aileron droop is operated simultaneously with Krueger flap operation (Ref. 27-11-00).

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
50CV	SOLENOID VALVE, KRUEGER SELECTOR		148		27-88-12
1149	VALVE, SAFETY		148		27-88-14
1194	ACTUATOR, KRUEGER FLAP RH		610		27-88-11
1195	ACTUATOR, KRUEGER FLAP LH		510		27-88-11
1198	VALVE, CHECK		148		27-88-13



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Component Location
Figure 001

3. Description

The Krueger flap hydraulic actuation comprises two actuators, one selector valve, one check valve and one safety valve. One actuator is installed in each wing root, the valves are installed in the fuselage.

A. Krueger Selector Solenoid Valve
(Ref. Fig. 002)

(1) The selector valve is a four-port, three-way, valve provided with and controlled by two solenoids. Port A is the pressure port, port B is the return port, ports C and D connect to the actuators.

(2) The direction of flow through ports C and D controls the direction of movement of the piston rod in each actuator.

(3) The two solenoids, identified as solenoid I (actuator extend) and solenoid II (actuator retract), are each provided with a manual operation button which can only be operated when the aircraft is on the ground. The buttons, identified as button I and button II, are mounted on solenoid I and solenoid II respectively. Pressing the required button achieves Krueger flap operation in the absence of control signals from the SFCC.

B. Krueger Flap Actuator
(Ref. Fig. 003)

The Krueger flap actuator is a double-acting actuator with mechanical locking of the piston assembly in the extended position (flap retracted)
R and hydraulic locking in the retracted position (flap extended), when no
R hydraulic pressure is applied to the actuator.

The piston end is connected to the Krueger flap by a reverse link. The cylinder head is mounted to the structure by two mounting blocks which allow the actuator to pivot on the mounting during the operating cycle. The actuator consists of a cylinder head, a cylinder and a valve block.

(1) Cylinder Head

The cylinder head consists of a mounting and connecting block. It is recessed to contain a locking spring, a locking piston and a locking sleeve. A through hole accepts and guides the piston rod.

(2) Cylinder

The cylinder contains the piston assembly which consists of the piston, locking collar and piston rod.

(3) Valve Block

The valve block contains a pilot valve, pressure relief valve, a check valve and two calibrated restrictors.

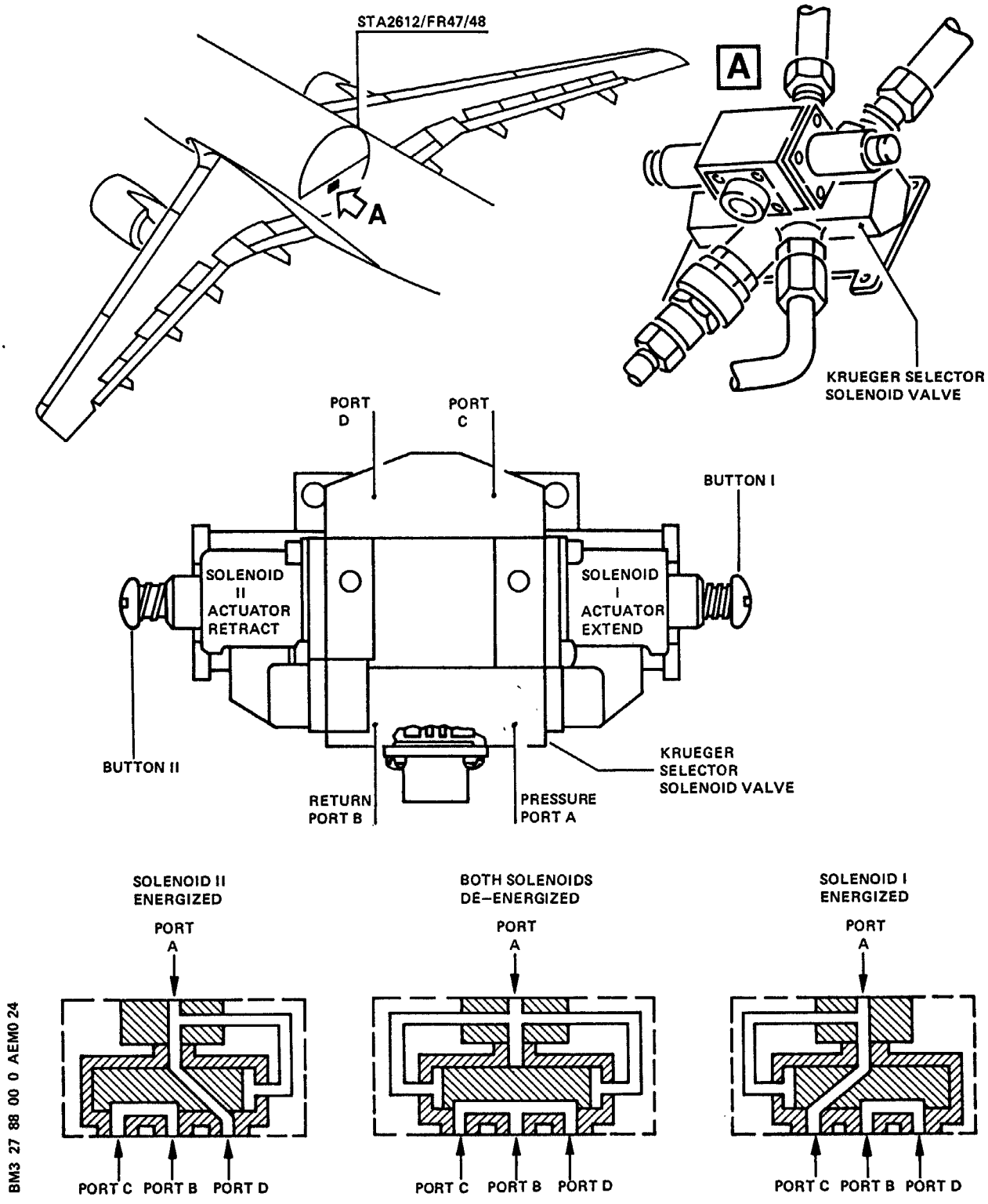
(a) Pilot Valve

The pilot valve is a simple two-way valve construction. It comes into operation when the hydraulic pressure is reversed during a retract or extend selection.

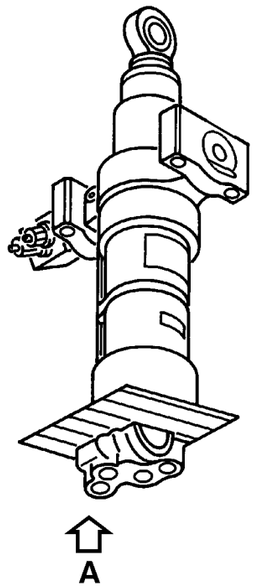
(b) Pressure Relief Valve

The pressure relief valve is a dual-function device. It serves to hydraulically lock the piston assembly when the actuator is in the fully retracted position. It also functions as a safety valve if the pressure rises above 237 bar (3,437 psi).

When the actuator is retracting, the piston pressure spring contacts the pressure relief valve actuating pin, closing the valve 6 mm



Krueger Selector Solenoid Valve
Figure 002



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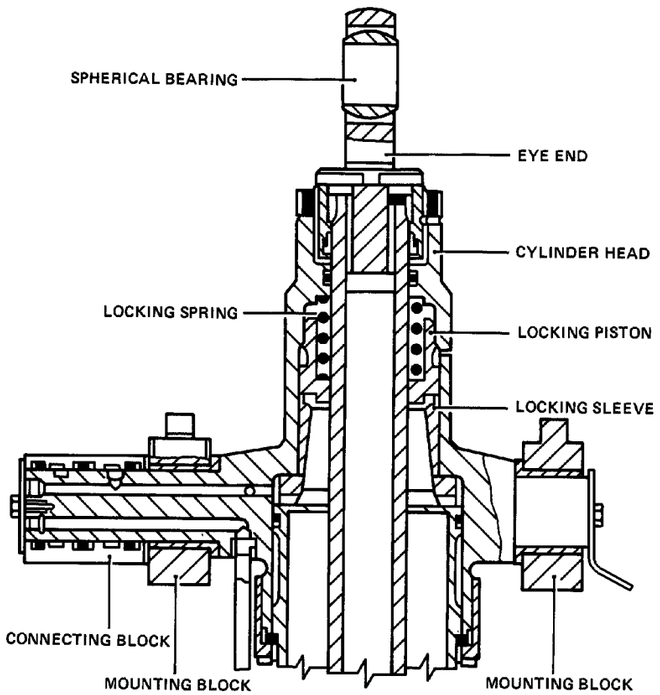

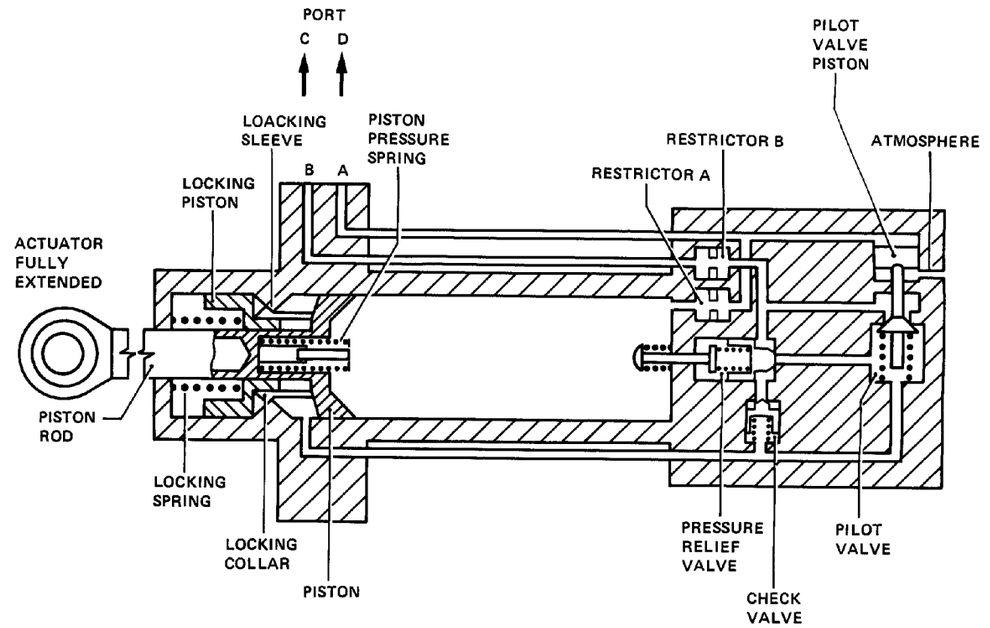

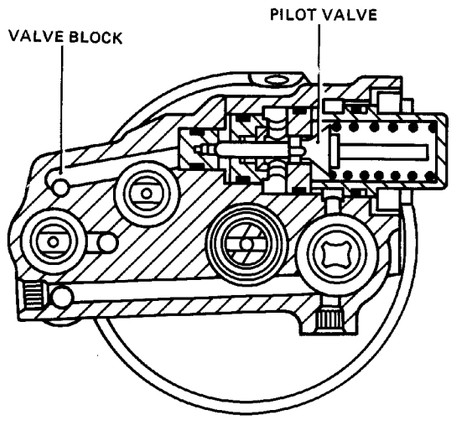

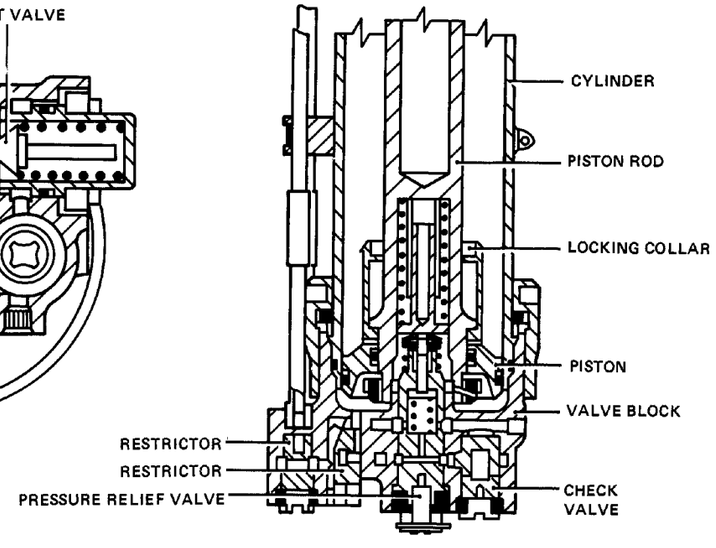

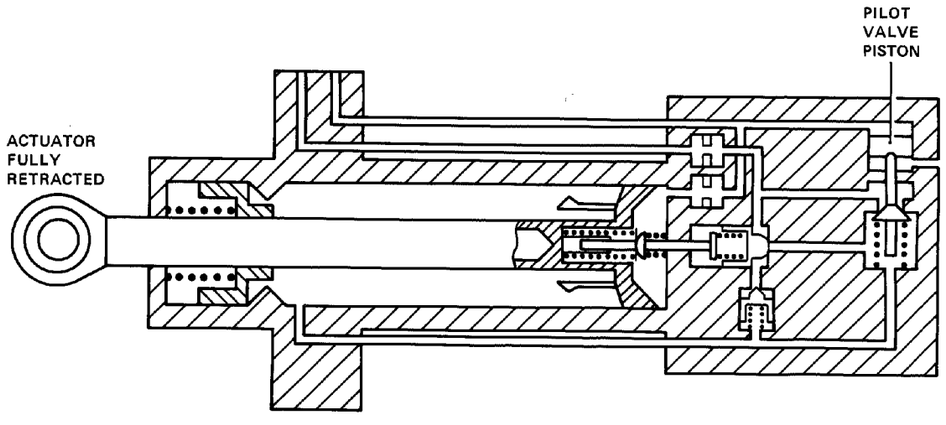

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Krueger Flap Actuator
Figure 003

(0.2362 in.) before the end of the stroke.
When the actuator is extending, the sealing cone is held in position by the sealing friction on the pressure relief valve actuating pin.

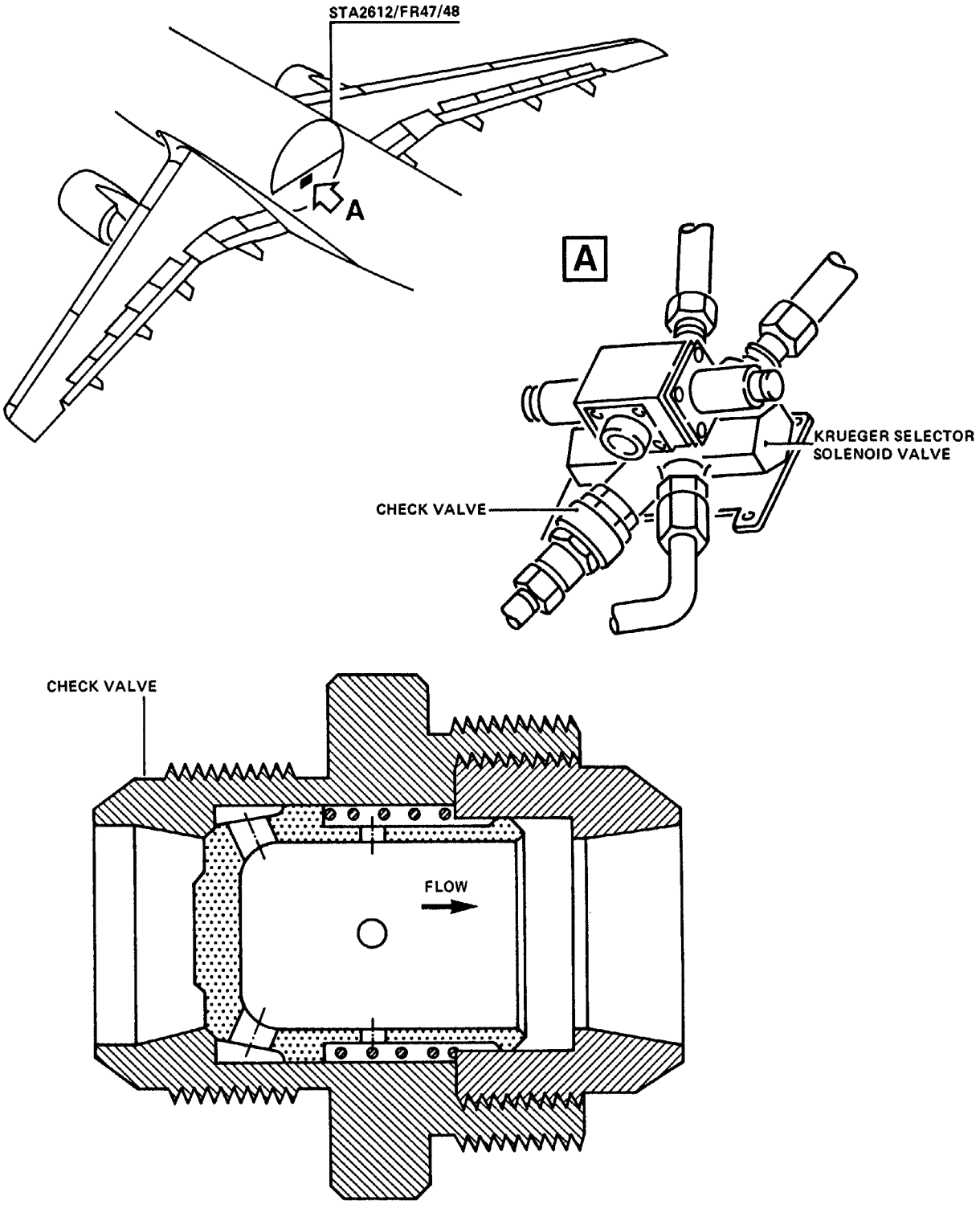
(c)Check Valve
The function of the check valve is to prevent the formation of a cavity in the piston ring chamber, when the pressure relief valve closes at the end of a retraction.
When the piston retracts and closes the pressure relief valve, the flow of hydraulic fluid to the piston ring chamber is interrupted and further movement is halted. If external pressure is applied when the actuator is in this condition a cavity could be formed in the piston ring chamber.
To prevent this the check valve opens, due to the differential pressure across the check valve, allowing fluid to flow into the piston ring chamber.

(d)Restrictors
Two restrictors are used in the system, one in each supply line. Their function is to control the flow rate and so control the extend and retract times.

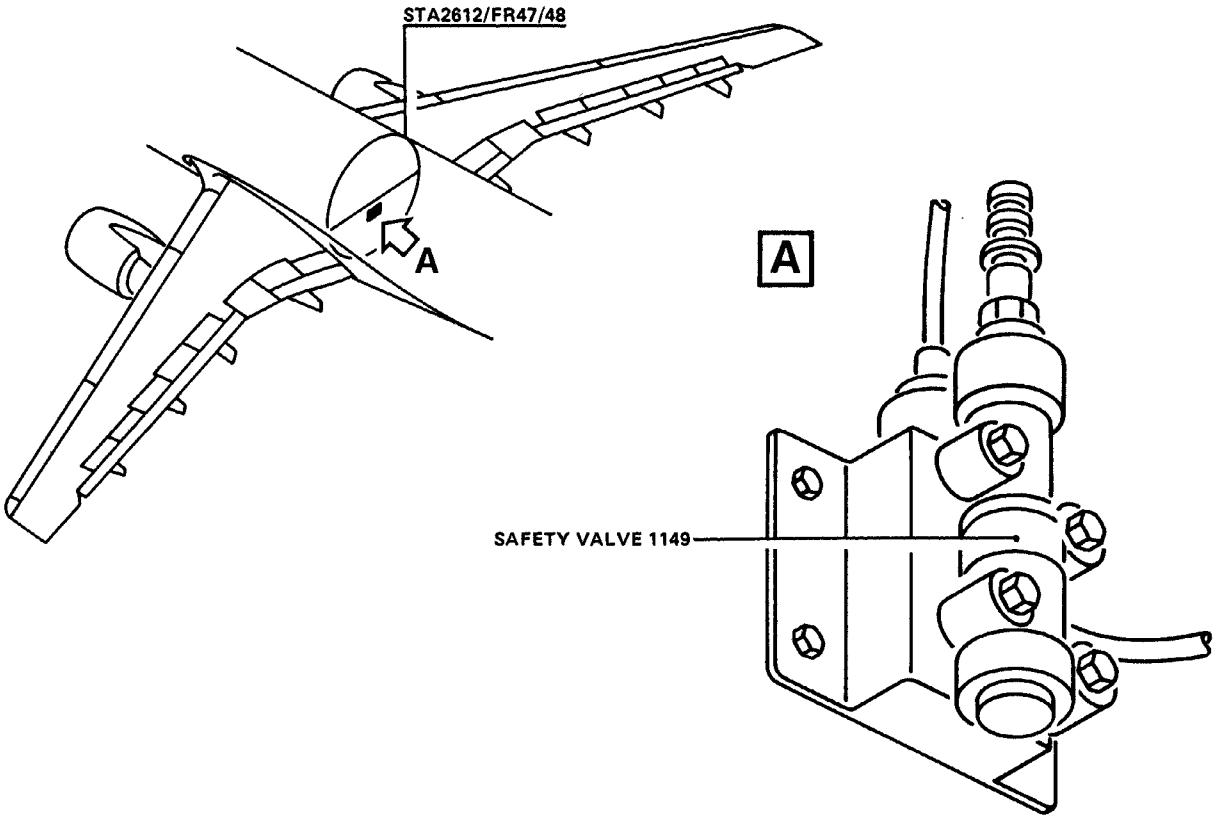
C. Check Valve (1198)
(Ref. Fig. 004)
(1)The check valve is a standard, spring operated, valve installed in-line between the selector valve and the GREEN hydraulic system return line.

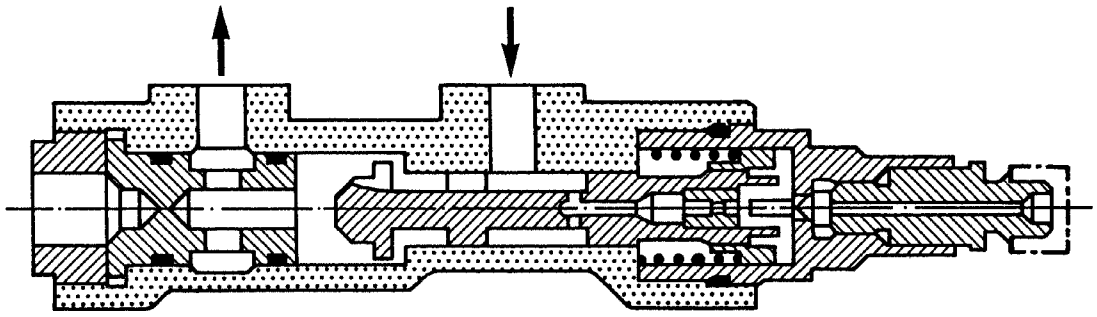
D. Safety Valve (1149)
(Ref. Fig. 005)
(1)The safety valve comprises a valve body housing a slide valve. The slide valve position is controlled by spring pressure, downstream pressure on one end, and metered supply pressure on the other end.

4. Operation
(Ref. Fig. 006)
(Ref. Fig. 007)
A. Krueger Flap Extension (Actuator Retraction)
(1)When solenoid II (actuator retract) of the selector valve is energized (or button II is pressed) the pressure port A of the selector valve is connected to port D of the selector valve; port C of the selector valve is connected to return port B of the selector valve.
(2)GREEN system hydraulic fluid, at system pressure, is supplied to each Krueger flap actuator at port B of the actuator. The hydraulic fluid passes through the actuator cylinder head via the restrictor B, the pilot valve, the pressure relief valve and the check valve, to the front (actuator retraction side) of the actuator piston.
(3)The hydraulic pressure moves the locking piston, compresses the locking spring, unclamps the claws of the locking collar and allows them to pass through the locking sleeve.
(4)The actuator retracts at a rate controlled by restrictor A.
(5)The plunger, located at the rear end of the actuator rod, contacts the pin of the pressure relief valve. Further retraction of the actuator changes the pressure relief valve to the high pressure mode.



Check Valve
Figure 004





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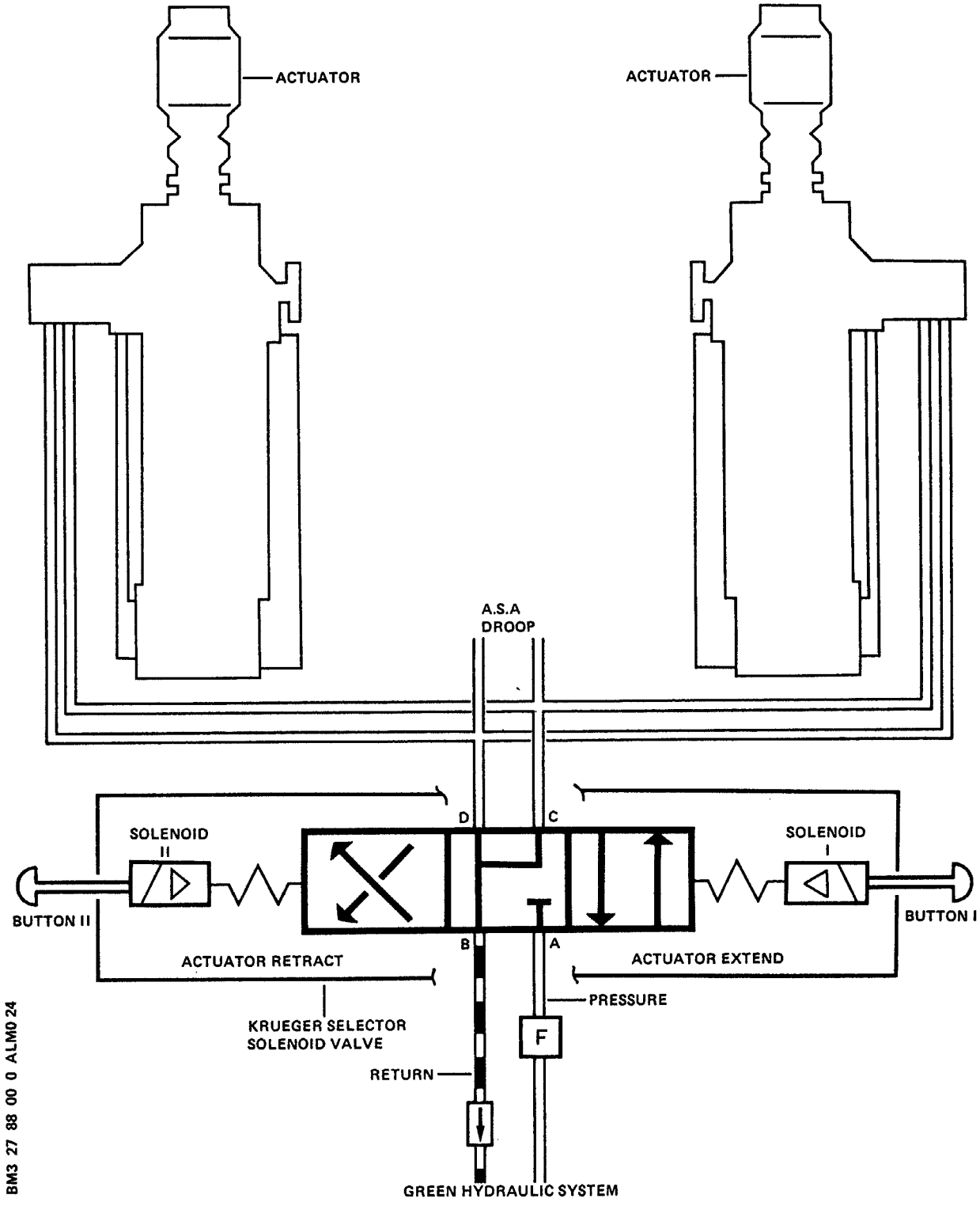
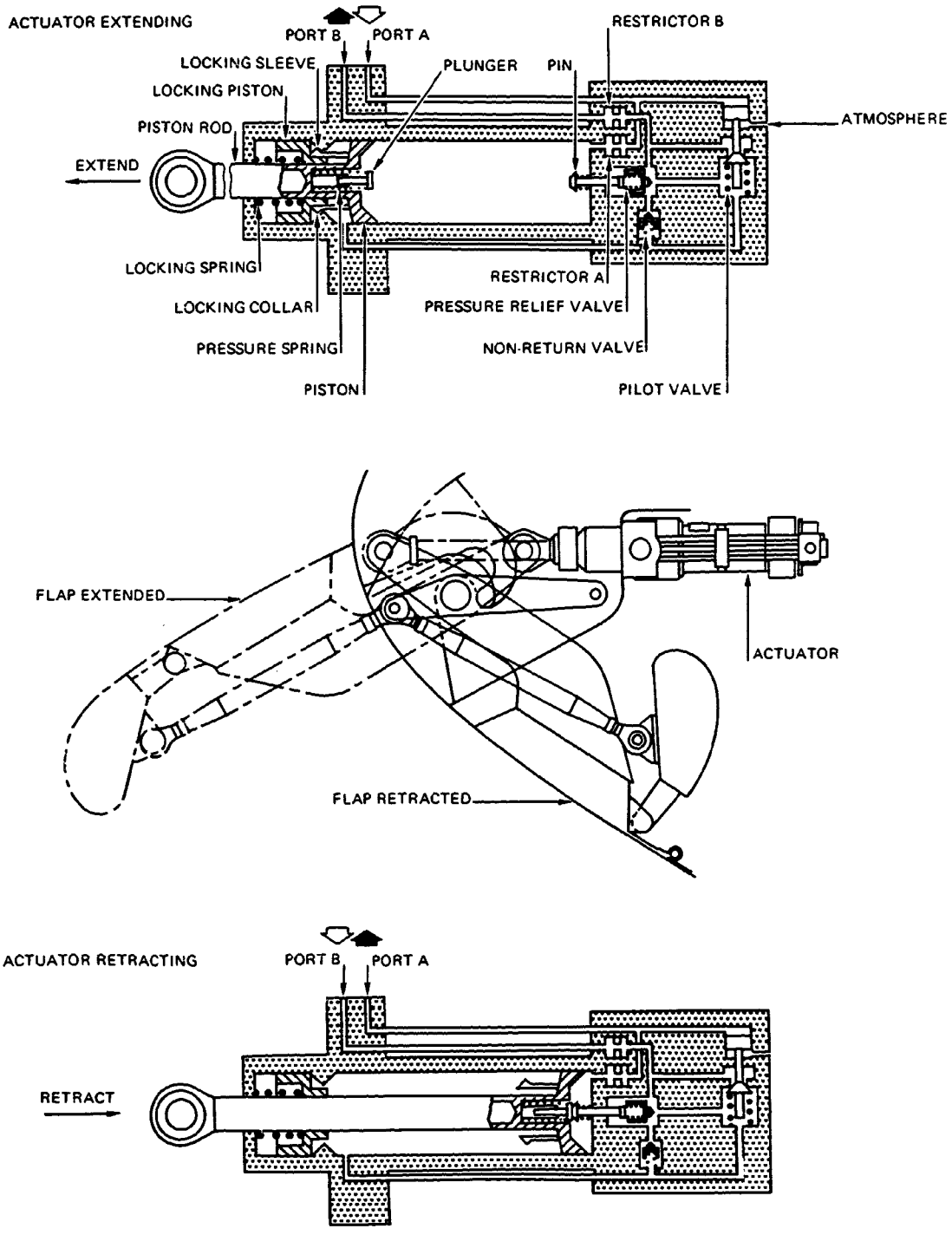
Safety Valve
Figure 005



Hydraulic Actuation
Figure 006



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Actuator Extension and Retraction
Figure 007

(6)Full retraction of the actuator forms a hydraulic lock when the check valve and the pilot valve are closed.

B. Krueger Flap Retraction (Actuator Extension)

(1)When solenoid I (actuator extend) of the selector valve is energized (or button I is pressed) the pressure port A of the selector valve is connected to port C of the selector valve; port D of the selector valve is connected to return port B of the selector valve.

(2)Green system hydraulic fluid, at system pressure, is supplied to each Krueger flap actuator at port A of the actuator. The hydraulic fluid passes through the actuator cylinder head, via the restrictor A, to the rear (actuator extension side) of the actuator piston, and to the pilot valve.

(3)The pilot valve opens and allows a return flow of hydraulic fluid from the front of the actuator piston.

(4)The actuator extends at a rate controlled by restrictor B.

(5)The claws of the locking collar, attached to the front of the actuator piston, engage the locking piston and compress the locking spring. Further extension of the actuator pushes the claws of the locking collar through the locking sleeve. The claws of the locking collar expand radially and the locking spring forces the locking piston inside the claws of the locking collar, clamping them against the locking sleeve to form a mechanical lock.

C. Krueger Flap Stationary (Fully Extended or Fully Retracted Position)

(1)When the Krueger flap is fully extended and the hydraulic lock is formed, solenoid II (actuator retract) of the selector valve remains energized until the slat flap control lever is moved to position SLATS 0.

(2)When the Krueger flap is fully retracted and the mechanical lock is formed, solenoid I (actuator extend) of the selector valve remains energized until the slat flap control lever is moved from position SLATS 0.

(3)In the event of an electrical failure which de-energizes the required solenoid, the selector valve spool returns to the central, neutral position; ports C and D of the selector valve are connected to return port B of the selector valve, pressure port A of the selector valve is isolated. The valve spool is held in position by spring force and the equal application of hydraulic pressure on both ends of the spool. The Krueger flap remains in the selected position. Movement of the Krueger flap to the alternative position can only be achieved by pressing button I or II, as applicable, on the selector valve.

(4)In the event of a hydraulic failure, the selector valve spool returns to the central neutral position as described in para (3). The valve spool is held in position by spring force and the equal application of the reduced hydraulic pressure on both ends of the spool. The Krueger flap remains in the selected position. Movement of the Krueger flap to the alternative position is not possible.

(5)In the event of a hydraulic failure occurring in combination with

an electrical failure which de-energizes the required solenoid, the selector valve spool returns to the central, neutral position as described in para (3). The selector valve spool is held in position by spring force and the equal application of the reduced hydraulic pressure on both ends of the spool. The Krueger flap remains in the selected position. Movement of the Krueger flap to the alternative position is not posssible.

5. Interface with All Speed Ailerons

The output from the Krueger selector solenoid valve is also directed to the aileron droop actuator. This introduces a 6.6 deg. aileron droop when the slats are selected (Ref. 27-11-00).

A. Operation
There are two droop actuators, one in each wing. The input to the droop actuator is connected to the krueger hydraulic actuating system. The output is interconnected to the mechanical control input linkage for the All Speed Aileron (ASA) servocontrols. When the slats are extended the krueger actuator and the ASA droop actuator receive hydraulic pressure from the krueger selector solenoid valve. The krueger flaps extend, and the ASA droop actuator drives the control linkage for symmetrical ASA deflection to a defined droop of 6.6 deg.
When the krueger flaps are retracted the ASA droop actuator reverses the input and the ASA are returned to their normal in flight condition.

B. Slat System Fault
If the slat system or the krueger system is inhibited due to fault the droop actuator will remain in the last commanded position.

KRUEGER FLAP HYDRAULIC ACTUATION - ADJUSTMENT/TEST

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Functional Test of Krueger Flap Actuator

A. Reason for the Job

To check correct hydraulic lock of Krueger flap actuator.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform, 3.0 m (10 ft.)
(2)98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
(3)98A27808011000	Rigging Pin - Krueger Flap
R (4)98A27808662000	Hydraulic Locking Test Equipment - Krueger Flap Actuator
(5)	Safety Barriers
(6)	Circuit Breaker Safety Clips and Tags
(7)	Test Weight 140 ±5 daN (315 ± 11 lbf.)
(8)Material No. 05-002	Special Materials (Ref. 20-31-00)

Referenced Procedures

- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-21-00, P. Block 301	Green Auxiliary Power

C. Procedure

(Ref. Fig. 501)

(1)Job Set-Up

(a)Pressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).

(b)Extend slats (15°) and Krueger flaps (Ref. 27-80-00, P. Block 301).

(c)Install safety guard PN 98A27503003000 on flap/slat lever quadrant.

(d)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY/SUPPLY/	9CV	335/R66

PANEL	SERVICE	IDENT.	LOCATION

SLATS/SYS 1

(e)Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
(f)Position access platform.
(2)Test
(a)Check Krueger flap extended position by screwing rigging pin PN 98A27808011000 into RIB2B. It should be possible to install rigging pin without excessive force.

NOTE : Check has to be performed immediately after depressurization of the hydraulic system.

(b)Remove rigging pin PN 98A27808011000.
R (c)Install threaded flange bush PN 98A27808662218 of the actuator test
R equipment PN 98A27808662000 in RIB2B.
R (d)Insert the check pin PN 98A27808662216 of actuator test equipment into threaded flange bush, to check for alignment.
R (e)Remove the check pin PN 98A27808662216.

CAUTION : TO AVOID DAMAGE TO KRUEGER FLAP ARM CENTER WEBS, ONLY HAND TIGHTEN FASTENERS OF HOISTING DEVICE.

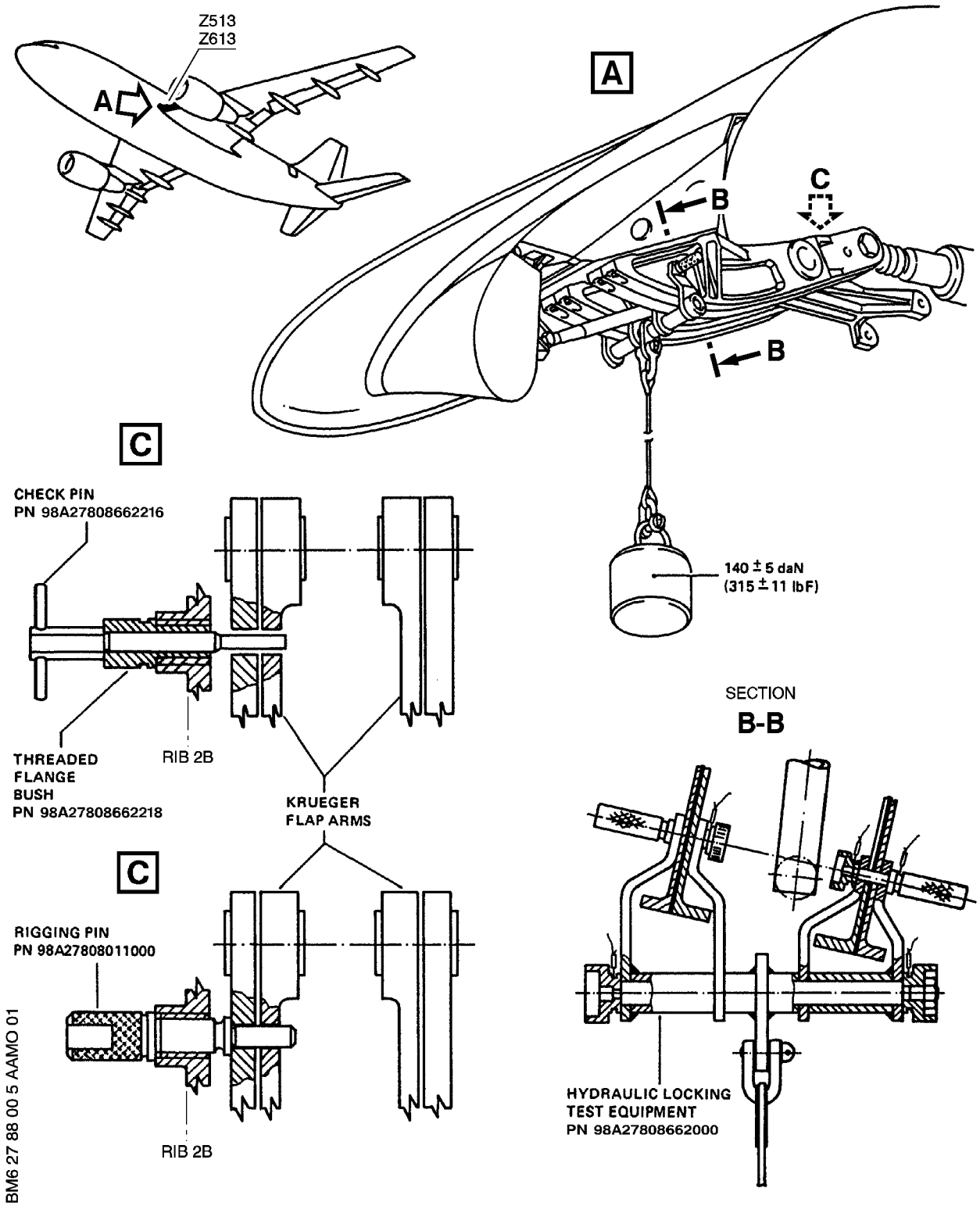
(f)Clean 6 mm (0.24 in.) dia. holes in Krueger flap arms. Install hoisting device and secure as shown in section B-B (Ref. Fig. 501).
(g)To make sure that Krueger flap actuator has just been pressurized and then depressurized before test will be performed, proceed as follows:

CAUTION : TO AVOID RETRACTION OF KRUEGER FLAP, MAKE SURE THAT SLAT/FLAP CONTROL LEVER HAS NOT MOVED TO 0° - POSITION.

1 Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
2 Remove safety clips and tags and close circuit breakers 7CV, 8CV, 9CV and 45CV.
3 Depressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
4 Open, safety and tag circuit breakers 7CV, 8CV, 9CV and 45CV.
(h)Attach test weight of 140 ± 5daN (315 ± 11lbf.) to the rope so that it is clear of the ground. Ensure that the suspended test weight is kept steady.
(j)Let test weight remain supported by Krueger flap arms for at least 60 minutes without swinging or touching the ground.
R (k)After 60-minute period, make sure that check pin PN 98A27808662216 can be inserted and extracted easily.

NOTE : The actuator is not serviceable, if check pin cannot be inserted and extracted.

(l)Remove test weight from hoisting device.



Installation of Hoisting Device
Figure 501

R

R (m)Remove check pin, threaded bush and hydraulic locking test equipment from Krueger flap arms.
R (n)Pressurize GREEN hydraulic system (Ref. 29-21-00, P. Block 301).
R (p)Remove safety clips and tags and close circuit breakers 7CV, 8CV, 9CV and 45CV.
R (q)Depressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).
R (r)Check that rigging pin PN 98A27808011000 can be easily screwed in.
R Remove rigging pin.

(3)Close-Up
(a)Apply corrosion preventive (Material No. 05-002) to holes where hoisting device was installed.
(b)Remove access platform.
(c)Remove safety barriers.
(d)Remove safety guard from flap/slat control lever quadrant.
(e)Retract slats and Krueger flaps (Ref. 27-80-00, P. Block 301).

KRUEGER FLAP ACTUATOR - REMOVAL/INSTALLATION

WARNING : LANDING GEAR - MAKE SURE THAT THE GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROLS - MAKE SURE THAT THE GROUND SAFETIES AND NOTICES ARE IN POSITION.

FLIGHT CONTROLS - MAKE SURE THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

HYDRAULICS - BEFORE YOU PRESSURIZE THE SYSTEM, MAKE SURE THAT THE CONTROL SURFACE POSITIONS AND THE FLIGHT CONTROL POSITIONS ARE THE SAME.

MAKE SURE THAT YOU ISOLATE THE ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS.

OBEY THE PRECAUTIONS GIVEN IN 29-00-00, P. BLOCK 301, WHEN YOU WORK WITH HYDRAULIC FLUIDS.

R

1. Equipment and Materials

ITEM	DESIGNATION
A. A0940000W2	Spanner
B. SL90.313 - 0.8750	Tool - Installation
C. SL90.314 - 0.8750	Tool - Extraction
D. SL90.374 - 0.8750	Wrench - Notched
E. 98A27808011000	Pin - Rigging
F.	Circuit Breaker Safety Clips and Tags
G.	Torque Wrench 110 - 130 1bf.ft (14.9 to 17.6 m.daN)
H.	Caps/Plugs
J.	Container, Hydraulic Fluid
K.	Warning Notice Prohibiting Use of Slats and Krueger Flap Systems
L.	Access platform, 4 m (13 ft)
M. Material No. 04-004	Common Greases (Ref. 20-31-00)
N. Material No. 09-001	Sealants (Ref. 20-31-00)
R P. Material No. 11-026	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 20-21-16, P. Block 1	STA-LOK Nuts and Lockwashers
- 20-28-11, P. Block 1	Electrical Bonding
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-80-19, P. Block 401	Krueger Flap
R	
- 29-00-00, P. Block 301	Hydraulic Power - General
- 29-10-00, P. Block 301	Main Hydraulic Power
- 32-12-11, P. Block 301	Main Gear Main Door

2. Procedure
(Ref. Fig. 401)
A. Job Set-Up
(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY SUPPLY/ SLATS SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS SYS 1	7CV	333/T63
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/KRUGER	45CV	333/T61

(2)Display warning notice.

WARNING : EXTENDING THE KRUEGER FLAP VIA THE SELECTOR SOLENOID VALVE WILL CAUSE THE AILERON TO DROOP BY 10 DEG.

R (3)If necessary, pressurize the Green hydraulic system (Ref. 29-10-00, P. Block 301). Open main gear main door (Ref. 32-12-11, P. Block 301). Locate Krueger selector solenoid valve (50 CV), STA2612 (FRAME 47) and press button II on solenoid II to extend krueger flap.

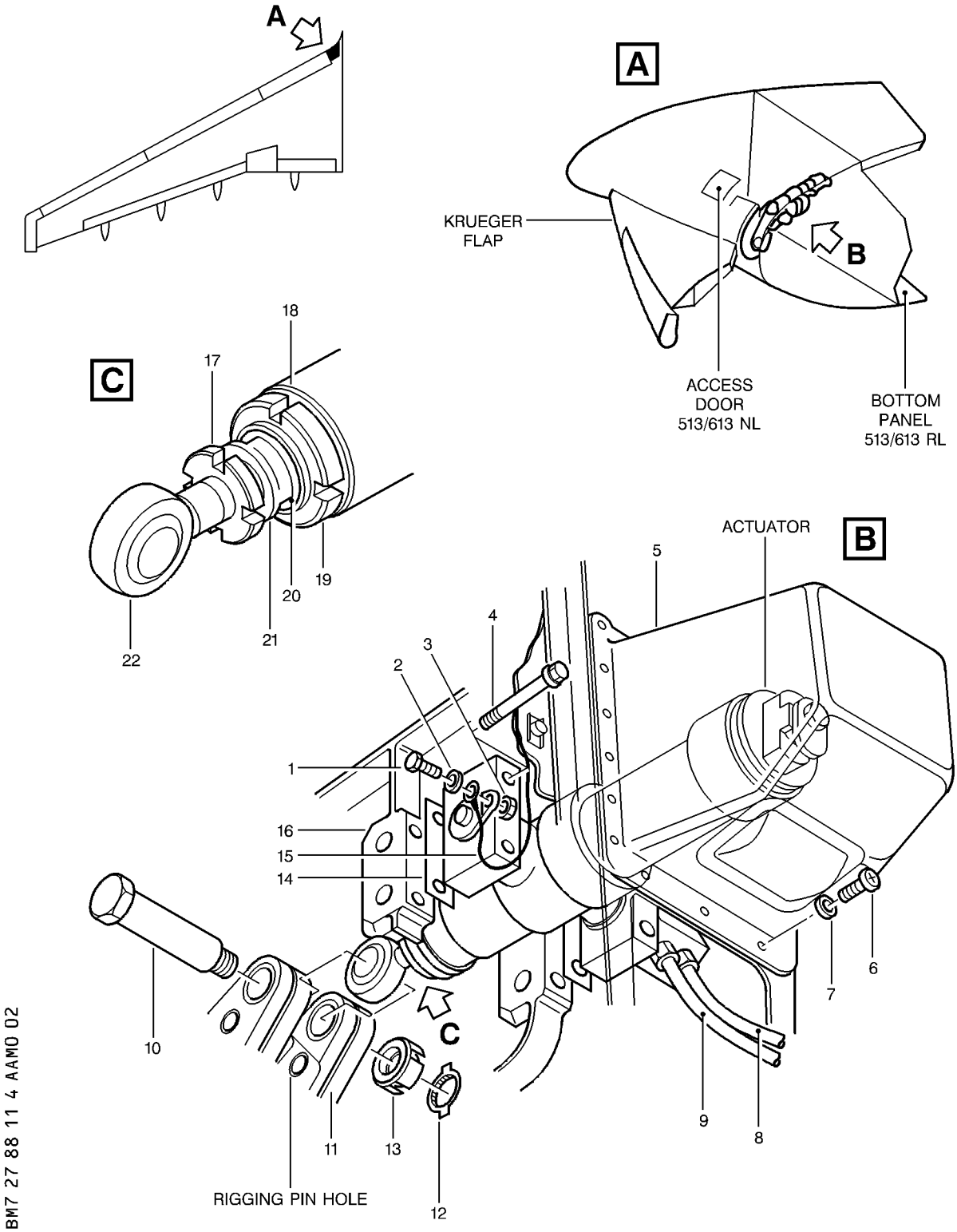
R NOTE : If the slats are positioned at 15 deg or greater, the Krueger flap will already be extended and step 2.A.(3) will not be necessary.

(4)Depressurize the green hydraulic system (Ref. 29-10-00, P. Block 301).
(5)Position access platform.
(6)Open access door 513(613)NL.
R (7)Insert the rigging pin PN 98A27808011000 thru rib 2B and the outboard bracket (11).
(8)Open access door 513(613)RL.

B. Removal

R (1)Remove the lockwasher (12) and the nut (13) (Ref. 20-21-16, P. Block 1):
- use the extraction tool PN SL90.314-0.8750 to remove the lockwasher (12).
- use the notched wrench PN SL90.374-0.8750 to remove the nut (13).

(2)Withdraw the bolt (10) from the bracket (11) and the actuator rod end (22) and allow the actuator to pivot.
(3)Remove the screws (6), the washers (7) and the cover assembly (5).
(4)Put a container under the actuator to collect any hydraulic fluid. Disconnect the lines (8) and (9) from the actuator. Cap open line ends.
(5)Remove nut (3), bolt (1), washer (2) and disconnect bonding lead (15) from actuator.
R (6)Cut and remove the lockwire from the bolts (4). Manually support the actuator (dry weight 9.4 kg (20.72 lb)) and remove the bolts (4). Collect the shims (14), if installed, and remove the actuator from the



Krueger Actuator - Installation
Figure 401

R

mountings (16).

C. Preparation of Replacement Component

R (1)Use a clean lint-free cotton cloth made moist with cleaning agent
R (Material No. 11-026) to clean the component, interface and adjacent
R area.
R (2)Do a visual inspection of the component, interface and adjacent area.

D. Installation

R CAUTION : IT IS NOT PERMITTED TO ADJUST THE STROKE OF THE ACTUATOR.
R
R
R
R CAUTION : BEFORE YOU INSTALL AN ACTUATOR PN 094B0000-01, YOU MUST EXAMINE
R THE LOCKWIRE BETWEEN THE LOCKNUT (19) AND THE WASHER (18). IF
R THE LOCKWIRE IS BROKEN OR MISSING, YOU MUST SEND THE ACTUATOR TO
R THE OVERHAUL SHOP FOR VERIFICATION OF THE HYDRAULIC LOCKING
R FUNCTION.

(1)Position actuator in Krueger box against mountings (16) with hydraulic connections on inboard side in LH wing and on outboard side in RH wing.
(2)Install bolts (4), do not safety at this stage. Do not install shims (14).
(3)Remove caps from hydraulic connections then connect lines (8) (9) to actuator.
(4)Connect bonding lead (15) to actuator using washer (2), bolt (1) and nut (3) (Ref. 20-28-11, P. Block 1).
(5)Remove hydraulic fluid container.
(6)Support actuator to allow retraction without obstruction.
(7)Pressurize the Green hydraulic system (Ref. 29-10-00, P. Block 301).
(8)On Krueger selector solenoid valve press button on solenoid II to make sure actuator is fully retracted.
(9)Depressurize green hydraulic system (Ref. 29-10-00, P. Block 301).
(10)Make sure that the Krueger flap is fully extended and secured with the rigging pin PN 98A27808011000.
(11)Apply grease (Material No. 04-004) to the bolt (10).
(12)Align the actuator rod-end (22) with the outboard bracket (11) then insert the bolt (10). If the bolt (10) cannot be inserted do the procedures in step (13) or step (14) to obtain the correct alignment of the actuator rod-end (22) with the outboard bracket (11).
(13)Adjustment using the actuator rod-end and shims.
(a)If necessary, cut and remove the lockwire from the locknut (17) and the actuator rod-end (22). Discard the lockwire.

NOTE : If the actuator is a replacement or has been to the overhaul shop, the locknut (17) will not be safetied with lockwire.

(b)Use the spanner PNA0940000W2 to loosen the locknut (17).
(c)Pull the lockwasher (21) clear of the piston rod (20). Turn the

actuator rod-end (22) thru steps of 180 deg. until the bolt (10) can easily be inserted thru the outboard bracket (11) and the actuator rod-end (22).

(d)If turning the actuator rod-end (22) thru 180 deg. is too much of an adjustment:

- support the actuator, remove the bolts (4) and insert shims (14) of equal thickness, as necessary under each trunnion, to give the required adjustment. Install the bolts (4) and insert the bolt (10) thru the outboard bracket (11) and the actuator rod-end (22).

(14)Adjustment using the actuator piston rod.

(a)If necessary cut and remove the lockwire from the locknut (17) and the actuator rod-end (22). Discard the lockwire.

NOTE : If the actuator is a replacement or has been to the overhaul shop, the locknut (17) will not be safetied with lockwire.

(b)Use the spanner PNA0940000W2 to loosen the locknut (17).

(c)Pull the lockwasher (21) clear of the piston rod (20). Hold the rod-end (22) and turn the piston rod (20) thru steps of 90 deg. until the bolt (10) can easily be inserted thru the outboard bracket (11) and the actuator rod-end (22).

(15)Install the nut (13) then use the notched wrench PN SL90.374-0.8750 to TORQUE the nut (13) to 60 lbf.ft (8.13 m.daN) (Ref 20-21-16, P. Block 1). Do not fit the lockwasher (12) at this stage.

(16)Remove the rigging pin PN 98A27808011000.

(17)Pressurize the Green hydraulic system (Ref 29-10-00, P. Block 301).

(18)Make sure that the Krueger flap trailing edge does not touch the Krueger box fixed structure. Make sure that continuous contact is maintained between the Krueger flap trailing edge seal and the Krueger box fixed structure (Ref. 27-80-19, P. Block 401).

WARNING : RETRACTING THE KRUEGER FLAP VIA THE SELECTOR SOLENOID VALVE WILL CAUSE THE AILERON TO RISE BY 10 DEG.

(19)On Krueger selector solenoid valve press button I on solenoid I to retract the Krueger flaps and make sure flap functions freely without obstruction.

(20)Check that Krueger flap is faired with wing and within the into and out-of-wind tolerances. If necessary adjust (Ref. 27-80-19, P. Block 401).

WARNING : EXTENDING THE KRUEGER FLAP VIA THE SELECTOR SOLENOID VALVE WILL CAUSE THE AILERON TO DROOP BY 10 DEG.

(21)On Krueger selector solenoid valve press button II on solenoid II to extend the Krueger flap.

(22)Depressurize the green hydraulic system (Ref. 29-10-00, P. Block 301). Examine actuator, hydraulic pipelines and unions for signs of leakage. Leakage is not acceptable.

(23)Using spanner PN A0940000W2, TORQUE locknut (17) to between 119.5 and 123.2 lbf.ft (16.2 and 16.7 m.daN) then safety to actuator rod-end

(22) with lockwire.
(24)Apply sealant (Material No. 09-001) to the locknut (17).
(25)TORQUE the bolts (4) to between 370 and 410 LB-IN. (4.18 and 4.6 m.daN).
(26)Safety bolts (4) together with lockwire.
(27)Use the installation tool PN SL90.313-0.8750 to safety the lockwasher (12) to the nut (13) (Ref. 20-21-16, P. Block 1).
(28)Position cover assembly (5) and secure with washers (7) and screws (6).

E. Preparation for Test
(1)Remove safety clips and tags and on panel 133VU close circuit breakers 4CV, 8CV, 9CV, 7CV, 3CV and 45CV.
(2)Energize aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks are ventilated (Ref. 21-21-00, P. Block 301).
(3)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/FLAPS/SYS 2/26 VAC	2CV	334/S62
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS/SYS 1	5CV	332/U61
133VU	FLT CTL/SFCC LAND RECOVERY SUPPLY/ FLAPS/SYS 1	10CV	335/R67
133VU	FLT CTL/FLAPS/SYS 1/26 VAC	1CV	335/R61

F. Test

WARNING : FLIGHT CONTROL SURFACES - MAKE CERTAIN TRAVEL RANGE IS CLEAR.

(1)Perform the following:

ACTION	RESULT
1. Fully extend slats and Krueger flap (Ref. 27-80-00, P. Block 301).	Slats and Krueger flap extend and aileron droops. NOTE : With Krueger flap fully extended, actuator is hydraulically locked in retracted position.
2. Fully retract slats and Krueger flap (Ref. 27-80-00, P. Block 301).	Slats and Krueger flap retract and aileron moves to neutral position.
3. Depressurize Green hydraulic system. (Ref. 29-10-00, P. Block 301).	Krueger flap is held in retracted position by mechanical lock in actuator.

G. Close-up

(1)Close the main gear main-door (Ref. 32-12-11, P. Block 301).
(2)De-energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
R (3)Make sure that the working area is clean and clear of tools and all other
R items of equipment.
(4)Close access door 513(613)RL.
(5)Close access door 513(613)NL.
(6)Remove access platform.
(7)Remove safety clips and tags, and close circuit breakers 2CV, 6CV, 5CV, 10CV and 1CV.
(8)Remove warning notice.

KRUEGER SELECTOR SOLENOID VALVE (50CV) - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK OR OR NEAR MECHANICAL FLIGHT CONTROL OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
R	A. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	B.	Circuit Breaker Safety Clips and Tags
	C.	Container for Collecting Spilt Fluid
	D.	Blanking Caps for Electrical Connectors
	E.	Blanking Plugs/Caps for Hydralic Lines
	F.	Warning Notices Prohibiting Pressurization of Green Hydraulic System

Referenced Procedures

- 12-12-29, P. Block 1	Hydraulics
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 27-88-13, P. Block 401	Check Valve
- 29-10-00, P. Block 301	Main Hydraulic Power, Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

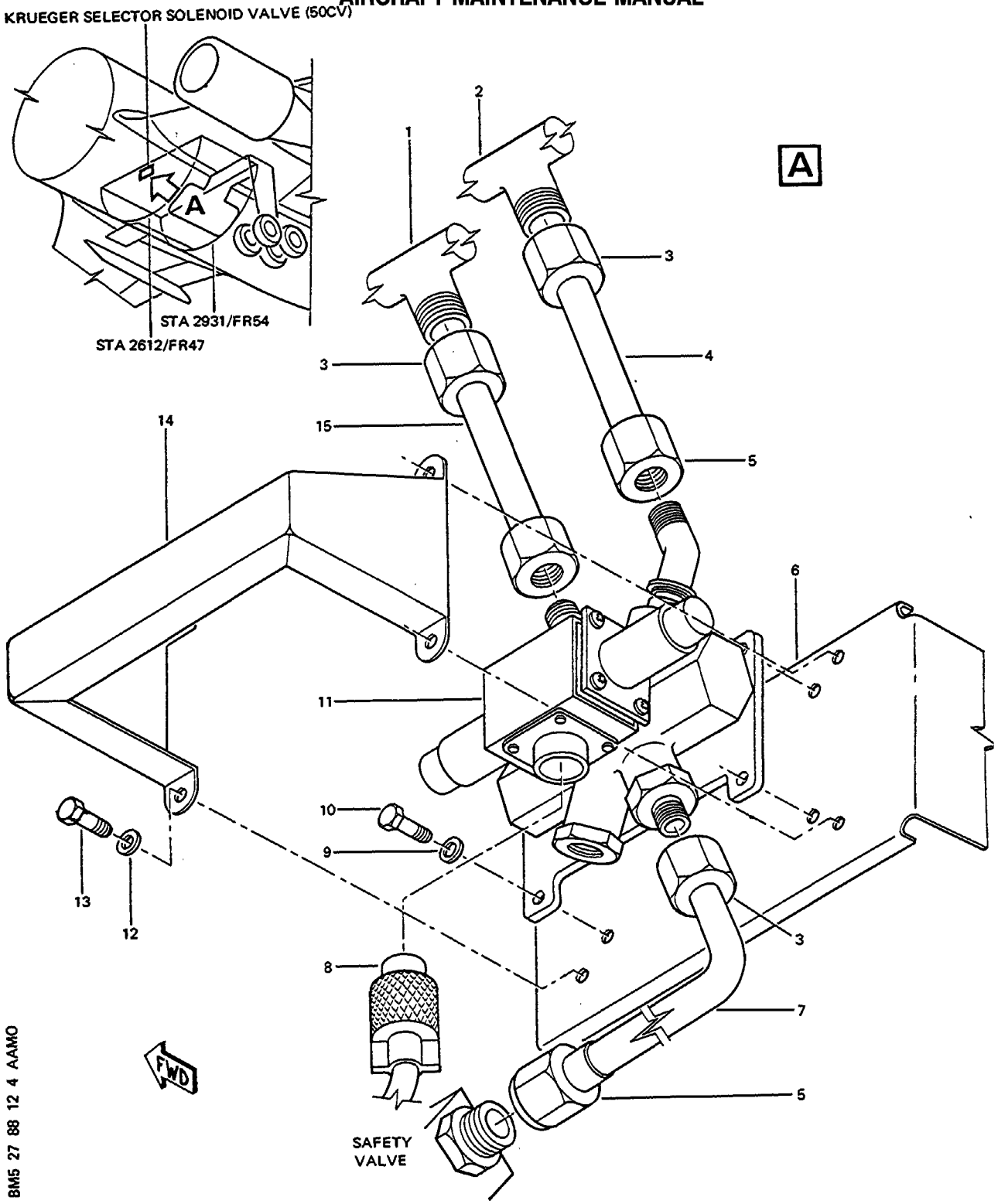
R (1)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(2)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(3)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).

(4)Display warning notices prohibiting prssurization of the Green hydraulic system:
- in flight compartment, on HYD PWR panel 427VU
- on ground connectors.

(5)Open, safety and tag the following circuit breaker:



Krueger Selector Solenoid Valve
Figure 401

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61

(6)Open one main gear main door (Ref. 32-12-11, P. Block 301).
(7)Position hydraulic fluid recovery container under solenoid valve 50CV.
(8)Remove check valve (Ref. 27-88-13, P. Block 401).

B. Removal
(1)Disconnect electrical connector 50CV-A (13). Install blanking plugs/caps on connector (8) and on solenoid valve (11).
(2)Remove attachment bolts (13) from protective cover (14). Retain washers (12).
(3)Remove protective cover (14).
(4)Loosen unions (3),(5) and remove pipes (4),(7),(15).
(5)Install blanking caps on safety valve, solenoid valve (11) and on tee unions (1),(2).
(6)Remove bolts (10) attaching solenoid valve (11) to support (6).
(7)Retain washers (9) and remove solenoid valve (11).

C. Preparation of Replacement Component
(1)Make certain that identification plate (1199) is installed on support (6) of solenoid valve (11).
(2)Remove blanking caps from replacement solenoid valve and drain storage hydraulic fluid if necessary.
(3)Install check valve on replacement solenoid valve (11) (Ref. 27-88-13, P. Block 401).

D. Installation
(1)Position solenoid valve (11) on support (6).
(2)Secure valve with bolts (10) and washers (9). Tighten bolts (10).
(3)Remove blanking caps from safety valve and tee unions (1),(2).
(4)Connect pipes (4),(7),(15). Tighten unions (3),(5).
(5)Position protective cover (14) on support (6) and secure with bolts (13) washers (12). Tighten bolts (13).
(6)Remove blanking caps and connect electrical connector (8) to solenoid valve (11).
(7)Remove warning notices.
(8)Remove safety clip and tag and close circuit breaker 45CV.
(9)Remove safety guard from flap/slat control lever quadrant.
(10)Pressurize Green hydraulic reservoir (Ref. 29-10-00, P. Block 301).
(11)Check hydraulic fluid level in Green hydraulic reservoir. Top-up if necessary (Ref. 12-12-29, P. Block 1).

E. Test
(1)Carry out operational test (Ref. 27-84-00, P. Block 501).
(2)Make certain that there are no leaks from the solenoid valve or any disturbed unions.

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove hydraulic fluid recovery container.
(3)Close main gear main door (Ref. 32-12-11, P. Block 301).

CHECK VALVE 1198 - REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
R	A. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	B.	Circuit Breaker Safety Clips and Tags
	C.	Container for Collecting Spilt Fluid
	D.	Warning Notice Prohibiting Pressurization of Green Hydraulic System
	E.	Blanking Plugs for Hydraulic Lines
	F. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)

Referenced Procedures

- 12-12-29, P. Block 1	Hydraulics
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)

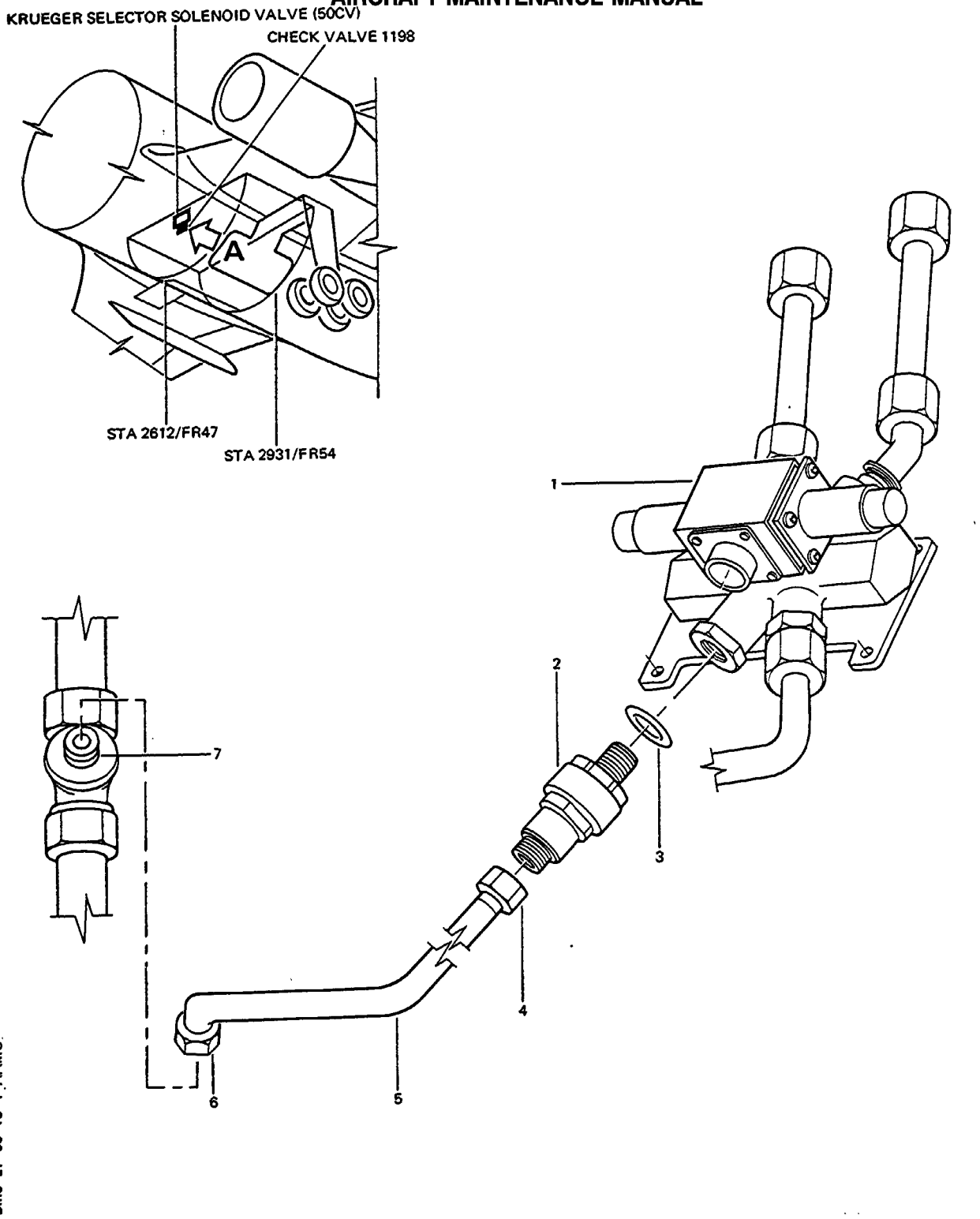
A. Job Set-Up

R (1) Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(2) Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(3) Depressurize Green hydraulic system reservoir (Ref. 29-14-00, P. Block 301).

(4) Display warning notices prohibiting pressurization of Green hydraulic system:
- on HYD PWR panel 427VU in flight compartment
- on ground connectors.



Check Valve
Figure 401

(5)Open, safety and tag the following circuit breaker:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61

(6)Open one main gear main door (Ref. 32-12-11, P. Block 301).
(7)Gain access to check valve to be removed on Krueger selector solenoid valve 50CV.
(8)Position a hydraulic fluid container under the check valve to be removed.

B. Removal
(1)Unscrew unions (4),(6) and remove hydraulic line (5).
(2)Unscrew and remove check valve (2), discard seal (3).
(3)Install a blanking plug on solenoid valve 50CV (1) and on T-union (7).

C. Preparation of Replacement Component
(1)Place a new seal (3) on replacement check valve (2) and lubricate seal using hydraulic fluid (Material No. 02-003) (Ref. 20-31-00).

D. Installation
(1)Remove blanking plugs from solenoid valve (1) and T-union (7).
(2)Install check valve (2) equipped with seal (3) on solenoid valve (1).
(3)Install hydraulic line (5) and tighten unions (4) and (6).
(4)Remove warning notices.
(5)Remove safety clip and tag and close circuit breaker 45CV.
(6)Remove safety guard from flap/slat control lever quadrant.
(7)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301). Make certain that electronics racks ventilation is correct.
(8)Pressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(9)Check hydraulic fluid level in Green reservoir and top up if required (Ref. 12-12-29, P. Block 1).
(10)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).
(11)Check hydraulic connections at check valve for leakage.

E. Test
(1)Carry out operational test of slat system (Ref. 27-84-00, P. Block 501).
(2)Make certain that there are no leaks from the check valve or any disturbed unions.

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove hydraulic fluid container.
(3)Close main gear main door (Ref. 32-12-11, P. Block 301).
(4)Depressurize Green hydraulic system and disconnect hydraulic ground power cart (Ref. 29-10-00, P. Block 301).
(5)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Restoration of Safety Valve 1149

A. Reason for the Job

To allow dropping hydraulic pressure in chamber C should a leak occur downstream from the safety valve. (Example: hydraulic line failure).

B. Equipment and Materials

	ITEM	DESIGNATION
R	(1) 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	(2)	Container for Collecting Spilt Fluid
	(3)	Lockwire, Corrosion-Resistant Steel, Dia. 0.8 mm (0.032 in.)
	(4)	Warning Notices Pressurization of Green Hydraulic System
	Referenced Procedures	
	- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
	- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

C. Procedure

(1)Job Set-Up

(a)Make certain that the Green hydraulic system is depressurized.

(b)Display warning notices prohibiting pressurization of Green hydraulic system on:
- HYD PWR panel 427VU in flight compartment
- ground connectors.

(c)Open, safety and tag the following circuit breaker:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61

R (d)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(e)Open one main gear main door (Ref. 32-12-11, P. Block 301).

(2)Restoration
(Ref. Fig. 301)

(a)On safety valve 1149, remove bleed screw cap and connect a suitable flexible hose. Place other end of hose in a hydraulic fluid recovery container.

(b)Cut and remove lockwire and slightly loosen bleed screw until fluid flows from chamber C.

(c)Upon completion of bleeding, close bleed screw and safety with lockwire.

(d)Disconnect vinyl flexible hose and install cap on bleed screw.

(e)Remove hydraulic fluid recovery container.

(f)Remove all traces of hydraulic fluid.

(3)Test

(a)Remove safety clip and tag and close circuit breaker 45CV.

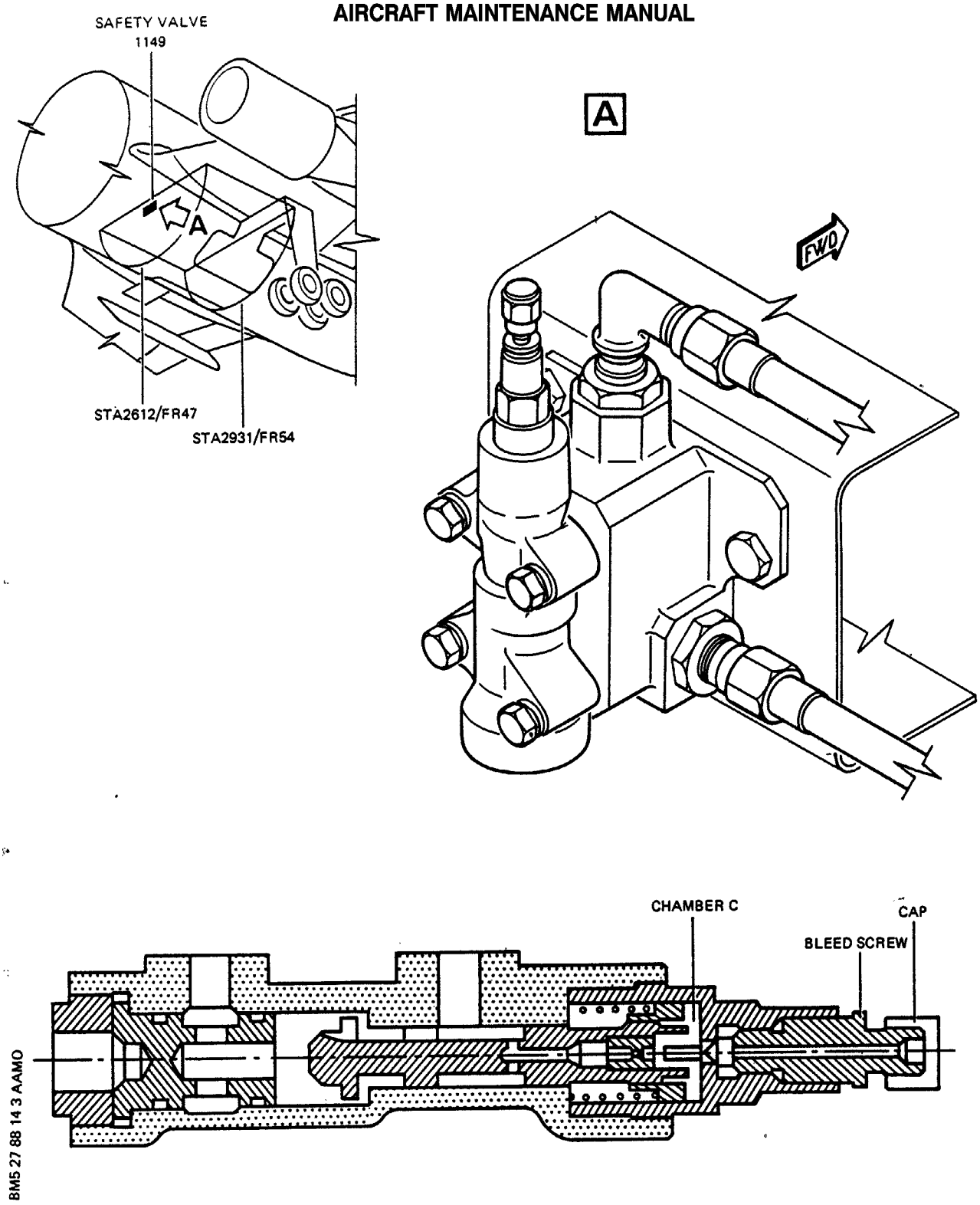
(b)Remove warning notice prohibiting pressurization of Green hydraulic system.

(c)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(d)Carry out operation test (Ref. 27-84-00, P. Block 501).

(4)Close-Up

(a)Close main gear main door (Ref. 32-12-11, P. Block 301).



Safety Valve - Bleeding
Figure 301

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

	ITEM	DESIGNATION
R	A. 98A27503003000	Guard - Safety, Flap/Slat Ctl Lever
	B.	Circuit Breaker Safety Clips and Tags
	C.	Container for Collecting Spilt Fluid
	D.	Warning Notices Prohibiting Pressurization of Green Hydraulic System
	E.	Hydraulic Blanking Plugs
	F. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
	G. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
	Referenced Procedures	
	- 12-12-29, P. Block 1	Hydraulics
	- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
	- 27-84-00, P. Block 501	Hydraulic Actuation and Power Transmission (Slats)
	- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
	- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
	- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up

(1)Retract slats to 0° position (Ref. 27-80-00, P. Block 301).

R (2)Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(3)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(4)Display warning notices prohibiting pressurization of Green hydraulic system
- on HYD PWR panel 427VU in flight compartment
- on ground connectors.

(5)Open, safety and tag the following circuit breaker:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61

(6)Open one main gear main door (Ref. 32-12-11, P. Block 301).
(7)Depressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(8)Put a container under safety valve to be removed.

B. Removal
(Ref. Fig. 401)

R (1)Cut and remove lockwire. Remove screws (5) and washers (6) securing
R safety valve (9) to manifold (8).
R (2)Remove safety valve (9).
R (3)Remove the two bobbins (7).
(4)Discard O-rings (1) and square seals (3).
(5)Check condition of stop rings (2),(4) and replace if necessary.
R (6)Plug ports of manifold (8).

C. Preparation of Replacement Component

R NOTE : Safety valve (9) is filled with hydraulic fluid (Material No. 02-003).

R (1)Clean mating faces of manifold (8) and replacement safety valve (9) with white spirit (Material No. 11-002).
(2)Apply hydraulic fluid (Material No. 02-003) to square seals (3) and O-rings (1).
(3)Make certain that stop rings (2),(4) are correctly positioned on
R bobbins (7). Install O-rings (1) and square seals (3).
NOTE : O-rings (1) must be installed in recesses on grooved ends of bobbins.
CAUTION : GROOVELESS ENDS OF BOBBINS MUST BE INSERTED IN PORTS OF
R SAFETY VALVE (9). GROOVED ENDS MUST BE INSERTED IN PORTS OF
R MANIFOLD (8).
R (4)Remove blanking plugs and insert bobbins (7) in manifold (5).

D. Installation

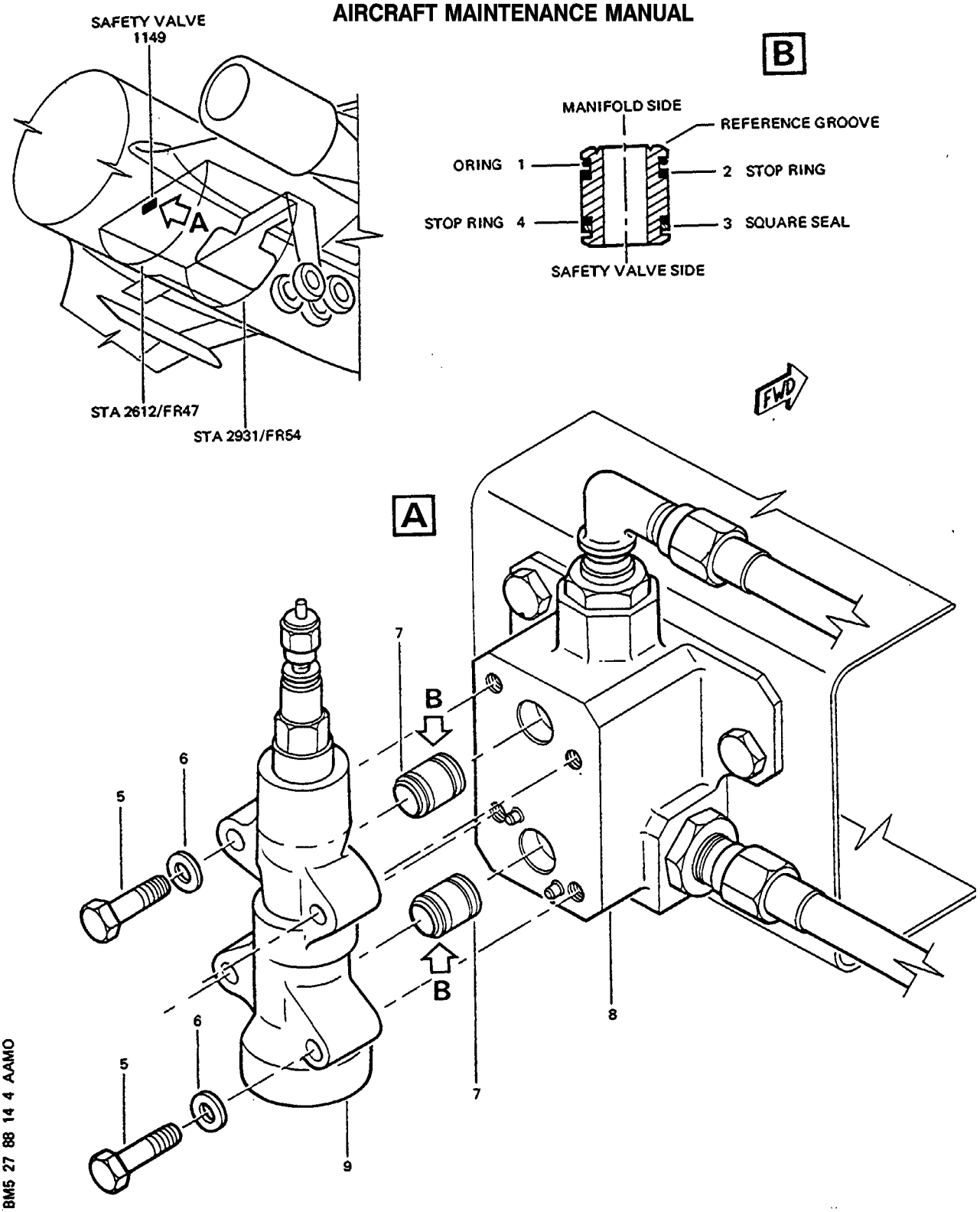
R (1)Position safety valve (9) on manifold (8).
R (2)Install screws (5) with washers (6).
R (3)Tighten screws (5) and wirelock in pairs.
(4)Remove safety clip and tag and close circuit breaker 45CV.
(5)Remove safety guard from flap/slat control lever quadrant.
(6)Remove warning notices.
(7)Pressurize Green hydraulic reservoir (Ref. 29-14-00, P. Block 301).
(8)Pressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

E. Test

(1)Carry out operational test of slat system (Ref. 27-84-00, P. Block 501).
(2)Check that there are no leaks from safety valve.

F. Close-Up

(1)Remove fluid recovery container.



Safety Valve
Figure 401

(2)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(3)Check Green hydraulic reservoir level and top up if necessary (Ref. 12-12-29, P. Block 1).
(4)Close main gear main door (Ref. 32-12-11, P. Block 301).
(5)Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

KRUEGER FLAP POSITION INDICATING - DESCRIPTION AND OPERATION

1. General

The Krueger flap system status is indicated to the Slat, Flap Control computers (SFCC1 and SFCC2) by position data presented by four position microswitches, two for each flap.

The SFCC slat channel in each computer checks the position data to determine that the Krueger flaps are in the commanded position (fully extended or fully retracted)

The system status is indicated by a combination of the following indicators:

- the KRUGER annunciator light on the slat, flap position indicator (5CN) on the center instrument panel.
- the BITE DISPLAY maintenance indicators (52CV and 53CV) on the maintenance panel (471 VU)
- the failure code set on the front face of SFCC1 (21CV) and SFCC2 (22CV) both located on 90VU.

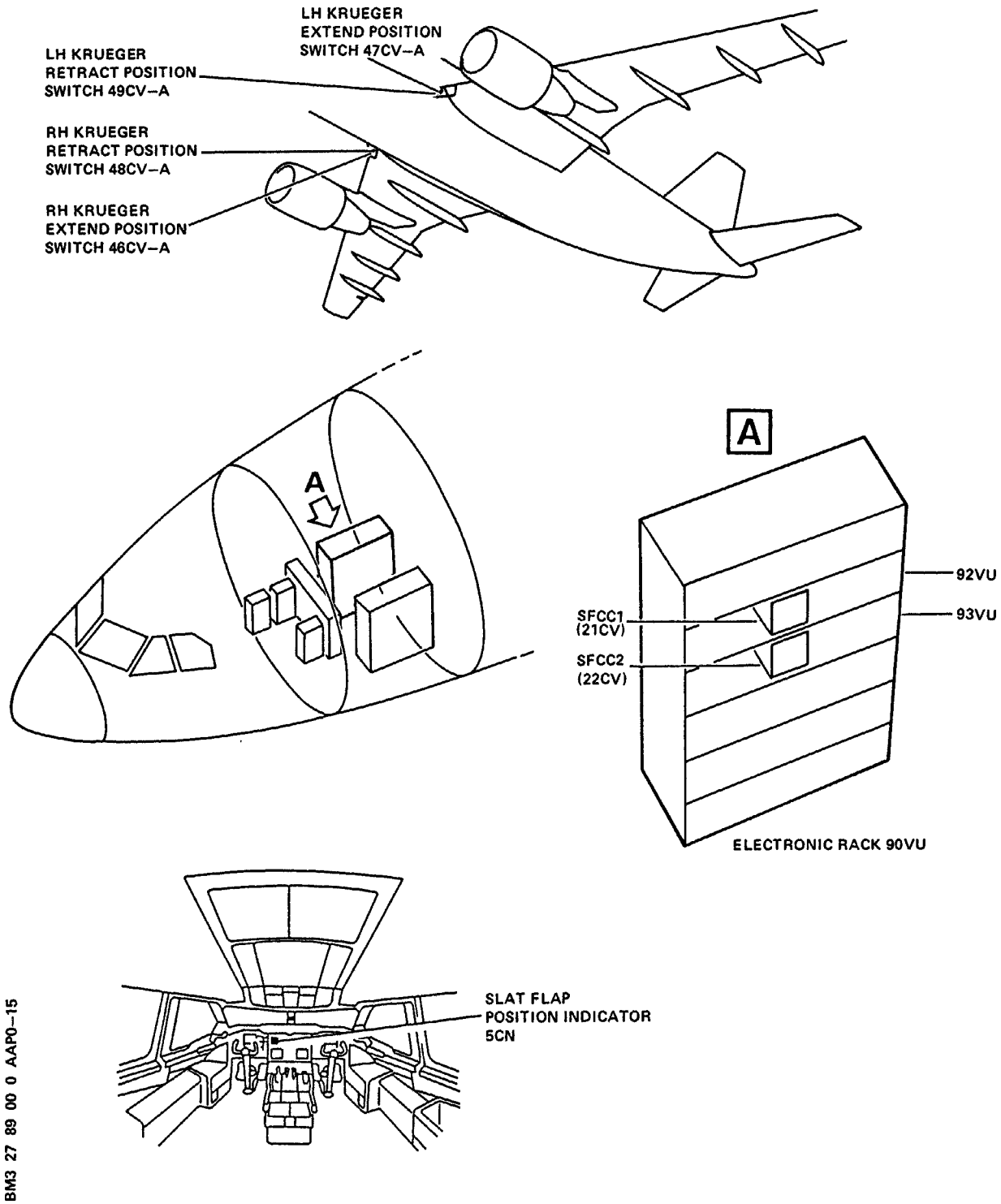
If the Krueger flaps are in the commanded position no indication is present. If they are not in the commanded position a combination of the three indicators are set. The combination is dependent on the logic input discretes from the position switches.

Whenever the KRUGER annunciator light is set to on, a fault discrete is also supplied to the Flight Warning Computers (FWC1 and FWC2) and the appropriate Electronic Centralized Aircraft Monitoring (ECAM) page is displayed.

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF
5CN	INDICATOR SLAT/FLAP POSITION	4VU	212		27-55-11
21CV	COMPUTER CONTROL SLAT/FLAP 1	92VU	122	211CZ	27-51-18
22CV	COMPUTER CONTROL SLAT/FLAP 2	93VU	122	211CZ	27-51-18
46CV-A	POSITION SWITCH-KRUEGER EXTEND, RH		613		27-89-11
47CV-A	POSITION SWITCH-KRUEGER EXTEND, LH		513		27-89-11
48CV-A	POSITION SWITCH-KRUEGER RETRACT, LH		613		27-89-12
49CV-A	POSITION SWITCH-KRUEGER RETRACT, LH		513		27-89-12



Component Location
Figure 001

3. Description
(Ref. Fig. 002)
(Ref. Fig. 003)

A. The Krueger flap position is indicated to SFCC1 and SFCC2 by four position switches, two on each flap. One to indicate the fully retracted position and one to indicate the fully extended position.
The associated Krueger flaps position switches are connected in series and presented to the computer slat channels as four logic input discretes.

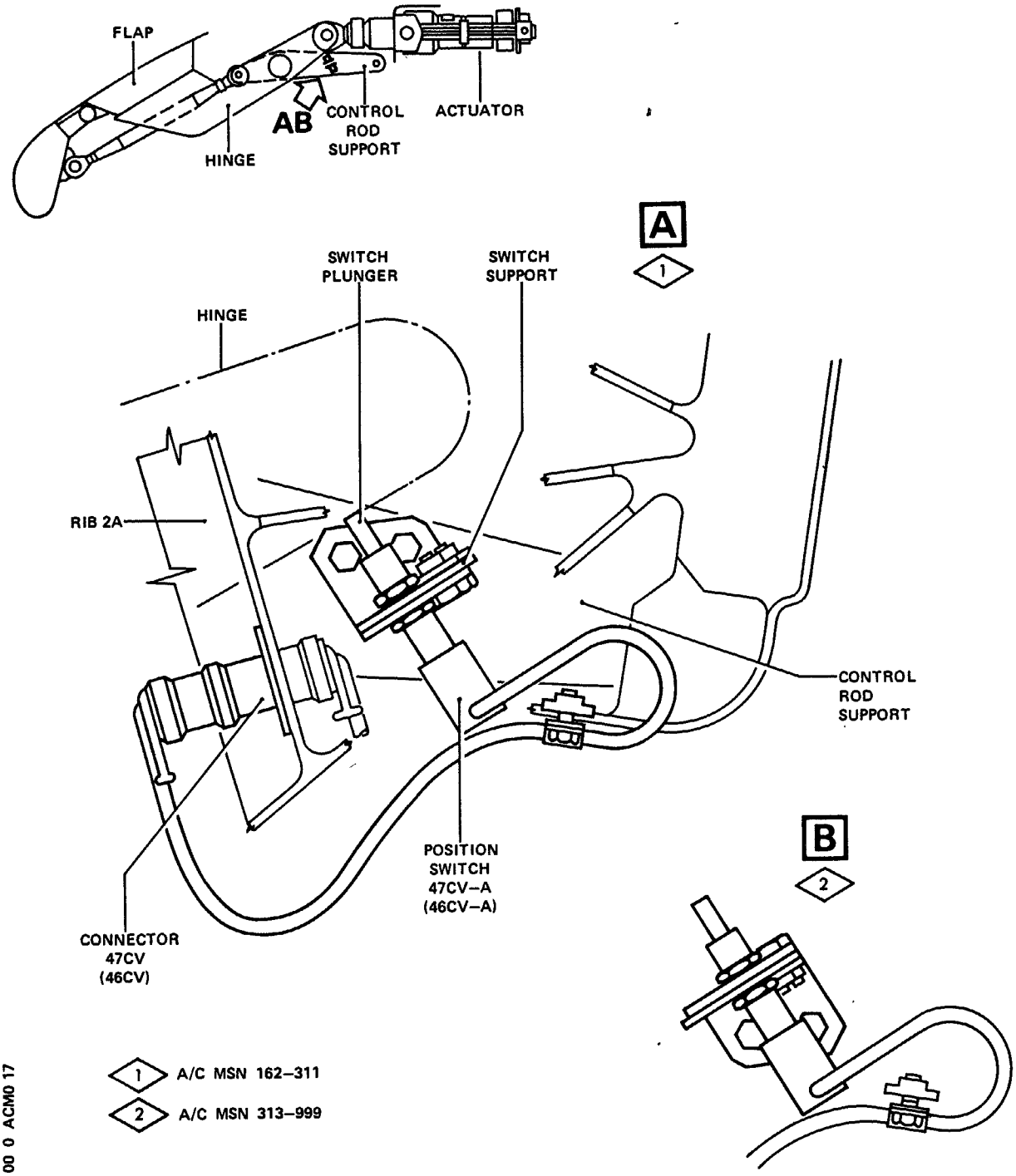
B. If the position switches indicate that the krueger flaps are not in the commanded position the slat channel fault logic presents a crew alert, maintenance alert or both. When a crew alert fault is established the ECAM Flight Warning computers are also alerted.
The slat channels of both SFCC receive information from the GREEN hydraulic system pressure switch (19CB). When the aircraft is on the ground, receipt of a "low pressure" input inhibits the krueger fault warning system (via the SFCC fault logic). This is to prevent warnings being presented which may otherwise occur due to the Krueger flaps being out of position as a result of low hydraulic pressure when the aircraft is parked.
The slat channels of both SFCC receive information via the relay 44CV from the GREEN hydraulic system pressure switch (19CB). When the aircraft is on the ground, receipt of a ground signal, which simulates "low pressure", inhibits the BITE DISPLAY and SFCC fault code indications if the krueger flaps are detected to be not in commanded position. This is to prevent latched warnings being presented which may otherwise occur due to the krueger flaps being out of position as a result of low hydraulic pressure when the aircraft is parked.
NOTE : Warnings will still appear on the ECAM display and the KRUGER annunciator light on the slat/flap position indicator, but these will automatically clear when the surfaces resume their selected position on hydraulic system pressurization.
The changeover from the "low pressure" to "high pressure" signal of the pressure switch 19CB will be delayed 30 s by means of the time delay relay 44CV. This is so that when the Krueger flap gets a hydraulic supply, it has time to move to its selected position before the SFCC detect an "out off position" fault.

4. Component Description

A. Slat Flap Position Indicator (5CN)
The slat flap position indicator is described in 27-55-00 and 27-85-00.
The amber KRUGER annunciator light comes on when either SFCC detects a Krueger flap position fault.

B. Slat Flap Control Computers (21CV, 22CV)
The SFCC are described in 27-51-00.

C. Krueger Extended Position Switches (46CV-A, 47CV-A)
(1)The Krueger extended position switches are non-latching microswitches; one position switch is located on the control rod support in each



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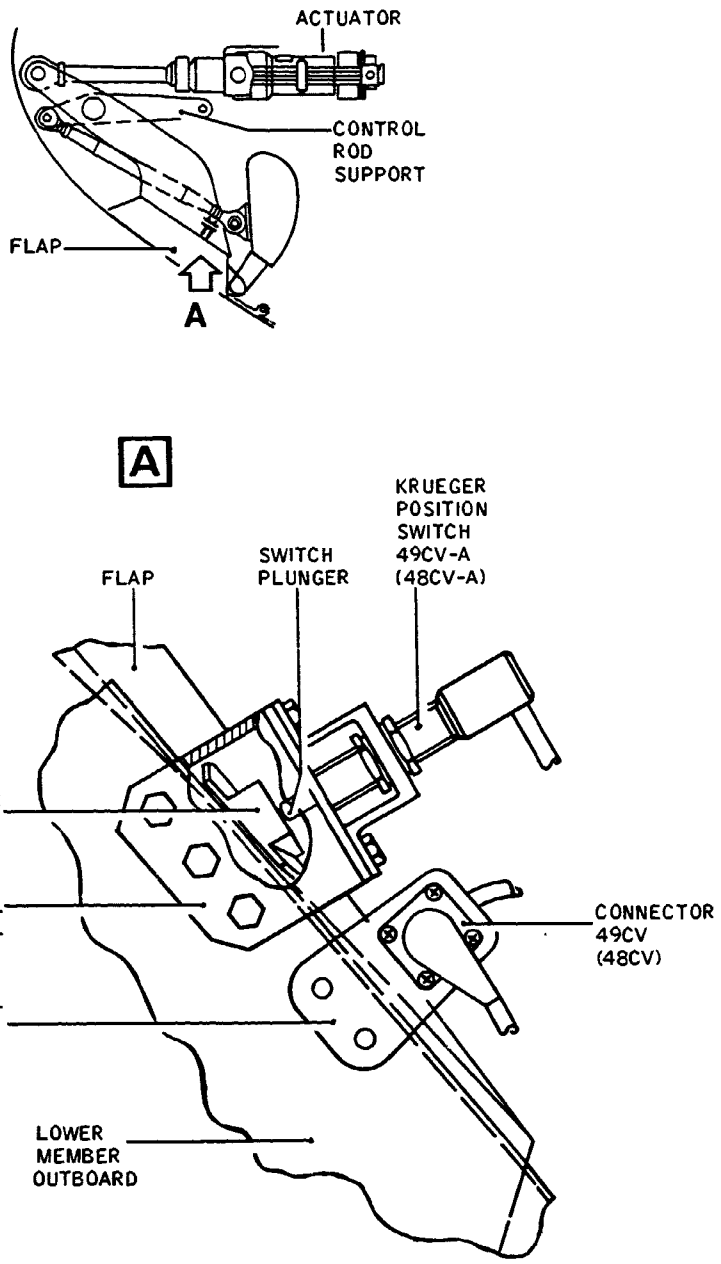
Krueger Position Switches - Extend
Figure 002



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Krueger Position Switches - Retract
Figure 003

Krueger flap installation.
(2)As the Krueger flap reaches the fully extended position, the hinge arm actuates the position switch.

D. Krueger Retracted Position Switches (48CV-A, 49CV-A)
(1)The Krueger retracted position switches are non-latching microswitches; one position switch is located on the lower member outboard in each Krueger flap installation.
(2)As the Krueger flap reaches the fully retracted position, the striker plate attached to the flap inner surface actuates the position switch.

E. Bite Display Maintenance Annunciator
The Bite Display annunciators are described in 27-51-00. If a fault is detected in the Krueger flap operating system which requires maintenance crew awareness, the **BITE DISPLAY** is set to **ON** by the SFCC slat channel.

5. Operation
(Ref. Fig. 004)
A. The Krueger extended and retracted position switches are actuated when the Krueger flap surfaces reach the limit-of-travel in the associated direction (e.g. the LH Krueger extend position switch is actuated when the Krueger flap in the left wing is in the fully "out" position).

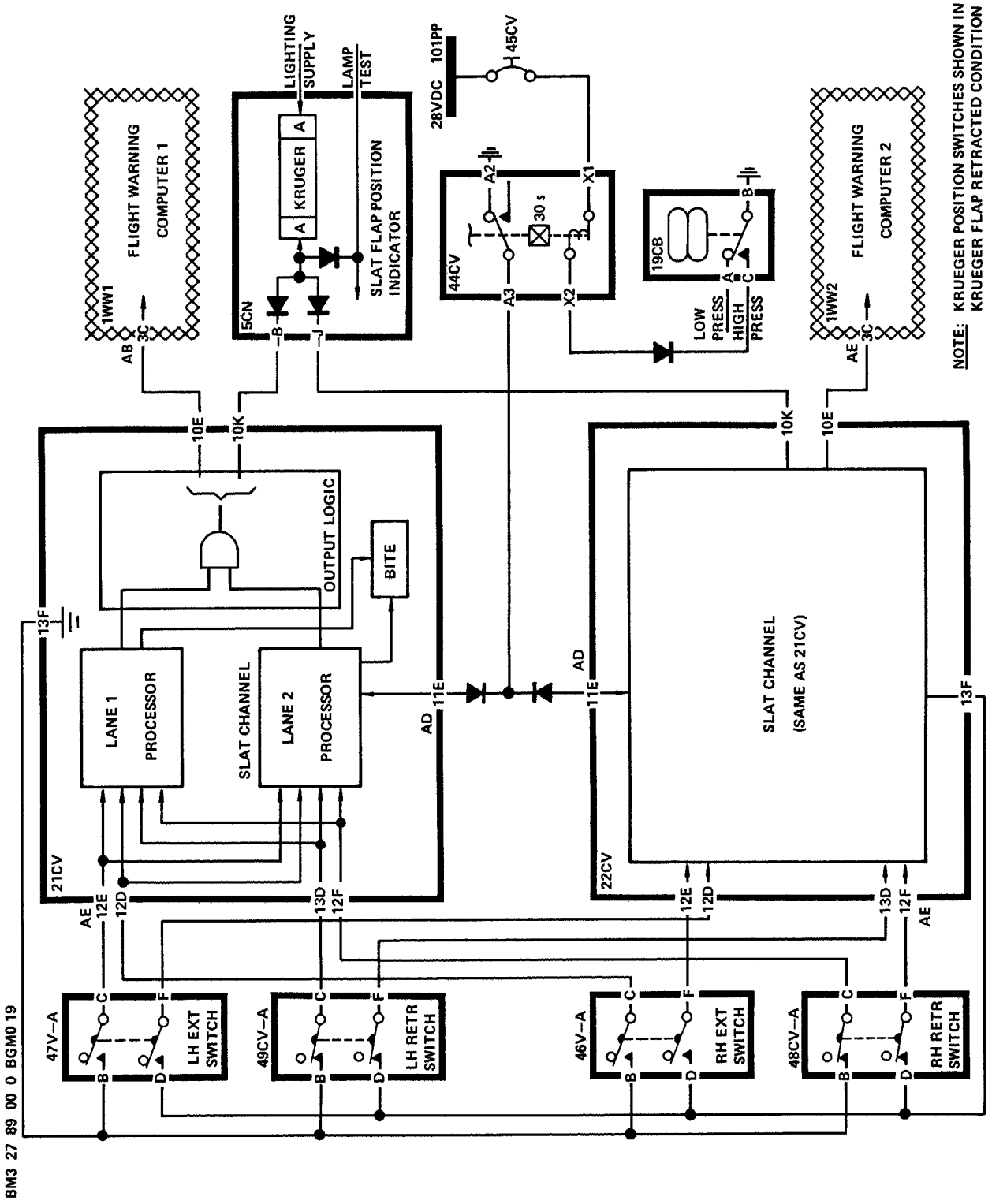
B. Each position switch has a dedicated input to SFCC1 and 2 slat channels. The inputs are fed to lane processors 1 and 2, after suitable interfacing.

C. The position inputs are used by the lane processors to:
(1)Generate a "Krueger fault" indication discrete. The discrete is produced by the SFCC output logic if both lane processors in the SFCC detect incorrect position switch inputs.
(2)Generate a "Krueger not in positon selected" warning discrete. This discrete is produced in a similar manner to the "Krueger fault" indication discrete.

D. The "Krueger fault" indication discretes from both SFCC are applied to the amber **KRUGER** annunciator light in the slat flap position indicator via **OR** logic. Thus if either SFCC produces a "Krueger fault" discrete, the **KRUGER** annunicator light is lit.

E. The "Krueger not in position selected" warning discretes from SFCC1 and 2 are fed to ECAM flight warning computers 1 and 2, respectively.

F. The lane processors also interface with the SFCC **BITE** circuits which, when enabled, cause the following indications:
(1)The associated fault indication code ("LH extend switch", "RH extend switch", "LH retract switch" or "RH retract switch") is set on the SFCC front panel.
(2)The **BITE DISPLAY** maintenance indicators come on.
(3)The **KRUEGER** annunciator light on the slat/flap position indicator comes on.



Position Indicating - Schematic Diagram
Figure 004

KRUEGER FLAP POSITION INDICATING - INSPECTION/CHECK

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

To make sure that the Krueger flap position indicating mechanism and the switches are in a good condition.

2. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform, 3.5 m (11.5 ft.)
R	B. 98A27503003000	Guard-Safety, Flap/Slat Ctl Lever
	C.	Circuit Breaker Safety Clips and Tags
	D.	Warning Notice Prohibiting Pressurization of Hydraulic Systems
	Referenced Procedure - 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)

3. Procedure

A. Job Set-Up

WARNING : MAKE CERTAIN THAT CONTROL SURFACE TRAVEL RANGES ARE CLEAR.

(1) Extend slats (15°) and Krueger flaps (Ref. 27-80-00, P. Block 301).

R (2) Install safety guard PN 98A27503003000 on flap/slat control lever quadrant.

(3) Depressurize Green hydraulic system (Ref. 29-10-00, P. Block 301).

(4) Display warning notices prohibiting pressurization of Green hydraulic system:
- on HYD PWR panel 427VU in flight compartment
- on hydraulic ground connectors.

(5) Open, safety and tag the following circuit breaker:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/KRUGER	45CV	333/T61

(6)Position access platform.
(7)Open access panels 513ML and 613MR.

B. Inspection of the Krueger Flap Position Indication Mechanism and Switches

(1)Visually inspect the Krueger flap position indication mechanism and make certain that there is no corrosion, cracks or other damage.
(2)Make certain that all nuts and bolts at actuating mechanism and switch support brackets are properly tightened.
(3)Visually inspect the Krueger flap position switches for proper attachment and make certain that there is no corrosion or any other damage.
(4)Make certain that the electrical wiring is in a good condition and that all connectors and cable clamps are properly attached.

C. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access panels 513ML and 613MR.
(3)Remove access platform.
(4)Remove warning notices.
(5)Remove safety clip and tag and close circuit breaker 45CV.
R (6)Remove safety guard PN 98A27503003000 from flap/slat control lever quadrant.
(7)Fully retract slats and Krueger flaps (Ref. 27-80-00, P. Block 301).

POSITION SWITCH - KRUEGER EXTEND - REMOVAL/INSTALLATION

WARNING : LANDING GEAR - MAKE CERTAIN GROUND SAFETIES AND CHOCKS ARE IN POSITION.

FLIGHT CONTROL SURFACES - MAKE CERTAIN TRAVEL RANGE IS CLEAR.

HYDRAULICS - BEFORE PRESSURIZING MAKE CERTAIN CONTROLS MATCH SURFACE POSITION.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft)
B.	Circuit Breaker Safety Clips and Tags
C.	Warning Notice Prohibiting the Use of Slats/ Flaps Systems
D.	Lockwire - Corrosion Resistant Steel Dia. 0.8 mm (0.032 in).
E.	Blanking Caps/Plugs

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting
- 29-10-00, P. Block 301	Main Hydraulic Power

2. Procedure

A. Job Set-Up
(1)Extend Slats and Krueger Flaps (Ref. 27-80-00, P. Block 301).
(2)Display warning notice.
(3)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC/LAND RECOVERY SUPPLY/SLATS SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS SYS 1	7CV	333/T63
133VU	FLT CTL/SLATS/26VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/FLAPS & SLATS POS IND	1CN	334/S66

(5)Position access platform.

B. Removal

(Ref. Fig. 401)

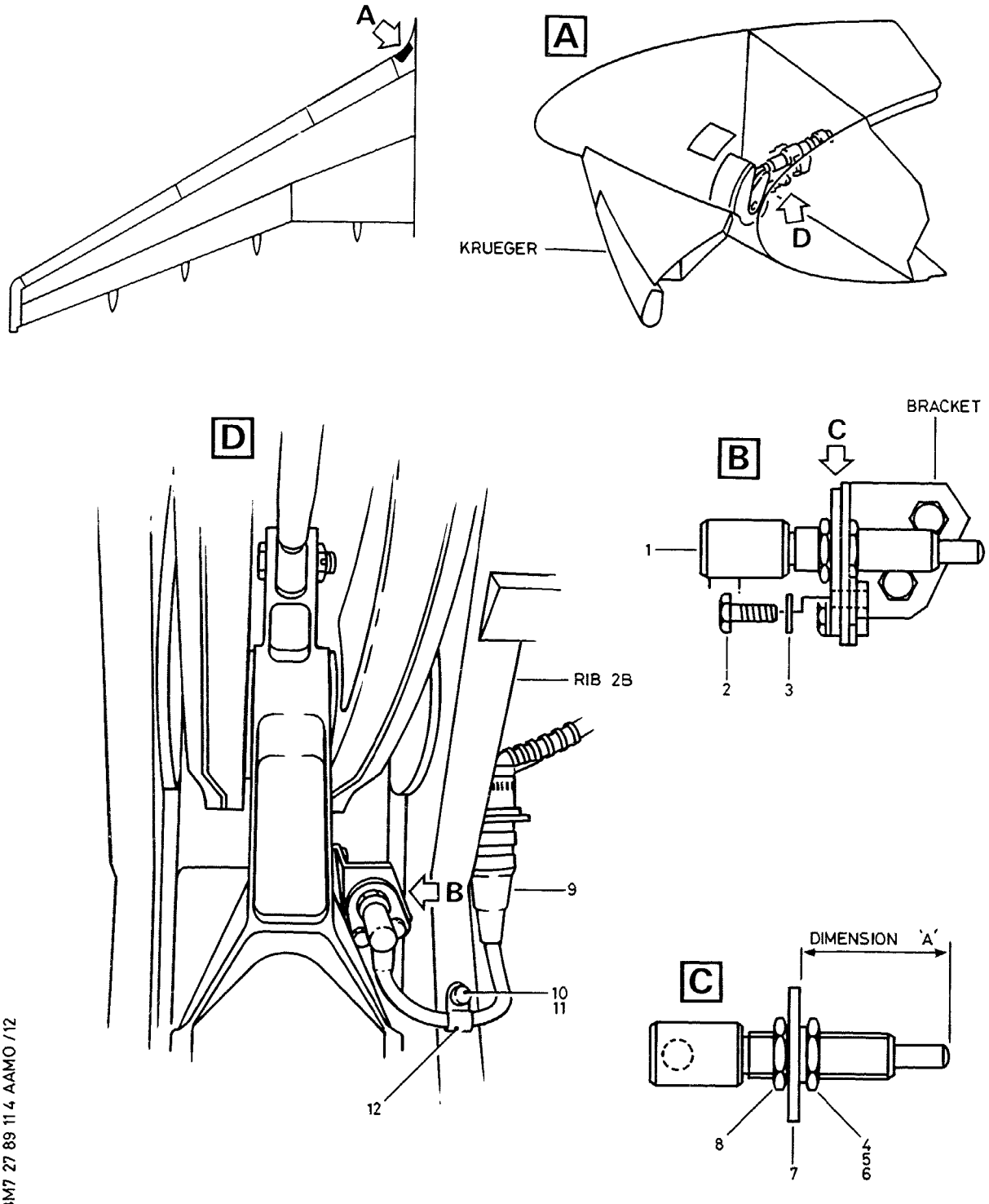
(1)Disconnect and cap electrical connector (9).
(2)Remove bolt (10), washer (11) and clip (12).
(3)Remove bolts (2), washers (3) and switch (1) complete with support (7) from bracket.
(4)Measure and record dimension 'A'.
(5)Cut and remove lockwire and remove nut (4) lock washer (5) and locking ring (6).

NOTE : Retain lock washer and locking ring if existing switch is to be installed.

C. Preparation of Replacement Component
(1)Remove nut (4) lock washer (5) and locking ring (6) from switch (1).
(2)Install switch (1) in support (7) with locking ring (6) lock washer (5) and nut (4). Do not tighten nut (4) at this stage.
(3)Adjust nuts (4 and 8) to obtain dimension 'A' as recorded in step 2. B (4). Position tag of locking ring (6) in support (7). Tighten nuts (4 and 8) and safety together with lockwire.

D. Installation
(1)Locate switch (1) and support (7) and secure to bracket with washers (3) and bolts (2).
(2)Remove cap, check electrical connector for correct condition and connect electrical connector (9).
(3)Position clip (12) and secure with washer (11) and bolt (10).

E. Preparation for Test
(1)On panel 133VU, remove safety clip and tag and close circuit breaker 45CV on line 333.
(2)Energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Pressurize GREEN hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Retract and extend Kruger Flaps (Ref. 27-80-00, P. Block 301).
(5)On panel 4VU, if after 10 seconds delay KRUGER amber warning light stays off, proceed to step (7). If after 10 seconds delay KRUGER amber warning light comes on, carry out steps (a) thru (d).
(a)Remove and discard lockwire and adjust nuts (4 and 8) to increase dimension 'A' by 1 mm (0.039 in).
(b)Retract and extend Kruger flaps (Ref. 27-80-00, P. Block 301)
(c)On panel 4VU, if after 10 seconds delay KRUGER amber warning light comes on, repeat steps (a) and (b) until warning light stays off.
(d)Adjust nuts (4 and 8) to increase dimension 'A' by a further 3 mm (0.118 in) and safety together with lockwire. Proceed with step (6).
(6)On panel 4VU, if after 10 seconds delay KRUGER amber warning light stays off retract and extend Kruger flaps (Ref. 27-80-00, P. Block 301)
(7)On panel 133VU, remove safety clips and tags and close circuit breakers 3CV, 4CV, 7CV, 8CV, 9CV and 1CN.
(8)On panel 428VU, make certain that SLAT SYS 1, SYS 2 FAULT annunciators



Position Switch - Installation
Figure 401

are off.

(9) Open access door 121BL and press RESET switch on front panel of SFCC 1 and SFCC 2. After five seconds make certain no KRUGER or SLAT fault codes are indicated.

(10) Remove warning notice.

F. Test

(1) Perform the following test:

ACTION	RESULT
1. On panel 436VU: - place ANN LT switch in TEST position	On panel 4VU: - KRUGER amber warning light comes on
- place ANN LT switch in OFF position	- KRUGER amber warning light goes off
2. On panel 133VU: - open KRUGER circuit breaker 45CV	
3. On panel 9VU: - place FLAPS/SLATS control lever in gate 1 position	- slats retract On panel 4VU: - after 10s delay, KRUGER amber warning light comes on
4. On panel 133VU: - close KRUGER circuit breaker 45CV	- Krueger flap retracts On panel 4VU: - KRUGER amber warning light goes off
5. On panel 133VU: - open KRUGER circuit breaker 45CV	
6. On panel 9VU: - place FLAPS/SLATS lever in gate 5 position	- slats extend On panel 4VU: - after 10 seconds delay, KRUGER amber warning light comes on
7. On panel 133VU: - close KRUGER circuit breaker 45CV	- Kruger flap extends On panel 4VU: - KRUGER amber warning light goes off
8. On panel 9VU:	

ACTION	RESULT
- place **FLAPS/SLATS** lever in gate 1 position	- slats and Kruger flaps retract On panel 4VU: - **KRUGER** amber warning light does not come on

Check fault indications as in 2. E (5) thru (6), but do not operate SFCC 1 and SFCC 2 **RESET** switches again.

G. Close-Up

(1) On maintenance panel 472VU, set **ANN LT** switch to **READ**.
(2) On panel 471VU, if SFCC 1 or SFCC 2 **BITE DISPLAY** annunciator(s) come on, press **MFA RESET** pushbutton on panel 472VU and make certain annunciator(s) go out.
(3) On panel 472VU, set **ANN LT** switch to **OFF**.
(4) Depressurize **GREEN** hydraulic system (Ref. 29-10-00, P. Block 301).
(5) De-energize aircraft electrical network (Ref. 24-41-00, P. Block 301)
(6) Close access door 121BL.
(7) Remove access platform.

R WARNING : LANDING GEAR - MAKE SURE THAT THE GROUND SAFETIES AND THE CHOCKS ARE
R IN POSITION.

R HYDRAULICS - BEFORE YOU PRESSURIZE THE SYSTEM, MAKE SURE THAT THE
R CONTROL SURFACE POSITIONS AND THE FLIGHT CONTROL POSITIONS ARE THE
R SAME.

R MAKE SURE THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR
R BEFORE YOU PRESSURIZE/DE-PRESSURIZE A HYDRAULIC SYSTEM.

R MAKE SURE THAT YOU ISOLATE THE ELECTRICAL CIRCUITS UPON WHICH WORK IS
R IN PROGRESS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notice Prohibiting the Use of Slats/ Flaps Systems
B.	Access platform 4 m (13 ft)
C.	Circuit Breaker Safety Clips and Tags
D. Material No. 05-005	Special Materials (Ref. 20-31-00)
E.	Lockwire - Corrosion Resistant Steel Dia.0.8mm (0.32in).
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 29-10-00, P. Block 301	Main Hydraulic Power

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Extend Slats and Krueger Flaps (Ref. 27-80-00, P. Block 301).
(2)Display warning notice.
(3)Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC/SYS 2	4CV	335/R64
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS SYS 2	8CV	333/T64
133VU	FLT CTL/SFCC LAND RECOVERY SUPPLY/SLATS SYS 2	9CV	335/R66
133VU	FLT CTL/SFCC NORM SUPPLY/SLATS SYS 1	7CV	333/T63
133VU	FLT CTL/SLATS/26V AC/SYS 1	3CV	335/R65
133VU	FLT CTL/KRUGER	45CV	333/T61
133VU	FLT CTL/FLAPS/SYS 2/26V AC	2CV	334/S62
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS SYS 2	6CV	331/V61
133VU	FLT CTL/SFCC NORM SUPPLY/FLAPS SYS 1	5CV	332/U61

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SFCC LAND RECOVERY SUPPLY/FLAPS SYS 1	10CV	335/R67
133VU	FLT CTL/FLAPS SYS 1/26V AC	1CV	335/R61
133VU	FLT CTL/FLAPS & SLATS POS/ECAM	2CN	334/S65
133VU	FLT CTL.FLAPS & SLATS POS/IND	1CN	334/S66

(5)Position access platform.

B. Removal
(1)Disconnect the electrical connector (1) and install a cap.
(2)Remove the nuts (2) and the bolts (4). Remove the switch assembly (5).

C. Preparation of the Replacement Component
(1)Not applicable.

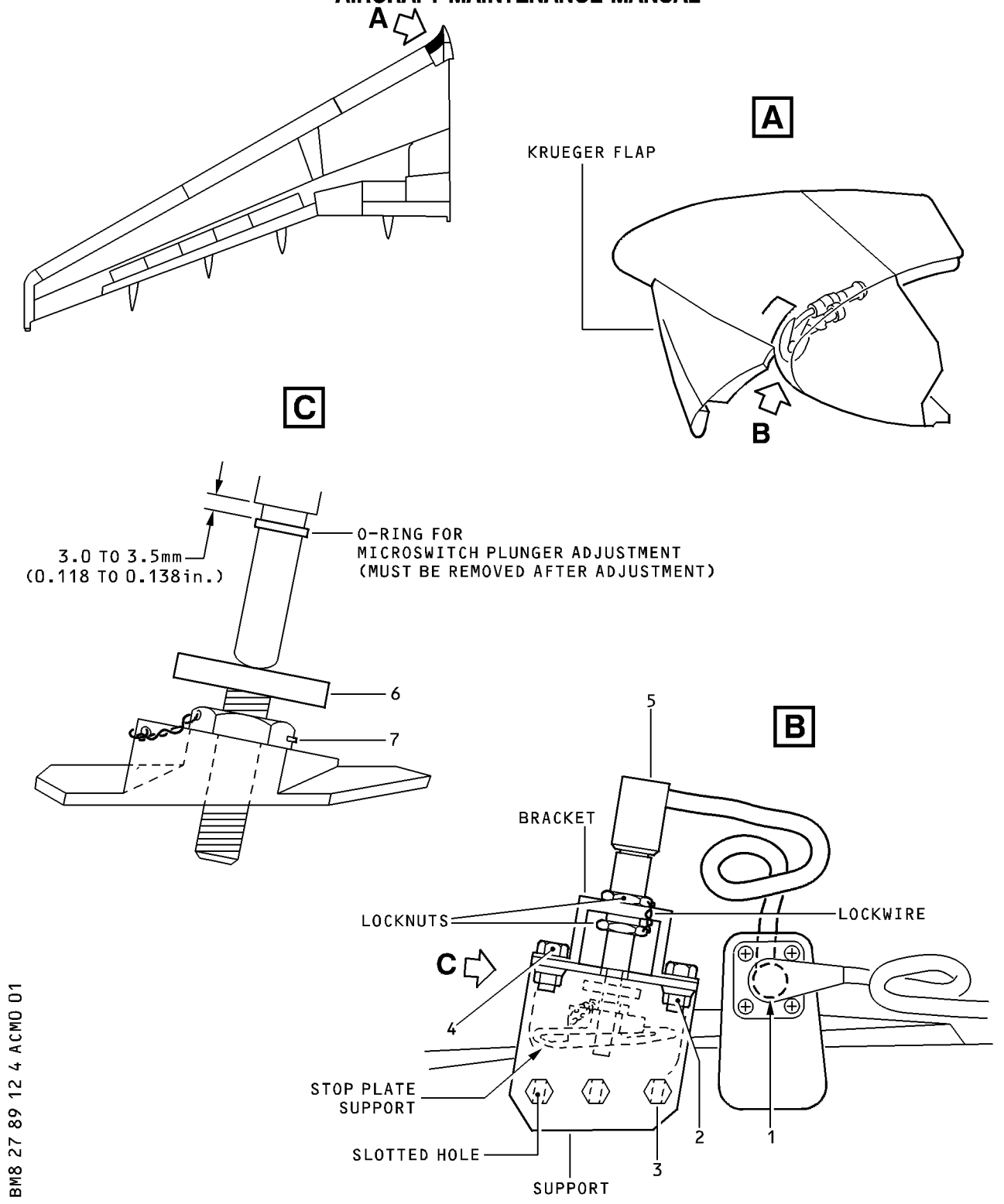
NOTE : The switch is supplied installed on the bracket with the locknuts adjusted and safetied with lockwire.

D. Installation

CAUTION : DO NOT INSTALL THE SWITCH ASSEMBLY IF THE LOCKWIRE ON THE LOCKNUTS IS BROKEN OR HAS BEEN MOVED.

(1)Put the switch assembly (5) in position on the support. Install the bolts (4) and the nuts (2).
(2)Remove the cap and examine the electrical connector (1) for correct condition. Connect the electrical connector.

E. Preparation for Test
(1)On the circuit breaker panel 133VU, remove the safety clip and tag and close the circuit breaker 45CV (333/T61).
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Pressurize the GREEN hydraulic system (Ref. 29-10-00, P. Block 301).
(4)Retract the krueger flaps (Ref. 27-80-00, P. Block 301).
(5)On panel 4VU:
R - if the KRUGER amber warning light stays off, continue from step (f)
R - if the KRUGER amber warning light comes on after a 10s delay,
R continue from step (a).
(a)Extend the krueger flaps (Ref. 27-80-00, P. Block 301).
(b)Cut and remove the lockwire and loosen the nut (7). Discard the lockwire.
(c)Turn the stop plate (6) half a turn towards the microswitch plunger and retract the krueger flaps (Ref. 27-80-00, P. Block 301).
(d)On panel 4VU:
- if the KRUGER amber warning light stays off, continue from step (f)
- if the KRUGER amber warning light comes on after a 10s delay, continue from step 1
1 Extend the krueger flaps (Ref. 27-80-00, P. Block 301).
2 Do steps (c) and (d) until the KRUGER amber warning light stays off.



Position Switch - Installation
Figure 401

R

3 If the KRUGER amber warning light still comes on after the stop
R plate (6) has reached its full adjustment, continue from step (e).
(e)Extend the krueger flaps (Ref. 27-80-00, P. Block 301) and do steps
1 thru 3.
R 1 If the nut (7) is safetied with wire, do step (b). Adjust the stop
R plate (6) to get the maximum distance from the microswitch plunger.
2 Loosen the bolts (3) and adjust the stop plate support fully in the
direction of the microswitch plunger. Tighten the bolts (3).
R 3 Do the steps (c) and (d) again.
(f)Extend the krueger flaps (Ref. 27-80-00, P. Block 301).
R (6)Do the steps that follow to make sure that the microswitch plunger
R contacts the center of the stop plate (6):
R (a)Put a suitable marking material on the end of the microswitch plunger.

R NOTE : Use a marking material, such as paint or engineering blue, that
R will make a mark on the stop plate (6) when the microswitch
R plunger contacts the stop plate (6).

R (b)Retract and extend the krueger flaps (Ref. 27-80-00, P. Block 301).
R (c)Check the position of the contact mark made by the marking material
R transferred from the microswitch plunger to the stop plate (6):
R - if the mark is not in the center of the stop plate (6), loosen the
R screws (3), adjust the position of the support switch bracket,
R tighten the screws (3) then do steps (a) thru (c) again,
R - when the mark is in the center of the stop plate (6), remove all
R traces of the marking material and continue with step (7).
R (7)Do the steps that follow to make sure that the microswitch plunger is
R compressed within the range 3.0 to 3.5 mm (0.118 to 0.138 in) when the
R plunger contacts the stop plate (6):
R (a)Put a suitable O-ring on the microswitch plunger and push the O-ring
R against the body of the microswitch.

R NOTE : The O-ring will move down the microswitch plunger when the
R krueger flaps are extended and the gap between the O-ring and
R the body of the microswitch will show the length of plunger
R compression. The O-ring must be removed from the microswitch
R plunger after the correct measurement has been made.

R (b)Retract and extend the krueger flaps (Ref. 27-80-00, P. Block 301).
R (c)Measure the distance between the O-ring and the body of the
R microswitch.
R - if the distance is not between 3.0 and 3.5 mm (0.118 to 0.138 in)
R loosen the nut (7), turn the stop plate (6) as necessary then do
R steps (a) and (b) again,
R - when the distance is between 3.0 and 3.5 mm (0.118 to 0.138 in),
R remove the O-ring from the microswitch plunger and continue with
R step (8).
R (8)Tighten the nut (7) and safety with lockwire.
R (9)On the circuit breaker panel 133VU, remove the safety clips and tags and
close the circuit breakers 4CV (335/R64), 8CV (333/T64), 9CV (335/R66),
7CV (333/T63), 3CV (335/R65), 2CV (334/S62), 6CV (331/V61),

5CV (332/U61), 10CV (335/R67), 1CV (335/R61), 2CN (334/S65) and 1CN (334/S66).

R (10) On panel 428VU, make sure that the annunciators SLATS SYS 1 FAULT and SLATS SYS 2 FAULT are off.

R (11) Open the access door 121BL, and push the RESET switch on the front panel of SFCC1 and SFCC2. After 5 seconds, make sure that no SLAT or KRUGER fault codes show.

R (12) Remove the warning notice.

F. Test

R (1) Do the test that follows:

ACTION	RESULT
1. On panel 436VU: - place ANN LT switch in TEST position	On panel 4VU: - KRUGER amber warning light comes on
- place ANN LT switch in OFF position	- KRUGER amber warning light goes off
2. On panel 133VU: - open KRUGER circuit breaker 45CV (333/T61)	
3. On panel 9VU: - place FLAPS/SLATS control lever in gate 1 position	- slats retract On panel 4VU: - after 10s delay, KRUGER amber warning light comes on
4. On panel 133VU: - close KRUGER circuit breaker 45CV (333/T61)	- Krueger flap retracts On panel 4VU: - KRUGER amber warning light goes off
5. On panel 133VU: - open KRUGER circuit breaker 45CV (333/T61)	
6. On panel 9VU: - place FLAPS/SLATS lever in gate 5 position	- slats extend On panel 4VU: - after 10s delay, KRUGER amber warning light comes on
7. On panel 133VU: - close KRUGER circuit breaker 45CV (333/T61)	- Krueger flap extends On panel 4VU: - KRUGER amber warning light goes

ACTION	RESULT
	off
8. On panel 9VU: - place FLAPS/SLATS lever in gate 1 position	- Slats and Krueger flaps retract, On panel 4VU: - KRUGER amber warning light does not come on
9. Make a check of the fault indications as in 2.E. steps (9) and (10) but do not operate SFCC1 and SFCC2 RESET switches again.	

G. Close-Up

(1) On Maintenance Panel 472VU, set ANN LT to switch READ.

(2) On panel 471VU, if SFCC1 or SFCC2 BITE DISPLAY annunciator(s) come
R on, press MFA RESET pushbutton on panel 472VU and make sure that the annunciator(s) go out.

(3) On panel 472VU, set ANN LT switch to OFF.

(4) Depressurize hydraulic system (Ref. 29-10-00, P. Block 301).

(5) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(6) Close the access door 121BL.

(7) Remove the access platform.